The Impact of Casino Gambling on Personal Bankruptcy Filing Rates

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Abstract

Personal bankruptcies soared in the U.S. between 1994 and 1998. Nearly 1.4 million U.S. households filed for bankruptcy protection in 1998, about a half million more than in 1995. One activity which can precipitate personal financial crises and has also experienced growth as dramatic as personal bankruptcies over the past decade is the volume of commercial gaming, especially casino gambling. This paper attempts to empirically determine whether casino gambling is associated with higher bankruptcy filing rates in and around counties where casinos have located. Our analysis predicts an 8% decline in 1998 filing rates for casino and collar counties, and a 1.4% decline in filing rates nationwide if one were to eliminate casino gambling. We conclude that the proximity of casino gambling appears to be associated with higher bankruptcy rates, but the local impact is far more pronounced than the influence of casino gambling on national filing rates. Nationwide, the incidence and growth of casino gambling over the past decade does not explain much of the rise in bankruptcies during the period.

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John M. Barron, Michael E. Staten and Stephanie M. Wilshusen

I. Introduction

Personal bankruptcies soared in the U.S. between 1994 and 1998. Nearly 1.4 million U.S. households filed for bankruptcy protection in 1998, about a half million more than in 1995. Bankruptcy filings fell back about 8% in 1999 to 1,260,000, but the level was still dramatically higher than at the beginning of the decade, at the peak of the last expansion (See Figure 1). Perhaps even more striking is the fact that from 1992 through 1998 one out of every 20 U.S. households filed for bankruptcy. Why this occurred against the backdrop of the most favorable economic conditions in a half-century has challenged researchers and even spurred Congress to consider legislative remedies.

The traditional explanation for personal bankruptcies has been the occurrence of "insolvency events" (layoffs, failure of a small business, divorce, extended illness, uninsured medical expenses) which create a financial crisis for which bankruptcy is the borrower's solution. Debtor surveys consistently find that the majority of bankruptcies are triggered by insolvency events, although an explanation for the ***rise*** in bankruptcies during the mid-1990s that is built around a comparable rise in insolvency events seems inconsistent with the marked improvement in the economic climate.[1] However, one activity which can precipitate personal financial crises and has also experienced growth as dramatic as personal bankruptcies over the past decade is the volume of commercial gaming, especially casino gambling. This paper attempts to empirically determine whether casino gambling is associated with higher bankruptcy filing rates in and around counties where casinos have located.

Section 2 describes the growth in casino gambling in the U.S. and its geographic spread, especially over the past two decades. The section also reviews prior research on the linkage between the opening of casinos and the incidence of personal bankruptcies. Section 3 summarizes an empirical model of bankruptcy filing rates at the county level for over 3,000 U.S. counties from 1993 through 1998. The model includes variables built to measure the incidence and growth in the volume of casino gambling activity for those counties hosting and adjacent to casino facilities. Section 4 discusses results from estimation of the model. Section 5 offers concluding thoughts and direction for future research.

II. Prior Research on the Impact of Casinos on Personal Finances

Consumer spending on all forms of commercial gambling in the U.S. reached a record $54.3 billion in 1998, up from $39.8 billion as recently as 1994. Gaming industry analysts refer to consumer spending on gaming more precisely as "adjusted gross revenues," defined as gross dollars wagered minus the dollars casinos pay out in the form of winnings. Table 1 displays recent growth trends in adjusted gross gaming revenues by gaming category and highlights the importance of casino gambling as the primary driver underlying the growth in gross gaming revenues. Casino gambling accounted for 56% of gross gaming revenues in 1998 (41% if gambling on Indian reservations is excluded). Figure 2 provides more detail on the breakdown of revenue by gaming category.

