Gamblers as Personal Finance Activists

Geng Li*

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Abstract

This paper addresses the following questions: Why and when do people gamble? Do gamblers have different preferential traits? How do such traits affect their personal finance? We find that consumers are more likely to gamble when income is higher than normal levels. Moreover, gamblers have higher saving rates, higher other expenditures notwithstanding. Also, gamblers assume more active balance-sheet positions but do not have a higher net worth. They are also more likely to engage in health-wise risky behaviors but simultaneously pay out-of-pocket for life and health insurance. We argue that active participants in personal finance markets are more likely to gamble, viewing gambling as an entertainment. These results suggest that gambling behavior is an informative indicator of difficult-to-observe consumer preferential heterogeneity.

Keywords: Gambling, Consumption expenditure, Household balance sheet, Insurance, Unobserved heterogeneity, Charitable giving.

JEL Classification: D12, D14, D81, E21, G02

1 Introduction

More than 50 percent of all consumers gamble in a given year in the U.S., and the national gambling revenues totaled nearly $100 billion in recent years. Despite a voluminous literature on the subject, there is little consensus on why people gamble. Even less is known about how gambling costs fit into a household budget, whether these costs crowd out other expenditures, and whether gamblers manage their balance sheets and other non-financial risks in a way different from other consumers. Answers to these questions not only help us understand the motivation and welfare implication of gambling, but also shed light on important difficult-to-observe consumer heterogeneity related to household saving behaviors, financial market participation, and risk management.

This paper presents—to the best of our knowledge—the first comprehensive study of gamblers' consumption, income, and personal finances using a nationwide representative sample. Specifically, we address the following questions: Why and when do people gamble? Do gamblers have preferential traits that are intrinsically different from those of other consumers, and how do such traits affect their personal finance? Our results suggest that most gamblers perceive gambling as a form of pastime, the spending on which is discretionary and does not necessarily crowd out other expenditures. The most novel finding of the paper is that consumers with certain traits are indeed more likely to engage in gambling. We interpret such traits, as evidenced in gamblers' balance sheets and risk management, as a "personal finance activism" that induces a consumer to more actively participate in financial markets.

Interestingly, though widely recommended by textbooks and financial advisors, active participation in financial markets does not guarantee higher wealth. We find that gamblers' net worth is almost identical to that of nongamblers, who, on average, are more averse to participating in financial markets. On balance, our results show that gamblers are best characterized as "personal finance activists," but not necessarily "personal finance experts."

Better understanding on household heterogeneity regarding participation in financial markets has both important theoretical and policy implications. It has long been recognized that consumers have different willingness to participate in financial markets. For example, it is well documented that stock market participation rates are fairly low despite its attractive long-run returns.[1] More recently, Amromin, Huang, and Sialm (2007) argue that many households have a "debt-averting" attitude and are reluctant to be either borrowers or lenders. Our results show that gamblers are markedly different from such consumers. Thus, gambling behaviors can serve as an informative indicator for willingness to participate in financial market, which is generally difficult to observe ex ante. From a policymaking point of view, because many government-sponsored programs for improving household welfare and financial positions are incentive-based, these programs would have little effects on the consumer who have only limited market participation and do not make active personal finance decisions (see, for example, Chetty et al, 2012).

This paper also complements a growing literature that studies specifically how gambling activities are related to investment strategies in the stock market. For example, Kumar (2009) shows that investors with a higher estimated propensity of gambling are also more likely to invest in lottery-like stocks. We contribute to this literature by presenting evidence on how directly observed—instead of probabilistically inferred—gambling behaviors are related to a broader range of individuals' financial activities in and out of the stock market.

Moreover, existing studies on gambling's welfare consequences typically focus on the so-called pathological gamblers, who represent only one percent of all gamblers in a given year, largely leaving the majority rank-and-file gamblers out of the scope of research (e.g., National Gambling Impact Study Commission, 1999, Treasury, 1999, and National Opinion Research Center, 2006). Further, most of these studies lack information on household expenditures and balance sheets that is critical to evaluate gamblings economic consequences.

[1]See, for example, Mankiw and Zeldes (1991), Vissing-Jorgesen (2002), and Gomes and Michaelides (2005).

This paper fills this important void in this literature.

We use the Consumer Expenditure Survey data, which began collecting gambling information from 2001. We first document that higher gambling expenditures are associated with higher expenditures in a wide array of discretionary spending categories, instead of crowding them out. We further show that gamblers' annual income is on average seven percent higher than its long run "normal" level predicted by observed demographic and socioeconomic characteristics. As a result, despite the gambling costs incurred and higher other household expenditures, gamblers have a higher active saving rate. These results are consistent with the notion that typical gamblers treat gambling activities as consumption, for which they budget along with other household expenditures. Notably, we also find evidence suggesting that some gamblers appear to perceive buying state lottery tickets as a way of making charitable donations.

To explore what gambling activities may inform us on a broader range of consumer behaviors, we subsequently contrast gamblers' balance sheets to those of other consumers. We find that, relative to nongamblers with the same observable characteristics, gamblers are more active borrowers and investors. As borrowers, gamblers are more likely to have credit card debt, mortgages, and car loans. Gamblers also manage their debt more actively in that a greater share of gambler mortgagors have refinanced their mortgages. As investors, gamblers are more likely to invest in financial securities and to own a second home.

Expanding the scope of our research beyond financial behaviors, we then document that gamblers have a higher propensity to engage in health-wise risky behaviors, such as heavy drinking and smoking. Surprisingly perhaps, gamblers are more likely to pay out-of-pocket for health and life insurance than nongamblers, a fortiori the assertion made by Friedman and Savage (1948) that many people buy both lotteries and insurance. Further demonstrating gamblers' active behaviors in personal finance markets, we find that while health-wise risky behaviors per se do not predict insurance purchases of all consumers, such behaviors of gamblers do.

Instead of the activism traits, one prominent alternative explanation for the differences between gamblers and nongamblers presented in this paper is that some survey participants report more complete information, including their gambling activities, to the survey. Should this be true, it is then not surprising that the survey participants who gamble also appear to be more active in many other aspects of their personal finances. To address this concern, a methodologically innovative step, we take advantage of the paradata recently released by the Consumer Expenditure Survey and present extensive reassuring evidence that various degrees of carefulness in survey reporting are not the main factor responsible for our findings.

The paper proceeds as follows: Section 2 presents a conceptual framework of our study; Section 3 describes the data and discusses their pros and cons; Section 4 and 5 study gamblers' expenditures and balance sheets, respectively; Section 6 studies health-wise risky behaviors and insurance purchases; Section 7 examines the alternative hypothesis of various carefulness in survey reporting; and Section 8 concludes.

2 Conceptual Framework

Gamblers are some of the most intriguing research subjects for consumer behavior. At the heart of the question of why people gamble is whether people perceive gambling as an investment with lousy average returns or a good, consuming which one can derive some utility. Because most games of chance are designed to have negative expected payoffs, for its merit as an investment vehicle, it has been widely argued that gambling behaviors are inconsistent with the standard expected utility theory.[2] A celebrated model that attempts to provide an explanation for gambling behaviors within the expected utility framework is due to Friedman and Savage (1948), who postulate utility functions that are not globally concave. The theoretical and empirical validity of this model has been frequently challenged in subsequent research (for example, Bailey, Olson, and Wonnacott, 1980). Even studies

[2]See Machina (1987) and Sauer (1998) for a survey.

favoring Friedman and Savage's ideas note the model's difficulty in explaining repeated gambling (Hartley and Farrell, 2002).

An alternative explanation for why people gamble is that gamblers derive some utility from playing games of chance. Such a theory has enjoyed support from extensive anecdotal evidence (for example, Bailey, Olson, and Wonnacott, 1980) and was formalized in Conlisk (1993). We build on the notion that gambling offers some utility as entertainment by providing a systematic analysis of gamblers' consumption using a nationwide representative household survey. To begin with, we examine whether gambling games are, on net, a complement or substitute good for the rest of the household consumption basket. Specifically, we examine the correlations between expenditures on gambling and a broad range of other categories, controlling for observable consumer characteristics. We then seek evidence speaking to whether gambling expenditures are compulsive, in which case higher spending on gambling reduces savings. We further explore the key factors that influence gambling behaviors. In addition to demographic characteristics, we highlight that income shocks—measured as the gaps between the observed current income and the imputed permanent income—have significant predictive power on whether a consumer gambled in a given year.

A prominent challenge this alternative theory faces is why, if gambling is a consumption good, all consumers do not gamble. Imposing preferential heterogeneity among consumers to explain different gambling propensity, though convenient, is not satisfactory unless we can find the footprints of such preferential heterogeneities in other aspects of consumer behaviors, which have been indeed largely absent from the the existing literature. We address such critiques by contrasting gamblers with other consumers in a rich context of household economic behaviors to identify a common theme of the behaviors of gamblers. Specifically, we test whether, with respect to a broad array of personal finance and risk management activities, gamblers act in a way that is consistently different from other consumers and whether such behavioral differences are conceptually consistent with gambling motivations.