These statistics are striking considering that prior to 1989 the only casinos in the U.S. were located in Nevada and New Jersey. National, and especially state, legislative activity propelled the expansion of casino gambling across the country in the late 1980s and early 1990s. In October of 1988, Congress passed the Indian Gaming Regulatory Act permitting casino

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[1] For example, see Visa U.S.A. Inc., *1998 Bankruptcy Debtor Survey*, November 1998, pp. 18-20.

gambling on Native American land. By 1998, gambling at reservation casinos represented 15% of total consumer spending on casino gambling nationwide. The first riverboat casino license was issued by the Iowa legislature in March 1989. Competition among states for gambling tax revenue and economic development dollars prompted Illinois, Mississippi, Louisiana, and Missouri to legalize riverboat casinos between 1990 and 1993. By 1998, adjusted gross revenue from riverboat casinos was 13.4% of all spending on commercial gambling, second only to slot machines in Nevada and New Jersey in contribution to non-Indian casino gambling share. Voters in South Dakota and Colorado approved limited/small stakes casinos in 1989 and 1990, respectively. Further expansion occurred in the 1990s with the proliferation of electronic gaming devices such as slot machines and video poker machines outside of casinos to racetracks, bars, and arcades in various states across the country.

The speed with which legalized casino gambling proliferated across the U.S. after 1989 led Congress to create the National Gambling Impact Study Commission (NGISC) in 1996.[2] The NGISC's creation represented the culmination of concerns surrounding the growth in casinos and the social and economic externalities associated with gambling such as pathological behavior, crime, and corruption. The NGISC was charged with quantifying the effects of these externalities on the communities that were in or near casino counties.

The literature is replete with studies that assess the aggregate economic benefits associated with the introduction of a casino into a community such as: job creation; investment stimulation; tourism development; capture of economic rents; and the revenue benefits of taxation.[3] However, few studies have addressed the direct impact on personal finances for households in such communities. A brief summary of such studies follows. In their examination of the impact

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[2] President Clinton signed Public Law 104-169 authorizing the creation of the NGISC on August 3, 1996. The final report of the NGISC was issued on June 18, 1999 and can be accessed at www.ngisc.gov.

of casino gambling on personal bankruptcy filing rates, these studies employed a variety of methods that produced results that ranged from no relationship to statistically significant effects.

The rapid growth in casino gambling outlets during the 1990s simultaneous with the rise in personal bankruptcies prompted a credit industry consulting firm, SMR Research (1997), to declare gambling as the "single fastest-growing driver of bankruptcy." SMR compared the aggregated personal bankruptcy filing rate of the 298 counties identified as having at least one major legal gambling facility (i.e., a casino: Indian, land-based, or boat; or pari-mutuel outlet) with the aggregated bankruptcy rate of counties without gambling. They found that counties with gambling had a bankruptcy filing rate 18% higher than those without. Counties with more casinos had higher filing rates: counties with one to four gambling facilities (275) had a bankruptcy filing rate 14% higher than in counties without casinos. The rate for counties with five or more gambling outlets (23) was 35% higher than counties without gambling. Next, SMR noted that the counties with the highest bankruptcy rates in Nevada, New Jersey, California, and Connecticut were those in closest proximity to major casino gambling activity. This result was generalized by correlating counties (with a population of at least 25,000) possessing the highest filing rate per 1,000 with the presence of a casino "nearby." Of the 24 counties with the highest bankruptcy filing rates per 1,000 in 1996, 9 were located "very close" to three casinos.[4]

The National Opinion Research Center (NORC) at the University of Chicago was commissioned by the NGISC to examine the impact of new casinos on communities by comparing counties in which casinos had and had not opened over the past decade. In particular,

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[3] For example, see Arthur Andersen & Co. (1997) and Walker and Jackson (1998).

[4] The American Gaming Association (AGA), the trade association for commercial gambling in the U.S., criticized SMR's conclusions by demonstrating an inverse relationship between the *national* bankruptcy filing rate and gambling revenue between 1991-1996. The AGA contended that SMR's evidence was anecdotal, at best, and claimed it could demonstrate as many instances of counties in close proximity to a casino that had a bankruptcy filing rate that was below the national average as SMR had found counties near casinos with rates higher than the national average.

NORC investigated the effects of casino openings on county level bankruptcy filings. Using a random sample of 100 counties, (excluding counties with Native-American casinos), NORC estimated the impact on a county's bankruptcy rate of being located within a 50-mile radius of one or more operating casinos. The analysis spanned the period from 1980-1997. In NORC's 100-county sample, 5 counties had casinos within or nearby in 1980. That number grew to 45 at the end of the sample period in 1997 with approximately 90% of these casino openings occurring after 1988. NORC found no significant change in per capita bankruptcy rates in communities where casinos were introduced. However, based on follow-up telephone surveys, they did find a substantially higher incidence of bankruptcy among pathological gamblers, vs. low-risk gamblers and non-gamblers. It also concluded that the availability of a casino within 50 miles (vs. greater distances) is associated with about double the prevalence of problem and pathological gambling.

Nichols, Stitt and Giacopassi (1999) also attempted to determine whether the introduction of casino gambling had an impact on local bankruptcy filing rates. They utilized county-level bankruptcy filing data from 1st Q 1989 through 1st Q 1998. After selecting 8 cities in counties that introduced casino gambling between 1991 and 1994, their analysis determined whether the pre-casino filing rate was significantly different from the post-casino filing rate. To control for the possible influence of other factors they created a control group by using a matching algorithm to select, for each casino community, 5 other communities nationwide that were located 50 miles or more away from a casino but had very similar levels of the following group of characteristics: % of population 15-34; percent Indian, Aleut or Eskimo; unemployment rate; percent black; percent Hispanic; total population; median household income; percent below poverty; percent not graduating from high school; percent of housing that is renter-occupied; percent of housing units in structures with 3 or more units; net migration; percent urban; average

population per square mile; and a GINI coefficient of income inequality. The empirical test examined whether the change in bankruptcy filing rates in casino communities is statistically different from the change in each community's control group.

They concluded that bankruptcy filings did increase, relative to the control group, following the introduction of casinos, in 7 of the 8 towns. They also noted that the largest increase occurred in the town that had casinos the longest and the effect was more pronounced for Chapter 13 bankruptcies than for Chapter 7s. In the 8th community bankruptcy rates were significantly lower, but its casinos could be classified as "destination resort casinos," with a higher proportion of casino patrons being tourists or visitors, relative to the other 7 communities. Eadington (1999) noted the possibility that the positive economic development effects of gambling (job creation, tax revenue, support of peripheral businesses and services, etc.) may be greater in destination communities, due to the net positive infusion of outside dollars, than if a casino is built in an urban setting with a higher percentage of local patrons.

Using a variety of methodologies, the studies reviewed above all sought to investigate whether the growth in legalized casino gambling contributed to higher bankruptcy rates in counties that hosted or were near casinos, with mixed results. However, regardless of the methodology, each study was hampered by the lack of appropriate data to account fully for variations in other economic variables, especially the use of debt, that also affect bankruptcy filing rates.

III. Methodology and Data

To identify the impact of casino gambling on bankruptcy filing rates while controlling for other factors, we employ a multivariate estimation procedure based on annual observations for over three thousand U.S. counties from 1993 through 1998 (18,313 observations). The model

must account for two characteristics of personal bankruptcy filings during the period: a wide variance in filing rates across counties in any given year and a substantial increase in annual filings beginning in 1995. Figure 3 displays the dramatic increase in the national filing rate from 8.0 per thousand in 1994 to nearly 14.0 per thousand in 1998.

The empirical model is based on the authors' prior work (Barron, Elliehausen and Staten (2000)) but includes newly developed variables to capture the impact of casino gambling. The model estimates county-level bankruptcy rates as a function of county-level variables that reflect: (1) household decisions to use more debt relative to income, (2) incidence of (and vulnerability to) unexpected declines in income or increases in expenses, and (3) social/economic stigma that accompanies filing for personal bankruptcy. Values on most of the independent variables enter the model for both the current year and the prior year to reflect the common survey observation that bankruptcy petitioners struggle with financial problems for a year or more before filing.[5]

Variables in the first category include household income as well as a unique series of variables measuring credit activity. The credit variables derive from a newly available database assembled by Trans Union, LLC, one of the three major U.S. credit bureaus. This new database tool, named TrenData, is based on a series of large random samples of U.S. consumer credit histories drawn quarterly since 1992. Each quarterly sample contains approximately 30 million depersonalized credit reports. From this underlying sample, variables have been built to describe consumer borrowing and payment behavior aggregated to the county, state, and national level. Prior statistical research on many topics related to consumer borrowing decisions, especially personal bankruptcy, suffered from a lack of representative credit data below the national level. TrenData now makes it possible for researchers to construct variables that measure and control

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[5] Visa U.S.A. Inc., *1998 Bankruptcy Debtor Survey*, November 1998, pp 23-24.

for credit activity at the local level, a tremendous step forward for research seeking to explain differences in bankruptcy filing rates across jurisdictions.