3 Data Description and Summary Statistics

3.1 Overview of the Gambling Cost Data in the Consumer Expenditure Survey

Household surveys that collect detailed expenditure and balance sheet data and gambler identify information have been historically lacking. An addition to the survey instruments in the Consumer Expenditure Survey (CE) in 2001 substantially expanded the scope of possible research on gamblers' consumption and financial behaviors. The CE is a nationwide representative survey conducted by the Bureau of Labor Statistics.[3] Although the primary purpose of the CE is to facilitate the construction of the Consumer Price Index, the household level data of the CE have been used extensively in economic research. The CE interviews each participating household quarterly four times, collecting detailed data on the consumption expenditures incurred during the three months prior to the interview. The first and the last interviews collect data on income earned during the respective twelve months prior to that interview.[4] The last interview also collects information about household financial assets. After the last interview, existing households leave the sample and new households are selected to replenish the sample. Consequently, the CE provides a short panel of four quarters for each household completing all interviews, a useful structure that this paper will exploit.

Beginning in the second quarter of the 2001, CE added a question about gambling costs—"*in the last 3 months have you (or any members of your CU) had expenses for lotteries and games of chance*"—thereby allowing us to identify the consumers who gambled in a given quarter and how much they spent on gambling.[5] We define gamblers as the

[3]The CE includes two independent components—an Interview Survey and a Diary Survey. We will use the former because the latter does not have balance sheet information and only covers a short period of time (two weeks) for each household.

[4]Three months before the first interview, CE conducts a preliminary interview to collect information on demographic and family characteristics and on the consumer unit's inventory of major durable goods.

[5]Section 19-A in the CE questionnaire. CU, or consumer unit, is a CE terminology that is defined similar to a household in other surveys. Each spending category is assigned a Universal Classification Code (UCC) in the CE data and UCC 620926 is assigned to gambling costs. In a typical year, the CE data

households that reported positive costs on lotteries or other games of chance in any quarter during the survey year.[6] We further define frequent gamblers as those who reported positive gambling costs in all four interviews and had annual gambling costs above $40.[7]

Table 1 presents summary statistics of gambling prevalence and intensity among the households surveyed after 2001:Q2, having participated in all four interviews, and having reported valid income data in both the first and the last interview.[8] For this table, our sample includes the households whose heads were between 20 and 80 years old at the time of the survey. Of note, our summary statistics include consumers older than 65 who are subsequently excluded from the analysis of household consumption and balance sheet. We deflate all expenditure amounts to year 2000 dollars.

As the top line of the table shows, 29% of the households in our sample gambled during the year they were surveyed by the CE. 5.6% of the sample (about 20% of all gamblers) are frequent gamblers. Among gamblers, the mean and median annual gambling costs are $201 and $57 respectively, whereas the mean and median gambling-cost-to-income ratios are 0.35% and 0.13%, respectively. Frequent gamblers' average annual gambling cost (not shown) is about $500.

3.2 Measurement Errors

A prominent observation from table 1 is that, relative to other surveys, the CE understates the prevalence and intensity of gambling activities. For example, the Gambling Impact and Behavior Study (National Opinion Research Center (NORC), 1999) report that 63% of survey participants gambled in the previous year, more than double the share in the CE

include expenditure information on more than 500 unique UCCs. For detailed description of the UCC level CE expenditure data, see Bureau of Labor Statistics (2011).

[6]Because the CE is a survey of households instead of individuals, we refer to gambling households as gamblers throughout the paper. Failing to collect data at an individual level has implications on the data accuracy of gambling costs, which will be discussed in the following subsection.

[7]Most of the frequent gamblers, as we define here, are not the pathological gamblers that many gambling studies have focused on.

[8]We focus on the households that participated in all four interviews to study the prevalence of gambling within a year and the annual gambling costs in order to compare with statistics published in other sources.

sample. Using the same NORC survey, Kearney (2005) reports that the average annual spending on lotteries alone was more than $100 per adult, or more than $200 per gambling adult, in 1998. Because what is spent on state lotteries is only a fraction of total gambling costs and most households have more than one adult, the CE estimates of prevalence rate and annual gambling costs are significantly below those derived from the NORC survey. More recently, NORC conducted the 2006 California Problem Gambling Prevalence Survey. The survey reveals that 58% of the surveyed California residents gambled in 2005, losing an average of nearly $300—again much higher than the CE estimates.

Several factors may have contributed to these gaps in estimates. Most importantly, unlike the NORC 1998 and 2006 survey that focused on people's gambling behavior, the CE is a general purpose survey that collects information on all aspects of household expenditures. Consequently, the CE asks only one question on the total costs for all gambling activities. Respondents may find it more difficult to provide an estimate of total gambling cost than cost on each type of gambling activity, as gambling-focused surveys are designed. Moreover, the CE typically interviews one respondent from each household. Should the household member responding to the survey not be aware of the gambling costs of other family members, gambling prevalence and costs will be underreported at the household level. We see some suggestive evidence of such a potential bias. Arguably, one may expect the likelihood that at least one spouse in a married couple gambles is higher than the likelihood that a single individual gambles, which implies that gambling costs per couple will be higher than per individual. However, as shown in table 1, about 30% of married households reported positive annual gambling costs that average $199, strikingly close to those for single males and only moderately higher than single females.

Despite the substantial underreporting therein, we argue that the CE remains a useful, and likely unique, data source for studying gamblers' consumption and balance sheet for the following reasons. First, a key advantage of the CE is that the data show who the gamblers are. It is unlikely that people who did not gamble mistakenly or deliberately

reported positive gambling costs. Therefore, the measurement errors on gamblers' identity should be one-sided and bias the statistical inference in a predictable direction. Second, it is possible that the gamblers under-report their gambling costs. But it is less likely that they under-report to various extents in the four quarterly interviews they participate in. We will exploit the panel structure to further examine the effects of gambling costs on spending on other consumption categories. Third, as we will discuss below in Section 3.3, cross-state variations in gambling prevalence and average costs observed in the CE data are consistent with the presence of state lotteries, further reassuring the informational merit of the data.

To characterize how the measurement errors may bias our estimates, we assume the following relationship between the true gambling costs, GC^T and the reported gambling costs, GC^R.

$$GC^R = \mathbb{P} \times \kappa \times \ GC^T, \tag{1}$$

where $\kappa < 1$ is a constant and $\mathbb{P}$ is an indicator function that is equal to zero with probability $p(GC^T)$ and equal to one with probability $1 - p(GC^T)$, where $\frac{dp}{d\ GC^T} < 0$. Basically, we assume that the reported gambling costs are a constant fraction of the true gambling costs if the household reports a positive number. The likelihood of reporting a positive number is assumed to increase with the true gambling costs. Thus, when we estimate the relationship between gambling costs and other household expenditures, our point estimate can potentially be biased away from zero due to $\kappa < 1$. However, when gamblers are contrasted with other consumers in terms of their investment behaviors, balance sheets, and risk management, our point estimates will be biased towards zero, or towards finding no differences between gamblers and nongamblers, because a substantial fraction of gamblers are treated as nongamblers in our estimation.

3.3 Gambling Prevalence by Demographic and Socioeconomic Characteristics

Table 1 also shows how gambling prevalence varies across demographic and socioeconomic status. Because the CE is a household, instead of individual, survey, we take the household head's demographic and socioeconomic characteristics as those for the household. Consistent with earlier findings using surveys focusing on gambling behaviors (e.g. Clotfelter et al., 1999 and Kearney, 2005), the CE data indicate that people between 45 and 65 years old and those who have a high school diploma but no college degree are most likely to have gambled in a given year (33%). They are also more likely to be frequent gamblers (7%). As discussed above, married households in the CE sample have about the same propensity to gamble as single males, perhaps reflecting the possibility that the responding household member is unaware of other members' gambling activities. Moreover, 30% of non-Hispanic whites are gamblers, a share significantly higher than Hispanic and black households. Though gambling prevalence is somewhat lower among black households and high school dropouts, for such consumers who gamble at all, their average gambling costs are higher than those of white consumers and those with higher educational attainment. Retired households are more likely to be frequent gamblers than those who are working. They also have the highest average gambling costs, both in dollar values ($266) and as a ratio to income (0.75%). Notably, different from Mikesell (1994), we do not find gambling prevalence to be higher among unemployed people.

Throughout our sample period (2001-2010), several states did not have state lotteries.[9] As shown in the lower part of table 1, we find that gambling prevalence is significantly lower in these states (13%) than in other states (30%). Noticeably, conditional on being a gambler, the average gambling costs are similar regardless of whether the household lived in a state with or without state lotteries, suggesting that access to state lotteries affects

[9]These states are Alabama, Hawaii, Mississippi, Nevada, North Dakota, Oklahoma, Utah, and Wyoming.

prevalence but has little effect on the intensity of gambling. Furthermore, several states introduced state lotteries between 2001 and 2010 (South Carolina in 2002, Tennessee 2004, North Carolina 2004, and Arkansas 2009). We find that the gambling prevalence in these states increased significantly following the introduction of state lotteries, from 19% to 25%, reassuring the informational content of the CE gambling-related data.[10] Finally, we find that gambling prevalence declined somewhat during the Great Recession years. Average gambling prevalence was 29% between 2001 and 2007 and declined to 26% after 2008.[11]

4 Gambling Costs, Other Expenditures, and Income

Researchers have long been interested in how households finance their gambling costs in studying gambling's welfare consequences. Answers to these questions shed light on the motivation of gambling. If gambling spending is compulsive, gamblers have to cut other spending or reduce saving when they gamble. Kearney (2005) exploits differences in the timing each state introduced its state lottery and finds that on average household non-gambling expenditures declined by nearly $140 during the quarter after state lotteries were introduced. She thereby concludes that lottery spending is financed by a reduction in non-gambling expenditures. In her experiment, gambling costs vary due to exogenous reasons—the introduction of state lotteries. Conceivably, residents of the states that recently introduced a state lottery are likely to experience a surge in gambling costs because such gambling vehicles had not been available to them previously.