Credit variables in the model include the number of debtors per household, average consumer (non-mortgage) debt per debtor, average mortgage debt per debtor, the number of revolving accounts per revolving user, and the proportion of the average borrower's credit accounts which were issued by finance companies. The first three credit variables measure the amount of debt per household. The inclusion of the number of revolving accounts and the proportion of all accounts at finance companies is a proxy for the average level of risk of the population of debtors in the county, as reflected in creditor supply decisions. Creditors view individual credit files to assess individual risk and make their lending decisions accordingly. A decision to extend a revolving line with a lower limit signals a creditor's assessment that the borrower is riskier, relative to a second borrower who received a higher limit. Consequently, an increase in the number of accounts in an area, holding constant the total amount of household debt, implies a riskier population and higher likelihood of bankruptcy. A similar argument underlies the inclusion of the finance company variable as a signal of a riskier underlying population.

In addition to the variables measuring casino gambling (explained in greater detail below) the other independent variables that capture household vulnerability to insolvency events include the state-level unemployment rate, the proportion of individuals divorced or separated, the proportion of households with at least some health insurance, the value of housing, and the proportion of individuals over the age of fifty. Bankruptcy filing rates are hypothesized to rise with both unemployment and the divorce rate. Bankruptcies should fall as more of the population is covered by health insurance. The market value of housing, when coupled with the

average mortgage debt, reflects the average amount of home equity. This serves as a proxy for (1) the level of household assets available as a cushion against income interruptions or expense shocks, (2) how much equity value would be given up in a Chapter 7 bankruptcy (which requires liquidation of non-exempt assets in order to pay off creditors) and (3) the general level of risk of borrowers in the area. All three interpretations of the variable imply the same expectation: higher average house values imply a smaller likelihood of bankruptcy, other factors held constant. A higher proportion of borrowers over the age of fifty should reduce the bankruptcy filing rate. Asset holdings and net worth rise with age. Consequently, older borrowers are less vulnerable to external income and expense shocks because they tend to have more assets available for liquidation.

Variables that capture the effects of social and economic stigma include population density, the proportion of households over the age of fifty, a dummy variable for counties in states with an unlimited bankruptcy homestead exemption, a dummy variable for counties in states that exempt delinquent debtors from wage garnishment, and a set of time dummies for 1994-1998. County-level population density reflects the effect of anonymity in reducing the reputational costs of filing for bankruptcy in more densely populated areas. Consequently, counties with higher population density should experience higher filing rates. Conversely, social stigma is hypothesized to be higher for older borrowers, whose attitudes were formed decades earlier during a period when bankruptcies were far less common. Counties with older borrowers should experience lower filing rates.

An unlimited homestead exemption allows a debtor to protect the full value of home equity from liquidation through the bankruptcy process. Bankruptcy rates should be higher in these counties. Wage garnishment is a creditor collection tool that a delinquent debtor can escape by

filing for bankruptcy. Consequently, a debtor's advantage to filing for bankruptcy is lower in states that prohibit garnishment, which should lead to lower filing rates.   The time dummies are included to detect any effects from an across-the-board decline in stigma over the past five years, independent of local effects related to age or density of the population. Table 2 displays the sources for all variables.

Measurement of Gambling Activity

Because previous public policy concerns and prior research have focused on the positive and negative local effects of casino gambling, as opposed to lotteries and other commercial gaming, our gambling variables measure the incidence and growth of casinos and devices. States with licensed (non-Indian) casino gambling were identified through an authoritative industry publication, *International Gaming & Wagering Business*.[6] The casino gambling category includes both land-based and riverboat facilities that provide electronic gaming activity (e.g., slot machines) or table games. Our gambling database includes facilities in 59 counties located in 11 states (Colorado, Connecticut, Illinois, Indiana, Iowa, Louisiana, Mississippi, Missouri, Nevada, New Jersey, and South Dakota).

Annual data on adjusted gross revenues (gross amount wagered, minus winnings paid to wagerers) by casino were collected from a variety of sources which varied by state. All states regulate gambling activity and require detailed reporting. State agencies contacted for data included State Gaming Commissions, Gaming Control Boards, Departments of Revenue and (in the case of Louisiana for data prior to 1996) the State Police. With the exception of two very large casinos in Connecticut, our database does not include casino gambling on Indian reservations.   Such data is extremely difficult to obtain. Because of tribal sovereignty, the

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[6] August issues of *IGWB* contain an annual supplement entitled "U.S. Gross Annual Wager" that provides statistics on gambling activity across the country.

various state gaming regulatory authorities do not have jurisdiction over reservation casinos. We were not able to identify any source in the industry, state governments, or the U.S. Department of the Interior (Bureau of Indian Affairs) that collected such data at the facility (casino) level and was willing to share it. The exceptions were the Foxwoods Casino and Mohegan Sun Casino in New London county, Connecticut, which are included in the database because they are the largest Indian casinos and are located near major population centers. Table 3 displays the aggregate adjusted gross revenue, by year, for the casino counties in our database. Excluding the Connecticut Indian reservation casinos, the database captures approximately 90% of non-Indian casino gambling activity in the U.S. in 1998.

The NORC study identified a significantly higher incidence of pathological gambling behavior in areas within 50 miles of casinos. Consequently, there is reason to expect that the presence of a casino may impact the financial stability of households within a 50-mile radius. Since this "impact area" often extends well into counties adjacent or near the county hosting the casino, a set of 375 "collar counties" was identified as either adjacent to the 59 casino counties, or with borders falling within 50 miles of the casino location. Exceptions to this definition occurred in Nevada which has large counties several hundred miles wide and towns widely dispersed.   In cases where the casino was located in the center of such large counties, some adjacent counties were well outside the "impact area" and were not designated as collar counties. Figure 4 displays the set of casino and collar counties.

From the casino database, two variables were constructed to capture the impact of casino gambling on county-level bankruptcy rates. For each of the more than 3,000 counties in the database, a "casino effect" variable was created that equals the aggregate annual adjusted gross revenues across all casinos in a county. The variable has a zero value for counties without

casinos. Since the database includes annual observations for each county from 1992 through 1998 this variable captures the presence of casinos as well as the growth of activity over time. A second "collar county effect" variable was constructed with a value equal to the aggregate annual adjusted gross revenues across all casinos within 50 miles of the collar county.   Note that in some cases collar counties were near more than one casino county. The collar county variable has a zero value for counties located more than 50 miles from casino counties. Note also that the casino and collar county definitions are mutually exclusive; a county can be one or the other but not both.

IV. Results

Results of the regression estimates are displayed in Table 4 and are consistent with nearly all of the hypothesized relationships. First, household decisions to take on higher debt loads clearly contributed to the rise in bankruptcies. Holding household income and other, non-credit factors constant, higher mortgage and non-mortgage debt levels per debtor were associated with higher bankruptcy filing rates at the county level, as was a larger average number of debtors per household. Interestingly, even after controlling for the amount of debt per household, the number of revolving accounts per debtor as well as the change in the number of revolving accounts per debtor were both positively associated with the bankruptcy filing rate. This result supports the hypothesis that when we observe a given amount of debt spread over a larger number of accounts it signals a riskier population. Similarly, the positive and significant sign on the variable for the proportion of credit accounts at finance companies suggests that the composition of accounts is an important signal of riskiness of the underlying population.

As for local economic and demographic factors, counties with higher average household income had lower bankruptcy rates. Similarly, changes in a county's average household income

were inversely related to its bankruptcy filing rate. Higher unemployment rates, higher divorce/separation rates, and less health insurance coverage all contributed to higher bankruptcy filing rates. Conversely, higher average housing prices, and a higher proportion of residents over the age of fifty (who tend to have relatively more assets and may feel greater stigma associated with filing as a function of attitudes formed when bankruptcies were far less common) tend to lower bankruptcy filing rates. As a proxy for local-level social stigma, population density was positively associated with filing rates (density reflects the effect of anonymity in reducing the reputational damage of filing for bankruptcy in more densely populated areas). Counties which permit wage garnishment had significantly higher bankruptcy rates, holding other things constant, suggesting that debtors do take a calculating approach to handling financial problems and opt for bankruptcy when the advantages (escape from court-ordered garnishment) outweigh the costs. However, the unlimited homestead exemption for Chapter 7 cases found in some states (most notably Texas and Florida) had no significant effect on bankruptcy filing rates.