Besides regulatory changes, gambling costs may also change endogenously as households choose to vary how much to gamble (or whether to gamble at all) when their financial situations and budgets change. For example, a household receiving a bonus may choose to take a cruise trip, on which gambling is part of the entertainment. Therefore, variations in

[10] To protect the identities of survey participants, the CE masks the state identifiers of about 20% of the sample, making statistics for some states unavailable for certain years.

[11] Lottery sales were historically higher during recessions. That trend flattened during the 1991 recession (Mikesell, 1994).

gambling costs due to different reasons can have different implications on other consumption expenditures. The CE data we use are collected after 2001. Unlike the sample period that Kearney (2005) focuses on, only a handful of states introduced state lotteries during our sample period; most changes to gambling costs in our sample are due to endogenous reasons. Thus, an important caveat is that the statistical correlations between gambling and nongambling expenditures that we are presenting below do not necessarily speak to any causal relationship between the expenditures. Rather, these results illuminate that spending on gambling is more likely to vary as a part of the entire basket of household expenditure on consumption goods.

4.1 Expenditure Levels Analysis

We first study the cross-sectional correlation between annual gambling costs and other household expenditures. Although the CE collects gambling costs and other expenditure information quarterly, we use the annual aggregation in the baseline analysis because first, many households only incurred gambling costs in one quarter, and second, the timing of some non-gambling expenditures can be fairly random and lumpy within a year. In a robustness analysis, we estimate the relationship between gambling costs and other expenditures at a quarterly frequency. Our baseline results are all qualitatively preserved.

The permanent income hypothesis postulates that consumption is largely determined by a household's permanent income. We incorporate gambling costs in an otherwise standard consumption function. Specifically, we estimate the following model

$$Exp_i^c = \beta_0^c + \beta_1^c GC_i + \beta_2^c \widehat{\mathbb{Y}}_i + \beta_3^c Z_i + \beta_4^c Year_i + \varepsilon_i^c. \tag{2}$$

In the above equation, $EXP_i{}^c$ denotes the expenditure of category c incurred by household i during the year the household was in the CE sample.[12] We study both household total expenditures and a variety of expenditure subcategories, including food, alcoholic beverage, tobacco, housing, transportation, apparel, health care, personal care, entertainment,

[12]Because each household only stays in the survey for one year, we omit the time subscripts.

reading materials, and education expenditure. GC_i is household i's annual gambling costs during the same year. Z is a vector of demographic characteristics, including a fourth-order polynomial of household head's age, dummies for single male and single female households (married households being the omitted group), dummies for households whose heads are black or Hispanic (non-Hispanic white being the omitted group), and number of adults and children in the households. $Year_i$ is a vector of dummies indicating in which year household i was in the CE sample to account for year fixed effects. Again, because ε^c can be correlated with gambling costs, GC, β_1^c should not be interpreted as measuring the causal relationship between gambling costs and other consumption expenditure. Rather, this coefficient reveals a statistical association between these expenditure (potentially due to a third common shock) when other factors are controlled for.

Because the observed income Y is at best a noisy indicator of a household's permanent income $\widehat{Y}$, we impute the logarithm of permanent income, $\widehat{y}$, using the following equation:

$$y_i = \phi_0 + \phi_1 Z_i + \phi_2 Edu_i + \phi_3 Occ_i + \phi_4 Year_i + u_i, \tag{3}$$

where $y_i = log(Y_i)$ is the logarithm of the observed current income and $\widehat{y}_i$ is equal to the projection value of y_i in eq.(3). Edu and Occ are educational attainment and occupation dummies, which are excluded from eq.(2). The residual term u_i (typically interpreted as an income shock) reflects the degree to which household i's current income deviated from its predicted level of permanent income.[13] Notice that in eq.(3) we assume that households' gambling behavior does not affect their permanent income and therefore do not include GC in the imputation equation. Previous studies (for example, National Gambling Impact Study Commission (1999)) find that gambling-related health, employment, and divorce problems typically are concentrated among pathological gamblers, who account for fewer than 1% of all gamblers. Furthermore, in eq.(2), we interact the imputed permanent

[13]Such a decomposition of current income into a predictable and an unpredictable component is widely used in studies of how consumption and savings respond to income uncertainties. See, for example, Carroll and Samwick (1997). In our subsequent analysis, we will explore the relative predictive power of $\widehat{Y}$ and u on gambling behaviors.

income $\widehat{Y}$, calculated as $e^{\widehat{y_i}}$, with a vector of dummies indicating the decile it belongs to in the imputed permanent income distribution in order to allow for a flexible, essentially nonparametric, relationship between expenditure and permanent income.

As mentioned above, our sample for estimating the model includes only households younger than 65. Moreover, because the estimation of a consumption equation in the form of eq.(2) using household survey data is often heavily influenced by outliers, in our baseline analysis we trim the top 1% of the distribution of $Exp^{\,c}$ when we estimate the model for expenditure category c.[14] To further assure that our results are not driven by tail observations, in a robustness analysis, we re-estimate the model, trimming the top 5% of the expenditure level distributions. The baseline results are qualitatively preserved.

The upper panel of table 2 shows the estimated β_1^c coefficients for total expenditure (net of gambling costs) and its nine major subcategories (as defined by the CE). The coefficients reported in column (1) are estimated with nongamblers being included as the control group. The most striking observation from the results is that nearly all estimated β_1 coefficients are *positive* and are highly statistically significant. As shown in the top row, $\beta_1 = 3.05$ for total expenditure, suggesting that one more dollar spent on gambling is associated with 3 more dollars being spent on other consumer goods. Recall that the reported gambling costs in the CE are likely only a fraction of the true gambling costs, the estimated β_1 is potentially upward biased. However, even assuming a 50% underreporting in gambling costs, the results remain quite economically significant.

The increase in nongambling expenditures is not concentrated in any expenditure subcategory. Spending on all but one major expenditure categories, including the more discretionary ones, increase by margins that are both statistically and economically significant. For example, a one-dollar increase in gambling spending is associated with a 30-cent increase in entertainment expenditure and a 18-cent increase in apparel expenditure. Aguiar

[14] We also remove households with extremely high or low annual income and households with extremely large income fluctuations.

and Bils (2012) report that the Engle curve elasticities of entertainment and men's and women's clothing expenditures are 1.93 and 1.51 respectively. Both are at the high end of the elasticity distribution across expenditure categories. Similarly, when gambling costs are one dollar higher, spending on food is 37 cents higher, more than two thirds of which come from the increase in spending on food away from home (not shown in the table). Note that spending on food away from home is on average only about one half of spending on food at home and is more discretionary than spending on food at home. Interestingly, expenditure on tobacco and alcohol and on personal and health care are all highly correlated with gambling costs. Arguably these expenditures are entirely discretionary, we nevertheless find that these positive correlations reveal interesting information regarding how gamblers manage health-related risks, which will be discussed in detail in Section 6. Only the coefficient estimated for education and reading materials is negative but the coefficient is very small with a large standard error. On balance, we interpret these results as being consistent with the hypothesis that consumers perceive gambling as a consumption good, the spending on which is complementary to expenditures on other discretionary categories.[15]

Because the results presented in column (1) use nongamblers as a control group, the positive β coefficients may reveal underlying preferential differences between gamblers and nongamblers and do not necessarily speak to how nongambling expenditures vary with gambling costs. For example, the positive βs could be due to that gamblers on average spend more on everything than nongamblers. To address this concern, we re-estimate eq. (2) using only the gambler sample, without including nongamblers as the control group. Apart from the point estimates being somewhat smaller and some coefficients becoming a bit less significant, the results, reported in column (2), are qualitatively similar to those in

[15] As shown in the table, the estimated βs for housing and transportation are also positive and statistically significant. Additional results (not shown) of analysis on more detailed expenditure categories within housing and transportation suggest that gambling expenditures are positively associated with spending on utility, gasoline and travel, which are also relatively discretionary expenditures.

column (1). Among gamblers, one dollar more in gambling spending implies an increase in net total expenditure of about $1 - 3/4$ dollars. We are also interested in whether the estimated relationship between gambling costs and other expenditures vary with gambling intensity. Thus, we re-estimate eq. (2) using the frequent gamblers subsample—those who gambled in all four quarters. The results, reported in column (3), are broadly consistent with those reported in column (2), suggesting little variation of this relationship between frequent and other gamblers.

4.2 Expenditure Growth Analysis

We now exploit the panel structure of the CE data to further separate the effects of gambling costs from consumer-level fixed effects on other consumption expenditures. Specifically, we estimate the following expenditure growth model

$$\Delta Exp^{c}_{i,q} = \gamma_0 + \gamma_1 \Delta GC_{i,q} + \gamma_1 f(Age_i) + \gamma_2 \Delta Famsize_{i,q} + \gamma_3 Year_i + \gamma_4 Month_{i,q} + \varepsilon_{i,q}, \quad (4)$$

where $\Delta Exp^{c}_{i,q}$ and $\Delta GC_{i,q}$ are the changes in expenditure of category c and gambling costs between quarter $q-1$ and q for household i, respectively. Because each household is surveyed four times, it provides three observations with respect to estimating eq. (4). We control for a fourth-order age polynomial, $f(Age)$, and family size variations to capture potential preference changes between $q-1$ and q. Also, in addition to year fixed-effects, we allow for month fixed-effects to control for the seasonality in expenditure growth.[16]

The results are shown in the lower panel of table 2. When nongamblers are included as the control group, the estimation results of eq. (4) are similar to those for eq. (2), with the only differences being the somewhat smaller point estimates and several coefficients, in particular housing and transportation expenditure coefficients, becoming statistically insignificant. The expenditure growth analysis suggests that the change in total expenditure

[16] Similarly to the sample selection in Section 4.1 we trim the bottom and top 1% of expenditure growth for each subcategory when estimating the respective model.

(net of gambling costs) from one quarter to the next will be 2.7 dollars greater if gambling costs increase one dollar between these two quarters.

The coefficients in column (2), estimated using the sample of gamblers only, are very similar to those in column (1), which perhaps is not surprising because for nongamblers $GC \equiv \Delta GC \equiv 0$. Like in the level analysis, we see rather consistent positive associations between expenditures on relatively discretionary spending categories and gambling costs. When the model is estimated using a sample of only frequently gamblers, some coefficients become appreciably smaller and less statistically significant, potentially reflecting the lumpiness of some household expenditures (such as housing and transportation) at a quarterly frequency. However, significant positive correlations are preserved for apparel, food (especially food away from home), and tobacco and alcohol expenditures. In addition, all but one of the coefficients in column (3) are positive, and our results reveal no evidence that any expenditures were materially reduced in a quarter when gambling costs were higher.

4.3 When Do People Gamble?

If the consumers with higher gambling spending also have higher other expenditures at the same time, a question that arises is how do they finance everything. Since other expenditures do not appear to be crowded out, are gamblers saving less relative to other consumers? Table 3 contrasts the average propensity to consume (APC) of gamblers to that of nongamblers. APC is defined as the ratio between total expenditures (including gambling costs) and total income. We compute the APC out of both the imputed permanent income and the observed current income. It is perhaps not surprising that gamblers have higher APC out of permanent income than nongamblers (98% versus 89%) with the average APC for frequent gamblers being the highest—topping 100%. However, this ordering is reversed for APC out of current observed income. Gamblers have lower APC (93%) than nongamblers (96%), whereas frequent gamblers have even lower APC out of current income

at 91%.

The differences between the APC calculated with different income measures indicate that gamblers' current income should be, on average, higher than their imputed permanent income. This can be seen in the residuals of the permanent income imputation equation, eq. (3). As the memo line of table 3 suggests, gamblers' current income as observed in the survey is on average 7% higher than their imputed permanent income. The gap for frequent gamblers is even wider at nearly 10%. By contrast, nongamblers' observed current income is on average 3% lower than their imputed permanent income.

Thus, we argue that gambling tends to occur when household income in a given year is higher than normal income in the long run as predicted by eq. (3), i.e., when u_i is larger. In such a scenario, households tend to increase expenditures broadly, with gambling being one part of it. To see this, we further estimate the following logistic model:

$$\Psi_i = \psi_0 + \psi_1 u_i + \psi_2 \widehat{y}_i + \psi_3 Z_i + \psi_4 Year_i + \varepsilon_i, \tag{5}$$

and the indicator variable, $Gambler_i$, is assumed to follow

$$Gambler_i = 1 \quad \text{if} \quad \Psi_i \geq 0; \quad Gambler_i = 0 \quad \text{if otherwise.} \tag{6}$$

The logistic model correlates the likelihood of being a gambler in a given year with $\widehat{y}_i$, the imputed logarithm of permanent income, and u_i, the residual between the logarithm of observed current income and $\widehat{y}_i$, controlling for demographic characteristics, Z, and year fixed effects, $Year$.

We find that a one-standard-deviation increase in the current-permanent income gap, u_i, is associated with a nearly 40% higher likelihood of being a gambler, whereas the imputed logarithm of permanent income, $\widehat{y}_i$ does not affect the likelihood of being a gambler.[17] In addition, we examine how gambling intensity (the dollar amount of gambling costs) varies

[17]Another observation made from this logistic regression is that the pseudo-R^2 is very small (below 0.03), potentially demonstrating that the extent to which demographic and socioeconomic characteristics may help to predict who gamblers are in a cross-sectional setup (Kumar(2009)) can be fairly limited.

with $\widehat{Y}$, the level of imputed permanent income, and $Y - \widehat{Y}$, with the same set of control variables. In this regression, we only use the gambler sample. We find that gambling costs are also positively correlated with $Y - \widehat{Y}$ but are negatively correlated with $\widehat{Y}$. Not surprisingly, in light of this result, gambling expenditure's share in total expenditure consistently declines with income (both imputed permanent and current income). As shown in figure 1, the average share of gambling costs in total expenditures for consumers in the lowest income decile is about 0.7%. The share declines to 0.2% for the highest income decile consumers.

4.4 Reconciling with Kearney (2005)

Our findings are different from those presented in Kearney (2005). Kearney finds that the introduction of state lotteries led to reductions in other consumer expenditures, whereas our analysis suggests that higher gambling costs are associated with higher other consumption expenditures, likely attributable to the higher-than-normal realized income in the survey year. The differences are partly due to that Kearney exploits exogenous changes in gambling costs associated with the introduction of state lotteries, which are not frequently observed in our sample period. In our data only four states (Arkansas, North Carolina, South Carolina, and Tennessee) introduced state lotteries. That said, we estimate a model similar to Kearney (2005) to confirm her results' applicability for our sample period. Our point estimates suggest that both total and nondurable expenditures of residents in these states indeed declined after state lotteries were introduced, though some of the estimates are not statistically significant. Because none of these states is very populous or has many observations in the CE sample, the statistical power of replicating Kearney's analysis using our sample is quite limited.

Figure 2 illustrates why regulatory changes cause gambling costs to crowd out other expenditures, whereas absent such regulatory changes, higher gambling costs tend to be associated with higher other expenditures. The figure plots two indifference curves regard-

ing consumption bundles of gambling and nongambling expenditures. Between the two indifference curves, the one farther away from the origin corresponds to a higher utility level and is achieved with a higher budget constraint—line AC. The pivotal factor accounting for the difference is that in Kearney (2005), assuming there are no other forms of gambling except state lotteries, consumers are moving from point A (no gambling is allowed) to point C (gambling is allowed due to the introduction of state lotteries), causing gambling expenditure to increase from zero to positive but nongambling expenditure, on net, to decline. By contrast, in our analysis, consumers are moving from point B to point C. Gambling expenditure increases because of a higher budget. Accordingly, nongambling expenditures also go up.

4.5 Charitable Giving—Another Potential Motivation for Gambling?

In addition to entertainment values, could there be alternative motivations for gambling, in particular, for buying lotteries?[18] Many commercials advertise state lotteries as, instead of a form of gambling, a way of giving on the basis that the net revenue of state lottery programs will be used for financing public projects.[19] State lotteries, interpreted as a substitute for donations to public projects, are more expensive than other direct donations because the costs on state lotteries are not tax deductible. That said, should such public relation campaigns be effective and the attached entertainment value of state lotteries offset some of their tax-related disadvantages, it is possible that some consumers buy lotteries out of charitable giving motivations.

If state lotteries are perceived by consumers as (imperfect) substitutes for charitable giving, there should be two testable hypothesis. Other factors held constant, first, char-

[18]Because we cannot separate gamblers who buy state lotteries from those who do not, we assume that most gamblers buy lotteries. In our sample, the sample of consumers from states not selling lotteries is very small and even for such consumers, many could buy lotteries from adjacent states.

[19]For example, a Washington, DC lottery commercial reads, "when you buy the lottery, lots of people win."

itable donors are more likely to buy state lottery tickets, and second, among charitable donors, gamblers' donations to charities are smaller in dollar amount because a portion of such donations is substituted for lottery expenses. The CE data record four types of donations—charitable, educational, religious, and political. We combine charitable and educational donations and refer to them as charitable donations.[20] Column (1) and (2) in table 4 presents the summary statistics of the share of households making a certain type of donation and, among the subsample of households making such a donation, the average donation value. In the CE sample, slightly more than 40% of nongamblers made charitable donations in a given year, while this share is much higher, 57%, among gamblers. By contrast, the share of households making religious donations in a given year looks remarkably similar between gamblers and nongamblers (near 45%). Finally, the share of households making a political donation is much smaller in general and is slightly higher among gamblers (5.5% versus 4.5%).[21] Looking at the dollar amount of such donations, consistent with the second testable hypothesis, gamblers, though more likely to make a charitable donation, have a much lower value of annual donations than nongamblers ($296 versus $417). Similarly, the average amount of religious and political donations among donors is appreciably lower among gamblers.[22]

Column (3) of table 4 reports results of an econometric analysis, controlling for a household's decile in the distribution of imputed permanent income, a vector of demographic variables, and the year dummies as in equation (2). We estimate the incidence of making contributions using a logistic model and the size of contribution using an OLS model. Consistent with the summary statistics, the odds ratio estimated from the logistic model suggests that gamblers are 85% more likely to make charitable donations and the margin

[20]Only a small share of households made donations to educational institutions in a given year.