Both variables capturing casino gambling activity were positive and significant. Consequently, the results suggest that, controlling for other factors, the volume of casino gambling is directly related to the bankruptcy filing rate in areas that have casinos nearby. Interestingly, the upward influence on bankruptcy filing rates associated with proximity to casinos declines with distance: bankruptcies in collar counties were less responsive to adjusted gambling revenues than were bankruptcies in casino counties themselves.

To quantify the effect, suppose there had been no growth in casino gambling activity during the years in which bankruptcy filings escalated, i.e., casino revenues were held at 1994 levels. The model suggests that bankruptcy filing rates in 1998 would have been 3.9% lower in counties that hosted or were adjacent to casinos but only 0.7% lower nationwide (See Figure 5). Put

another way, the model indicates that about 9,500 fewer petitions would have been filed

nationally in 1998 had gambling growth been flat between 1994 and 1998. Imposing a more

extreme assumption, suppose there were no casino gambling at all. The model predicts an 8%

decline in 1998 filing rates for casino and collar counties, and a 1.4% decline in filing rates

nationwide. We conclude that the proximity of casino gambling appears to be associated with

higher bankruptcy rates, but the local impact is far more pronounced than the influence of casino

gambling on national filing rates. Nationwide, the incidence and growth of casino gambling over

the past decade does not explain much of the rise in bankruptcies during the period.

Lastly, a significant, unexplained increase in bankruptcy filing rates occurred in 1996, 1997

and 1998 even after controlling for debt growth, number of accounts, a variety of insolvency

events and local-level stigma effects.[7] To the extent that declining stigma has increased

consumer willingness to take on more debt, those effects are already captured in the debt and

account growth variables. Consequently, the finding that there still remains significant

unexplained growth suggests that the second manifestation of declining stigma, i.e., an increased

willingness to file for any given level of debt relative to income, may also have contributed to the

dramatic surge in bankruptcies from 1996-1998.

IV. Concluding Remarks

Using multivariate techniques that control for the influence of factors such as debt usage,

income interruptions, expense shocks and filing stigma (social and economic) we found

statistically significant increases at the county level in the number of personal bankruptcy filings

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[7] This is consistent with the findings of Gross and Souleles (1999). Based on a detailed econometric study of the performance of several hundred thousand credit card accounts between 1995 and 1997 they concluded that, even after controlling for risk composition and other economic fundamentals, the propensity to default increased significantly over the period. Increases in credit limits on the cards explained only a small part of the change in default rates. Consequently, they found the results consistent with the "declining stigma" argument.

due to the introduction of casino gambling. Several caveats and additional comments are warranted.

First, by design, the model measures the *net effect* of gambling on the county-level bankruptcy filing rate. The potential boost to personal finances associated with the economic development that accompanies the introduction of a casino into a county is captured, in part, by our income and unemployment variables and should hold down the bankruptcy filing rate. Consequently, any influence of gambling on bankruptcy filing rates detected by the model is the net of both positive and negative influences on household finances. The economic development benefits appear to be significant: local officials across the country competed with each other throughout the last decade to attract the construction of gambling facilities to their state/jurisdiction.

Once completed, the type of facility constructed determines its repercussions on a community (Eadington 1999). Facilities that invite relatively more of their patrons from outside of their jurisdiction (tourist traffic) will see fewer adverse effects and attract relatively greater marginal local economic benefits. Consequently, a "destination resort casino" found in places such as Las Vegas or Atlantic City is effectively a "net exporter" of gambling negatives. Its patrons are generally tourists and take any financial difficulties back home with them while depositing their welcome tourist dollars. In contrast, an urban casino (or neighborhood video gambling outlet) attracts most of its patrons from the community and therefore the good effects are smaller and the bad effects remain in the community.   Consequently, Nichols (1999) suggests trying to measure the local effects of gambling based on the type of casino environment. This is an issue we plan to address with additional variable construction. Nichols (1999) found a

more pronounced influence of gambling on Chapter 13 bankruptcies than on Chapter 7 bankruptcies. This is also an area that we plan to explore in future work.