[21]The low share of households making political donations is not surprising given that some research documents that the richest 4% of the population provide nearly 100 percent of all individual contributions (see, for example, Hersgaard 2002).

[22]Statistics among frequent gamblers (not shown) are very similar to those in column (2), suggesting that donation making does not vary much with gambling intensities among gamblers.

is highly significant and does not vary much by gambling intensity. However, we find no evidence that gambling activities help predict religious donations. In addition, gamblers are slightly more likely to make political donations but the results appear to have limited statistical power. Finally, we estimate an OLS model with donation amount being the dependent variable using the subsample of donors with the same set of control variables to test the second hypothesis.[23] We find that charitable donations made by gamblers are on average $100 lower than such kind of donations made by comparable nongamblers. Interestingly, despite their higher current income and a similar propensity of making religious contributions, gamblers make a substantially smaller amount of such donations (more than $600 lower) even after controlling for observable characteristics.

5 Gamblers' Balance Sheets

A key insight derived from our analysis of gamblers' expenditure is that gambling, to most households who gamble, is a form of pastime and entertainment, and is budgeted along with other household expenditures. That said, given that only a fraction of consumers gambled in a given year and some consumers have not gambled over their entire lives, gambling is likely a type of pastime or entertainment that only individuals with certain traits will engage in. The subsequent analysis that contrasts balance sheets and attitudes towards risks (financial and nonfinancial) between gamblers and nongamblers suggests that such traits can be understood as a "personal finance activism."

5.1 Asset and Liability Holdings

Table 5 presents summary statistics of key liability and asset holdings indicators. Johnson and Li (2010) document that the CE liability data compare favorably with their counterparts in the Survey of Consumer Finances (SCF), which is widely regarded as the most

[23]Because the values of donation are all positive, the dependent variables are potentially censored. We estimate a Tobit model using the entire sample (donors and other households). The Tobit results are very similar to the OLS results.

comprehensive and accurate data source of household balance sheet for U.S. households. The CE financial assets data, however, have far fewer details and potentially greater measurement errors. Therefore, results related to the levels of financial asset should be interpreted with a grain of salt. For this reason, we focus more on indicators of whether a household owns a particular type of asset, such as securities, instead of asset holding levels.

On balance, the table shows that gamblers tend to be more active than nongamblers on both sides of the household balance sheet in the sense that they are more likely to have various types of debt and are more likely to own various types of assets, both financial and nonfinancial. Looking at the top of table 5, nongamblers on average hold about $13,000 (in year 2000 dollars) liquid financial assets (balances in checking and saving accounts), while gamblers on average hold more than $16,000, or more than 20% higher. Looking at holdings of frequent gamblers, we find the variations in liquid financial asset levels are relatively small by gambling intensity. Notably, gamblers are more likely to hold financial securities, including stocks.[24] More than 21% of gamblers hold financial securities, in contrast to a 14% financial security ownership among nongamblers.

Turning to ownership of real assets, we find that gamblers are somewhat more likely to be homeowners than nongamblers (75.5% versus 71.8%). Similarly, gamblers are slightly more likely to own a car. Among gamblers, home and car ownerships do not appear to vary much by gambling intensity. More interestingly, gamblers are more likely to own a second home—6.5% of nongamblers own a "second home, vacation home, or recreational property," while 7.7% (20% higher) of gamblers own such properties.[25] In a similar spirit, another intriguing observation from table 5 is that, among car owners, gamblers are more likely to concurrently lease a car (5.7%) than nongamblers (4.4%). We argue that our findings suggest that gamblers are more willing to enter various markets of services and

[24]The CE asks "What was the estimated value of securities, such as stocks, mutual funds, private bonds, government bonds or Treasury notes owned by you (or any members of your CU)?" One important limitation of the CE financial assets data is that we do not observe the detailed composition of financial securities.

[25]The second home ownership in the entire CE sample is very similar to that in the SCF sample.

products.

We now study the liability side of the household balance sheet. First, gamblers and nongamblers, conditional on owning a home, have essentially the same probability of having a mortgage. That said, gamblers appear to manage their mortgage in a more active fashion. More than 38% of gamblers with a mortgage reported that they have refinanced their mortgages before, in contrast to only 31% of nongambler mortgagors. In particular, frequent gamblers are also frequent refinancers, with 40% of their mortgages having been refinanced previously.

Looking at debt with shorter maturities, we find that, despite a significantly higher liquid financial asset holding, gamblers are at the same time more likely to owe debt that typically carries substantial interests and financial charges. 38% of gambler car owners have car loans, compared with 33% of nongambler car owners. More strikingly, 47% of gamblers owe credit card debt, with the share among frequent gamblers being even higher (51%), while only 35% of nongamblers owe credit card debt. Furthermore, gamblers, and in particular frequent gamblers, are more likely to accumulate net credit card debt over the year they participated in the CE survey.

Furthermore, gamblers are more likely to *jointly* own certain assets and owe certain debts at the same time. For example, about 9% of nongamblers owe significant credit card debt (greater than $1,000) and simultaneously have a substantial amount of liquid financial assets (at least 50% of their credit card debt balance).[26] By contrast, this share is almost 50% higher among gamblers. Such a concurrent holding of low-yield liquid assets and high-cost credit card debt is often viewed as a puzzle—the so-called "credit card debt puzzle" (Telyukova and Wright (2008) and Telyukova (2011)). Presumably, a household would be better off paying off the expensive credit card debt using their checking account balances. Potentially speaking to this puzzle, we also find that (not shown) gamblers are

[26]The threshold is chosen somewhat arbitrarily. Using other thresholds yields essentially the same contrasts.

appreciably more likely to concurrently owe credit card debt or car loans and invest in financial securities, such as stocks. Because the checking account balances reported to the CE include balances on brokerage accounts, it is possible that security investors choose to hold a certain level of liquidity and simultaneously borrow expensive credit card debt. Amromin, Huang, and Sialm (2007) show that many households have a debt aversion attitude, i.e., they do not want to participate in financial markets, both as a borrower or as a lender. Our analysis suggests that gamblers' attitudes towards financial markets are markedly different. They do not shy away from indebtedness and appear to keep their assets in fairly active portfolios.

The statistics presented in table 5 are illuminating but are estimated without controlling for consumers' observable characteristics. Table 6 presents the coefficients, standard errors, and odds ratios estimated from logistic regressions that include the set of same control variables as in eq. (2). The odds ratios are evaluated by switching the *Gambler* dummy from zero to one. For brevity, we only report regression results of a subset of asset and debt ownership indicators. Consistent with table 5, these results indicate that gamblers, controlling for other observable characteristics, are 60% more likely to invest in financial securities than nongamblers, are 17% more likely to own a second home or vacation property, nearly 60% more likely to concurrently have credit card debt and liquid financial assets (the "credit card puzzle"), 27% more likely to have had their mortgage refinanced before, and 30% more likely to own a car and lease a car at the same time. Estimated coefficients for other ownership indicators are all consistent with the statistics reported in table 5 and are all statistically significant. The coefficients estimated using a sample of nongamblers and frequent gamblers (not shown) are largely alike.

5.2 Does the Activism Pay Off?

Having documented extensive evidence that gamblers tend to more actively participate in a wide range of household finance markets, we are interested in whether such active

investment and borrowing behaviors help improve their net financial positions. We compare the net worth of gamblers and nongamblers, taking into account their potential income differences. Because the CE does not collect comprehensive information on household balance sheets, our measure is only a part of the household total net worth. In particular, we do not observe the value of owned vehicles. Moreover, we do not use the CE data on some liabilities, such as home equity loans, because they are substantially different from the SCF counterparts. Accordingly, we construct the partial net worth (PNW) as

$$PNW = Financial\ \ Assets\ +\ Home\ \ Value\ -\ Mortgage\ \ Bal.\ -\ Credit\ \ Card\ \ Bal.$$

We argue that the constructed PNW is informative regarding understanding the total net worth because the SCF counterpart of our partial net worth measure accounts for about 80% of the SCF comprehensive measure of net worth and the SCF partial and comprehensive measures of net worth are highly correlated, with a correlation coefficient equal to 0.8.

We find that, notwithstanding active management of their portfolios, gamblers and nongamblers have remarkably similar levels of net worth. After all, simultaneously holding debt and assets per se does not necessarily improve the bottom line of the balance sheet. In many scenarios, a household would be better off had they paid off more expensive debt using liquid assets with lower yields (see, for example, Li and Smith (2010)). As shown in the lower part of table 5, both gamblers and nongamblers have a net worth somewhat higher than \$160,000. Because gamblers have, on average, higher current income, the net worth to income ratio is lower for gamblers. As discussed in Section 3, gamblers' higher current income likely reflects (potentially transitory) deviations from their long-run normal levels (the permanent income). Accordingly, we also present the mean of the logarithm of permanent income imputed with eq.(3). The mean statistics are calculated within each subsample, respectively.[27] As shown in the data, gamblers' imputed permanent

[27]By construction, the mean of the imputed logarithm of permanent income, $\widehat{y}$, is equal to the mean of

income, though higher than nongamblers, is much more similar to that of nongamblers. The difference in current income is 15 log points, while the difference in imputed permanent income is only 5 log points. On balance, net worth relative to long-run normal income appears to be fairly similar between gamblers and nongamblers.