The construction of the gambling variables was designed to test the local-level influence of gambling activity on bankruptcy incidence. As noted above, given the volume of tourist trips to gambling destinations such as Las Vegas, Atlantic City and, more recently developed casino complexes along the Gulf Coast and in places such as Tunica, Mississippi, it is possible that some of the ill effects of casino gambling are exported back to the counties where tourists reside. Our gambling variables do not capture this effect if the tourist lives far away from a casino. Consequently, our model is silent on how much the growth in casino gambling during the 1990s may have influenced the national bankruptcy filing rate, other than the influence on the national filing rate exerted by filings in the 434 casino and collar counties themselves.

Finally, measurement of local effects associated with gambling activity is likely to become more difficult. Technological advances are rapidly changing the delivery of gambling services. The rise in Internet gambling activity has been dramatic and promises to continue. Christiansen Capital Advisors (CCA; formerly Christiansen/Cummings Associates), a widely cited industry specialist, estimates that adjusted gross revenue from Internet gambling increased from $300 million in 1997 to over $1.1 billion in 1999. CCA predicts that Internet gambling will increase by 55% per year until the year 2003. As Internet gambling expands, it will become more difficult to measure the local effects of gambling because there will be few, if any, local areas without it: all households with Internet service will have access to virtual casinos.

References

Arthur Andersen & Co. (1997*). Economic Impacts of Casino Gaming in the United States, Volume 2: Micro Study*. Washington, D.C.: American Gaming Association.

Barron, John M., Gregory Elliehausen, and Michael E. Staten. (2000). "Monitoring the Household Sector with Aggregate Credit Bureau Data." *Business Economics*. 35(1), January, pp.63-76.

Christiansen, Eugene Martin. (1999). "Steady Growth for Gaming." 1998 Gross Annual Wager supplement to *International Gaming & Wagering Business*. 20(8), August, pp.17; 22-25. See also August 1998 and 1996 issues.

Christiansen, Eugene Martin. (1998). "Gambling and the American Economy." *Annals of the American Academy of Political and Social Sciences*. 556, March, pp.36-52.

Eadington, William R. (1999). "The Economics of Casino Gambling." *Journal of Economic Perspectives*. 13(1), Summer, pp.173-192.

Eadington, William R. (1998). "Contributions of Casino-Style Gambling to Local Economies." *Annals of the American Academy of Political and Social Sciences*. 556, March, pp.53-65.

Gross, David B. and Nicholas S. Souleles. (1999). "An Empirical Analysis of Personal Bankruptcy and Delinquency." Wharton Financial Institutions Center Working Paper #98-28-B. November.

Liang, Kung-Yee and Scott L. Zeger. (1986). "Longitudinal Data Analysis Using Generalized Linear Models." *Biometrika.* 73(1), April, pp.13-22.

National Opinion Research Center at the University of Chicago, Gemini Research, The Lewin Group, and Christiansen/Cummings Associates. (1999). *Gambling Impact and Behavior*

Study: Report to the National Gambling Impact Study Commission. April. Available as part of the NGISC's final report issued June 18, 1999 at www.ngisc.gov.

Nichols, Mark W., B. Grant Stitt, and David Giacopassi. (1999). "Casino Gambling and Bankruptcy in New U.S. Casino Jurisdictions." April. Forthcoming in the *Journal of Socio-economics*.

SMR Research Corporation. (1997). *The Personal Bankruptcy Crisis: Demographics, Causes, Implications, & Solutions*. Hackettstown, NJ. pp.116-130.

U.S. General Accounting Office. (2000). Report to the Honorable Frank R. Wolf, House of Representatives. *Impact of Gambling: Economic Effects More Measurable Than Social Effects*. GAO/GGD-00-78. April. Washington, D.C.

Visa U.S.A. Inc. (1998). *1998 Bankruptcy Debtor Survey*. November. San Francisco, CA.