6 Risky Behaviors and Non-mandatory Insurance

Most gambling games feature huge variances in payoffs, presenting substantial financial risks to players. Gamblers' willingness to bear the risks despite such games' typical negative expected payoffs, besides the games' entertainment values, may also reflect these consumers' more tolerant and accommodative attitudes towards financial risks. Indeed, balance sheet analysis reveals that gamblers are more likely to assume more aggressive positions when managing their own finances. In this section, we study whether such a bold attitude also applies to nonfinancial risks, in particular, health risks. Our findings suggest that gamblers do have a higher propensity to engage in activities risky to one's health, prompting us to also examine whether gamblers understand such risks and choose to insure themselves against them. In this regard, our analysis shows that gamblers are more willing to pay out-of-pocket to purchase non-mandatory insurance policies, such as health, home, and life insurance.

We consider two types of activities that are potentially risky for one's health—(excessive) drinking and smoking. We define a household as a drinker and a smoker if within a given year it has positive spending on alcoholic beverages and tobacco products, respectively. Because moderate drinking may not be harmful, we further define someone as a heavy drinker if the household spent more than 2.5% of its annual income on alcoholic beverages and spent more than $100 in each of the four quarters.

Table 7 presents summary statistics of engaging in drinking and smoking and purchasing

the logarithm of observed income, y. However, due to Jensen's inequality, the mean of $e^{\widehat{y}}$ is lower than the mean of Y.

home, life and health insurance. Gamblers, especially the frequent gamblers, are more likely to drink alcohol, both moderately and heavily, and to smoke. For example, 5% of nongamblers behaved like heavy drinkers, in contrast to nearly 10% of gamblers. The heavy drinker share among frequent gamblers is even higher. In addition, about 30% of nongamblers smoke, compared with 43% of gamblers.

We then explore the opposite side of engaging in risky behaviors, namely, what share of gamblers buy insurance. Documenting gamblers' purchases of insurance potentially sheds light on the preferences of such consumers. A famous assertion due to Friedman and Savage (1948) claims that people buy lotteries and auto insurance at the same time, a seemingly violation of the global concavity of preferences. More than six decades later, concurrent purchases of lotteries and auto insurance no longer speak to consumers' preferences because auto insurance has become mandatory. We therefore focus on non-mandatory insurances. Besides life and health insurance, home insurance is essentially optional if there is no outstanding mortgage attached. We count a household as having purchased such non-mandatory insurance only when there are some out-of-pocket expenses incurred, thus excluding insurance provided entirely by employers.

Despite the higher likelihood of engaging in activities potentially harmful for one's health, a large share of gamblers pay out-of-pocket costs to buy home, life, and health insurance.[28] The statistics show that, while about 45% of nongamblers buy life insurance and health insurance, the shares for gamblers who buy these insurance are somewhat higher at 57% and 50%, respectively. In addition, two thirds of gamblers who own a home without having a mortgage continue to buy home insurance, a share almost 10 percentage points higher than nongamblers.[29] Finally, we point out, in the memo line of table 7, that although gamblers are more willing to buy non-mandatory insurance, conditional on

[28]The CE lumps "Life, endowment, annuities, and other insurance policies providing death benefits" together under one Universal Classification Code.

[29]We calculate the share of consumers purchasing home insurance using only the sample of homeowners not owing a mortgage, for home insurance is typically required by mortgage lenders.

buying insurance, gamblers appear to spend a similar amount of money on this insurance.[30]

The regression results, with the same controls as those included in previous logistic models, are presented in Table 8. Essentially all of the unconditional differences in the propensity of drinking, smoking, and purchasing insurance are preserved in the coefficients estimated from the models. In all regressions the estimated gambler dummy coefficient is positive and statistically significant at a 99% level or higher. The estimated odds ratios suggest that the differences between gamblers and nongamblers in the propensity of heavy drinking and smoking are substantial. Specifically, gamblers are 100% and 80% more likely to be heavy drinkers and smokers than nongamblers. Turning to the purchase of insurance, the results are essentially the same. Controlling for observable characteristics, gamblers are about 20% more likely to buy health insurance, almost 50% more for life insurance, and 30% more for home insurance. Noticeably, all estimated effects are more pronounced for frequent gamblers and the differences are statistically significant.

The lower panel of the table presents a tentative test of the hypothesis that people rationally insure themselves when they choose to engage in risky behaviors, conditional on observable characteristics. We run logistic regressions with health and life insurance dummies on the left hand side. On the right hand side, in addition to the same control variables in previous logistic regressions, we include a risky behavior dummy (smoking or heavy drinking) and a term of this dummy interacting with the gambler dummy. The estimation results largely reject the hypothesis in the general population. Except that heavy drinkers appear to be more likely to buy health insurance regardless whether they gamble (column 3), estimated smoker and heavy drinker coefficients are either negative and statistically significant (columns 1 and 2) or being a insignificant small positive number (column 4). By contrast, the coefficients on the smoker-gambler interaction terms are positive and significant and outweigh the negative smoker dummies in both life and health

[30]The table only presents mean total costs on all three types of insurance. Expenses on each individual type of insurance are also remarkably similar between nongamblers and gamblers.

insurance regressions.[31] Thus, though smokers in general are less likely to buy life and health insurance, gambling smokers are more likely to do so. The gambling heavy drinker coefficient in the health insurance regression is positive and marginally significant (Wald $\chi^2 = 2.4$ and p-value $= 0.12$). Finally, in contrast to the small and insignificant coefficient for the heavy drinker dummy, the coefficient of the gambling heavy drinker dummy is positive and both statistically and economically significant in the life insurance regression. Thus, on balance, our analysis indicates that it is not generically true that smokers and drinkers are more willing to buy insurances. Rather, only those smokers and drinkers who also gamble appear to be more willing to buy insurance, relative to other consumers with similar observable characteristics.[32] We interpret these results as broadly consistent with the notion that gamblers are more active in engaging and managing risks, similar to their attitudes and strategies taken with respect to financial risks.

7 Personal Finance Activists or Careful Survey Participants?

We argue that the expenditure, charitable donations, balance sheets, and risk management patterns among gamblers reflect such consumers' unique traits, which we refer to as a "personal finance activism." One prominent alternative explanation is that gamblers recorded in the CE data are more careful survey participants. They answer questions related to expenditures and balance sheet more carefully and it is not surprising that they are more likely to report positive gambling expenditures and, for the same reason, more active balance sheets. In this section we argue that this is not the main factor responsible for differences between gamblers and nongamblers we have documented in this paper.

First, as a methodological contribution of the paper, we make use of the paradata that

[31] F-tests strongly reject the sum of the *smoker* and *smoker* $\times$ *gamblers* coefficients in each regression is equal to zero.

[32] A possible competing hypothesis, also consistent with their more active behaviors, is that gamblers are more actively exploiting moral hazard.

CE released for the 2005 - 2010 surveys. These paradata include information recorded by interviewers regarding whether respondents used records, such as receipts and bank statements, while answering questions and total interview time. These data were recently released by the BLS and had not been used extensively by the research community. We find that the fraction of households not referring to records while answering survey questions in any quarterly interviews is only slightly higher among nongamblers (15.6%) than among gamblers (13.5%). The fraction of consumers who referred to records in all four quarterly interviews (the most careful survey participants) are essentially the same for gamblers and nongamblers, both are 46%.

Comparing the survey time aggregating all four interviews, we find that the total time spent with nongamblers on average are 1,800 seconds short, or 7.5 minutes shorter per interview, than gamblers. Putting comparison in perspective, the mean interview time for all four interviews is 15,000 seconds, implying an average quarterly interview lasting slightly over an hour. This is not surprising if nongamblers genuinely have fewer expenditures to report. However, the total time difference may also be due to some consumers deliberately skipping certain questions. To see whether the survey time gaps account for the differences between nongamblers and gamblers we have documented, we remove consumers whose total interview time is shorter than 10,000 seconds from the sample, or about 20% of the entire 2005-2010 sample. Gamblers and nongamblers in the restricted sample have very similar mean of total interview time. Essentially all the gambler-nongambler differences presented in this paper are preserved in the restricted sample.

We then take advantage of the fine details of the CE expenditure data and use the UCC-level information to compare expenditure reporting patterns of gamblers and nongamblers. If careless reporting and question-skipping causes some gamblers being categorized as nongamblers, we will see that gamblers report positive expenditures for more UCCs than nongamblers. Similarly, we would expect that frequent gamblers report positive expenditures for more UCCs than other gamblers. Over the entire four interviews, the number of

UCCs for which gamblers reported positive expenditures is only slightly higher than that for nongamblers. Further, the average number of UCCs reported by frequent and other gamblers are almost identical. On balance, the lack of difference in the number of UCCs reported by consumers with different gambling prevalence and intensity suggest that careless reporting and questions skipping is not the main factor that explains the documented behavior differences between gamblers and nongamblers.

We then calculate, for each UCC, the share of gamblers and nongamblers (and of frequent and other gamblers) who reported positive expenditure. The ratio, R^{UCC}, of the two shares measures the relative propensity of reporting positive expenditures on a particular UCC. Eliminating the UCCs rarely reported by all consumers, we find that R^{UCC} calculated between frequent and other gamblers has a mean and median both very close to one, suggesting that there are about equal number of UCCs that are more likely being reported by frequent gamblers and by other gamblers. R^{UCC} calculated between nongamblers and gamblers has a mean and median equal to 0.8, suggesting that a positive expenditure on the same UCC is 20% less likely to be reported by nongamblers than gamblers. Although we cannot rule out careless reporting as an explanation for $mean(R^{UCC}) < 1$, examining the R^{UCC} that has the lowest value—the UCCs that are least likely to be reported by nongamblers relative to the reporting propensity of gamblers on the same UCCs—we find that most of these UCCs correspond to either expenses directly speaking to gamblers's more active balance sheets (for example, membership fees for credit cards) or expenses that are not likely to be overlooked or skipped during the survey (for example, newspaper and magazine subscriptions).[33]

[33]We assume, for consumers who deliberately skip survey questions, to the extent that they remain in the survey, they are most likely to skip questions on expenditures either difficult to recall or revealing personal information they prefer not to disclose.

8 Concluding Remarks

Why do people gamble? Are gamblers intrinsically different from other consumers? What else can we learn from observing gambling behavior? Little consensus has been reached regarding answers to these questions. Our paper brings new perspectives in answering these questions. We find that gambling activities are, on net, complements to other consumption, and gambling expenditure is likely discretionary in the sense that higher gambling spending typically does not reduce household savings, because consumers tend to gamble when their income is higher than its normal levels. We further argue that most gamblers appear to perceive gambling as a form of pastime. Caveats thus should apply regarding the extent to which risk-aversion parameters teased out from gambling betting strategies (for example, Quandt 1986, and Golec and Tamarkin, 1998)can be generalized to the broad context of household financial decision making.

Furthermore, we show that the observed gambling activities are correlated with important household characteristics such as tolerance to risks, attitude towards financial markets, and confidence, which all play pivotal roles in determining household consumption, saving, and portfolio choices. We argue that differences in these characteristics potentially lead certain households to more actively participate in a wide range of financial markets. In particular, gamblers tend to be both active borrowers and investors, markedly different from those " neither borrower nor lender be" type of households (Amromin, Huang, and Sialm (2007)). Understanding the variations in households' propensities of participating in financial markets has important policy implications. For example, identifying certain "traits" of active stock investors potentially helps promoting more efficient saving and investment strategies among those more "passive" investors. Indeed, a recent analysis using Danish data by Chetty et al. (2012) shows that there are only 15% of all consumers are "active savers" whose saving decisions respond to incentives.

Finally, we note that classical consumption and saving models use a representative agent

framework. These models, though insightful and elegant, often fall short in explaining empirical regularities. However, extending these models to allow for household heterogeneity is difficult, for doing so involves modeling differences in household preferences, perceptions, and information possessed, it is difficult to map such models to data. Data regarding such heterogeneity can rarely be collected directly in surveys. For example, it is unlikely that an econometrician will get useful answers if she asks the survey respondents "what is your subjective discounting factor and risk aversion coefficient?"

Thus, the identification of household heterogeneity in these regards often relies on inferences made by comparing observable individual behaviors. For example, Hurst (2006) labels consumers as "grasshoppers" (spenders) and "ants" (savers) by their pre-retirement level of wealth and documents that the consumers who have low pre-retirement wealth would have consistently deviated from the permanent income hypothesis over their life cycles. Similarly, Ameriks, Caplin, and Leahy (2003) find that "planners," who spend more time on developing financial plans, are more likely to have higher wealth. More recently, Cadena and Keys (2011) infer time discounting factors of young adults using information about whether they were patient while participating in a survey. To this extent, our analysis suggests that the observed gambling behaviors have a merit of "measurement ahead of theory." They can serve as an informative indicator for important household preferential differences that future heterogeneous consumer models can take advantage of.

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Table 1: Share of Gamblers and Gambling Expenditure by Demographic Characteristics

			Among all gamblers	
Characteristics	% Gamblers	% Frequent	Gambling costs ($)	Ratio to income (%)
All	29.3	5.6	201 [57]	0.35 [0.13]
Age < 30	22.3	1.7	89 [35]	0.20 [0.10]
Age $30 - 44$	27.7	4.4	147 [47]	0.23 [0.09]
Age $45 - 64$	33.2	7.1	225 [64]	0.37 [0.13]
Age > 65	27.1	6.3	269 [79]	0.70 [0.26]
Married	30.6	6.0	199 [59]	0.29 [0.11]
Divorced/widowed	27.7	5.4	215 [52]	0.57 [0.18]
Single male	29.9	5.9	223 [67]	0.53 [0.19]
Single female	24.4	3.6	141 [43]	0.36 [0.15]
Non-Hispanic white	30.0	5.7	194 [56]	0.33 [0.12]
Hispanic	26.3	4.7	151 [50]	0.34 [0.15]
Black	25.5	4.9	229 [65]	0.53 [0.22]
Below high school	23.4	4.8	227 [60]	0.68 [0.23]
High school	32.8	6.7	222 [64]	0.45 [0.16]
Some college	32.8	6.5	190 [58]	0.35 [0.13]
College degree	27.3	4.4	147 [44]	0.19 [0.07]
Above college	23.2	3.7	177 [42]	0.20 [0.06]
Retired	27.9	6.5	266 [81]	0.75 [0.28]
Unemployed	22.7	3.4	136 [47]	0.47 [0.17]
Self-employed	27.4	4.9	216 [51]	0.30 [0.10]
State lottery	29.9	5.8	201 [58]	0.35 [0.13]
No State lottery	12.8	0.6	229 [40]	0.42 [0.10]
Pre-Great Recession	29.1	5.3	190 [56]	0.33 [0.13]
Great Recession	26.2	4.4	204 [60]	0.37 [0.14]
Number of households	35,192	2,047		

Note: The sample includes the households that were surveyed after the second quarter of 2001 through the first quarter of 2011 and have participated in all four interviews and reported valid income data in both the first and the last interview. The sample includes the households whose head was between 20 and 80 at the time of the survey. Gamblers are defined as the households that had positive gambling expenditure in the survey year. Frequent gamblers refer to those reported positive gambling costs in all four interviews and had annual gambling costs above $40. Gambling costs and ratio to income are estimated among the gamblers sample. The median is reported in the bracket.

Table 2: How Do Household Expenditures Change with Gambling Costs?

Exp. Category	All Households (1)		All Gamblers (2)		Frequent Gamblers (3)	
	Expenditure Levels Analysis					
Total expenditure	3.05***	(0.35)	1.76***	(0.37)	1.71***	(0.56)
Entertainment	0.28***	(0.03)	0.14***	(0.03)	0.17***	(0.05)
Apparel	0.18***	(0.02)	0.11***	(0.02)	0.10***	(0.03)
Food	0.38***	(0.04)	0.29***	(0.04)	0.30***	(0.06)
Housing	0.58***	(0.13)	0.34***	(0.13)	0.46***	(0.19)
Transportation	0.66***	(0.14)	0.27*	(0.15)	0.13	(0.24)
Tobacco and Alcohol	0.22***	(0.01)	0.14***	(0.02)	0.08***	(0.03)
Personal and health care	0.19***	(0.04)	0.09**	(0.04)	0.11**	(0.06)
Education and reading	-0.01	(0.03)	-0.01	(0.03)	0.01	(0.05)
Other expenditures	0.51***	(0.10)	0.30***	(0.10)	0.28*	(0.15)
Number of observations	27,225		8,280		1,568	
	Expenditure Growth Analysis					
Total expenditure	2.71***	(0.56)	2.68***	(0.60)	1.44	(1.27)
Entertainment	0.25***	(0.06)	0.25***	(0.06)	0.15	(0.11)
Apparel	0.23***	(0.04)	0.23***	(0.04)	0.16**	(0.08)
Food	0.37***	(0.07)	0.37***	(0.07)	0.45***	(0.14)
Housing	0.21	(0.14)	0.20	(0.14)	0.14	(0.29)
Transportation	0.47	(0.42)	0.46	(0.46)	0.26	(1.01)
Tobacco and Alcohol	0.09***	(0.02)	0.09***	(0.02)	0.09**	(0.04)
Personal and health care	0.13***	(0.05)	0.13***	(0.05)	0.15	(0.10)
Education and reading	0.07	(0.05)	0.07	(0.05)	-0.00	(0.10)
Other expenditures	0.33***	(0.08)	0.33***	(0.08)	0.10	(0.17)
Number of observations	79,572		23,876		4,735	

Note: *, **, *** indicate statistical significance of 90, 95 and 99 percent, respectively. The upper panel reports β_1 coefficients in eq.(2) estimated for various expenditure categories. Control variables include imputed permanent income interacted with its decile dummy, demographic characteristics, and year dummies. The lower panel reports γ_1 coefficients in eq.(4) estimated for various expenditure categories. Control variables include an age polynomial, family size changes, and year and month dummies. The samples used for the estimation include only households whose heads were younger than 65. In the level regression, the top 1% of the corresponding expenditure level distribution is excluded. In the growth regression, the top and bottom 1% of the corresponding expenditure growth distribution is excluded. Standard errors are reported in parentheses.

Table 3: Average Propensity to Consume

	Nongamblers	Gamblers	Frequent Gamblers
Relative to imputed permanent income	88.6%	98.2%	100.3%
Relative to observe current income	96.4%	93.0%	90.6%
Memo: $u = y - \widehat{y}$	-0.033	0.077	0.098
	(0.004)	(0.003)	(0.003)

Note: Average propensity to consume is calculated as the ratio between total expenditure (including gambling costs) and the observed current income and the imputed permanent income. We impute the logarithm of permanent income, $\widehat{y}$, and the level of permanent income is calculated as $\widehat{Y} = e^{\widehat{y}}$. Standard errors of the mean of imputation residuals are reported in parentheses.

Table 4: Gambling Activities and Donations

	Summary statistics		Econometric analysis
	Nongamblers	Gamblers	(gambler dummy odds ratios)
	Shares that made a donation (%)		Logistic regression
Charitable donations	41.0	56.7	0.62***
			(0.03)
			[1.85]
Religious donations	43.8	45.4	0.02
			(0.03)
			[1.02]
Political donation	4.5	5.5	0.13**
			(0.06)
			[1.13]
	Donation amount (donors, in 2000$)		OLS regression
Charitable donations	417	296	-97***
			(30)
Religious donations	1614	981	-616***
			(48)
Political donation	295	162	-122
			(80)

Note: Charitable donations include donations made to educational entities. Donation amounts refer to annual donations and their means are calculated within the subsample of consumers who made such donations. *, **, *** indicate statistical significance of 90, 95 and 99 percent, respectively. The logistic regressions use the entire sample whose heads were younger than 65. The control variables include a vector of dummies indicating imputed permanent income deciles, a vector of demographic variables as used in eq.(2), and a vector of year dummies. The OLS regressions use the subsample of households who made a certain type of donation, with the same set of control variables as in the logistic analysis. Standard errors are reported in parentheses and odds ratios estimated from logistic regressions are reported in brackets.

Table 5: Summary Statistics of Household Balance Sheet Characteristics

	Nongamblers	All gamblers	Frequent gamblers
Assets ownership			
Liquid financial assets	12,942	16,104	15,637
Securities ownership(%)	14.0	21.6	23.0
Home ownership (%)	71.8	75.5	77.3
Homeowners with a second home (%)	6.5	7.7	7.2
Own a car (%)	91.8	94.3	94.1
Car owners leasing a car (%)	4.4	5.7	5.3
Household Debt			
Homeowners having a mortgage (%)	75.4	76.4	73.5
Homeowners having refinanced (%)	31.3	37.9	40.1
Car owners with a loan (%)	33.3	37.9	38.2
Have credit card debt (%)	35.4	47.2	51.3
Have added credit card debt (%)	21.9	27.8	29.9
"Credit card puzzle" (%)	8.9	13.5	13.6
Partial net worth†	163,005	164,399	169,449
memo:			
Annual income	57,392	62,527	62,356
Log(annual income)	10.65	10.80	10.82
Imputed log(permanent income)	10.69	10.74	10.73

Note: All dollar values are in 2000$. † Partial net worth is calculated as the sum of financial assets and home value net of mortgage and credit card debt balances. Have added credit card debt refers to the households who reported higher credit card debt balances in the last interview than in the first one. Liquid financial assets refer to balances in checking and saving accounts, including discount brokerage account. Securities include stocks, mutual funds, private bonds, government bonds or Treasury notes. Second home includes second home, vacation home, and recreational property. "Credit card puzzle" refers to the households who concurrently have more than $1,000 credit card debt while holding liquid financial assets greater than 50% of their credit card debt balances. Annual income refers to the observed annual income reported in the last interview. Imputed log(permanent income) is imputed from eq.(3).

Table 6: Logistic Regressions on Ownership of Debts and Assets

	Investing in financial securities	Second home ownership	Credit card puzzle	Have refinanced mortgage before	Car Owner and leaser
[1ex] Gambler	0.48***	0.15**	0.46***	0.24**	0.27***
	(0.04)	(0.06)	(0.04)	(0.05)	(0.06)
	[1.61]	[1.17]	[1.59]	[1.27]	[1.31]
Memo: Share among nongamblers	14.0%	6.5%	8.9%	31.3%	4.4%

Note: *, **, *** indicate statistical significance of 90, 95 and 99 percent, respectively. The logistic regressions use the entire sample whose heads were younger than 65. The control variables include a vector of dummies indicating imputed permanent income deciles, a vector of demographic variables as used in eq.(2), and a vector of year dummies. Standard errors are reported in parentheses. Odds ratios are reported in brackets.

Table 7: Summary Statistics of Drinking and Smoking and Insurance Purchasing Behavior

	Nongamblers	All gamblers	Frequent gamblers
Alcohol Drinker (%)	62.1	78.8	79.8
Heavy drinker (%)	4.9	9.6	11.2
Tobacco smoker (%)	29.5	43.2	47.6
Purchase life insurance (%)	45.4	56.7	62.0
Purchase health insurance (%)	44.7	49.3	50.7
Purchase home insurance (%)	57.8	66.3	70.6
Memo: Total out-of-pocket expenditure for life, home, and health insurance (2000$)	1,669	1,755	1,833

Heavy drinkers refer to those who spent more than 2.5% of annual income on alcoholic beverages and spent more than $100 in each quarter. Purchases of insurances refer to households pay out-of-pocket on insurances. Life insurance includes life, endowment, annuities, and other insurance policies providing death benefits. The share of households that purchased home insurance is estimated using the sample of homeowners who do not have outstanding mortgages.

Table 8: Logistic Analysis on Risky Behaviors and Insurance

	Risky Behavior		Insurance		
	Heavy drinker	Smoker	Health	Life	Home
Gambler	0.72***	0.58***	0.17***	0.39***	0.27***
	(0.05)	(0.03)	(0.03)	(0.03)	(0.07)
	[2.06]	[1.79]	[1.19]	[1.47]	[1.31]
Frequent gambler	0.95***	0.74***	0.24***	0.54***	0.42***
	(0.09)	(0.06)	(0.05)	(0.06)	(0.14)
	[2.59]	[2.09]	[1.27]	[1.72]	[1.53]
Statistically different?	Yes	Yes	Yes	Yes	Yes
Memo: share among nongamblers (%)	4.9	29.5	44.7	45.4	57.8

Concurrent behavior	Health insurance (1)	Life insurance (2)	Health insurance (3)	Life insurance (4)
Smoker	-0.09***	-0.19***		
	(0.03)	(0.03)		
	[0.91]	[0.83]		
Smoker × gambler	0.19***	0.29***		
	(0.04)	(0.05)		
	[1.21]	[1.34]		
Heavy drinker			0.16**	0.06
			(0.07)	(0.07)
			[1.17]	[1.07]
Heavy drinker × gambler			0.15	0.18*
			(0.10)	(0.07)
			[1.16]	[1.19]

Note: *, **, *** indicate statistical significance of 90, 95 and 99 percent, respectively. The logistic regressions use the entire sample whose heads were younger than 65. The control variables include a vector of dummies indicating imputed permanent income deciles, a vector of demographic variables as used in eq.(2), and a vector of year dummies. Standard errors are reported in parentheses. Smoker gambler is defined as the smoke dummy interacting with gambler dummy. Heavy drinker gambler is defined as the heavy drinker dummy interacting with gambler dummy. Standard errors are reported in parentheses. Odds ratios are reported in brackets.

Figure 1: Gambling Costs Share in Total Expenditure

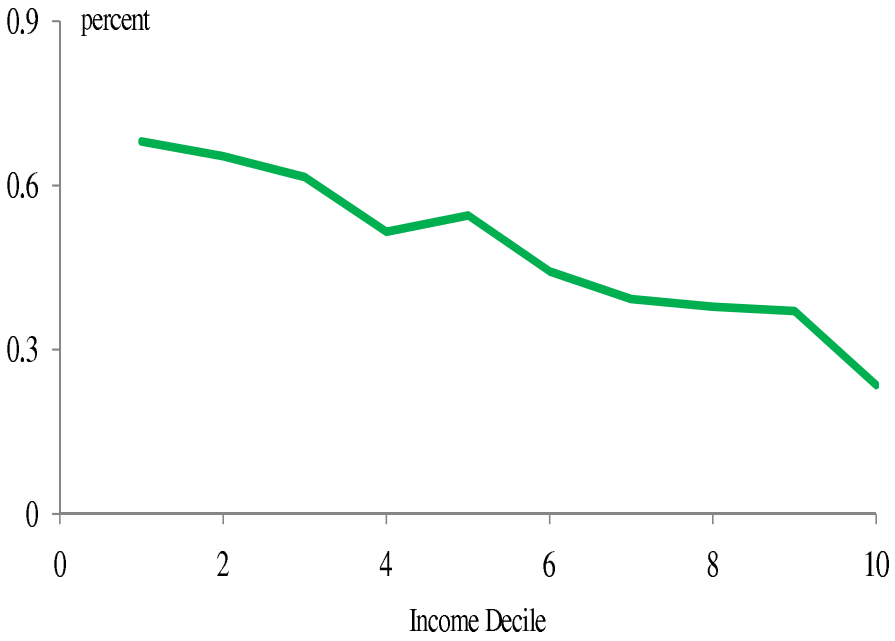

Figure 2: Reconciling with Kearney (2005)