Walker, Douglas M. and John D. Jackson. (1998). "New Goods and Economic Growth: Evidence from Legalized Gambling." *Review of Regional Studies*. 28(2), pp.47-69.
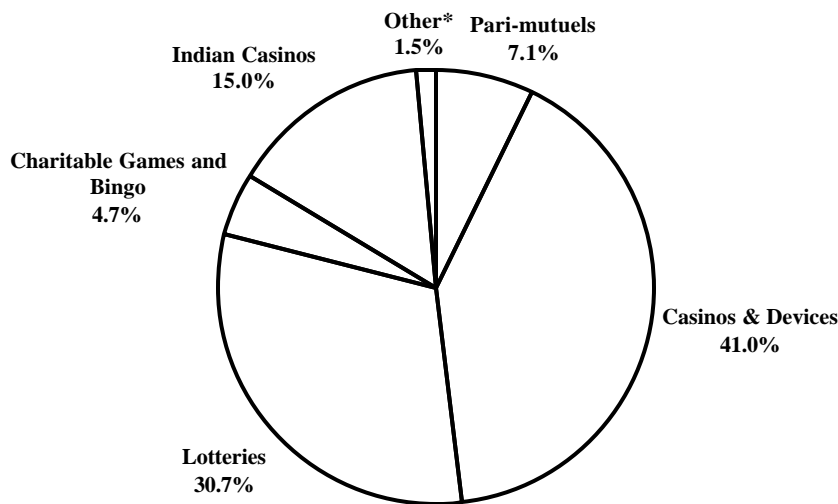
Figure 1

Nonbusiness Bankruptcy Filings,
(Thousands, NSA)
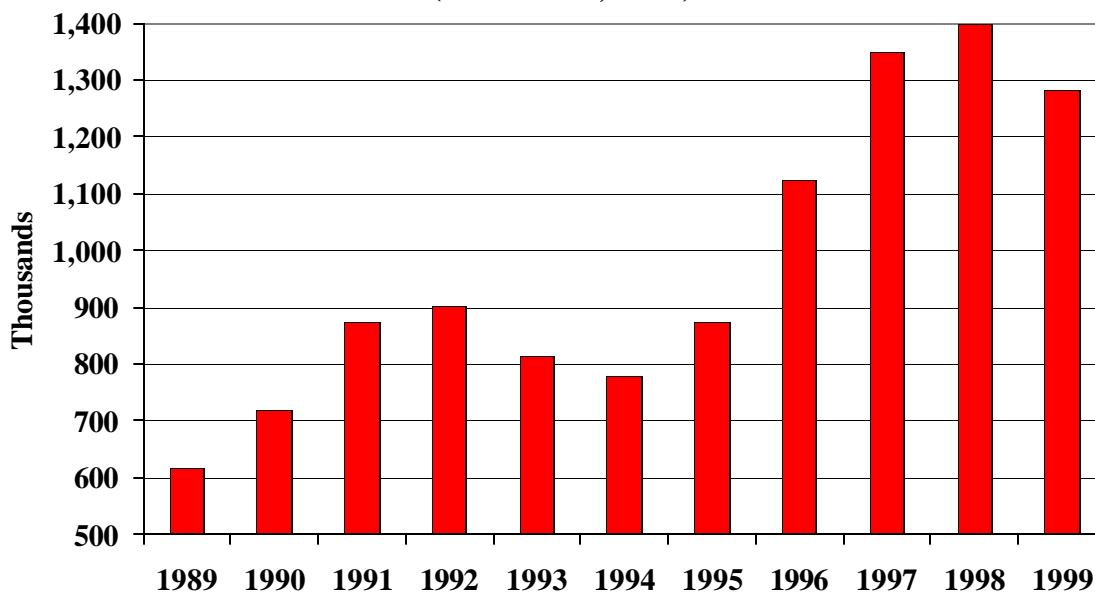
Source: Administrative Office of the U.S. Courts.

Figure 2

1998 U.S. Adjusted Gross Gambling Revenues

Other*
1.5%

Pari-mutuels
7.1%

Indian Casinos
15.0%

Charitable Games and
Bingo
4.7%

Casinos & Devices
41.0%

Lotteries
30.7%

U.S. Total Adjusted Gross Gambling Revenues: $54.3 Billion
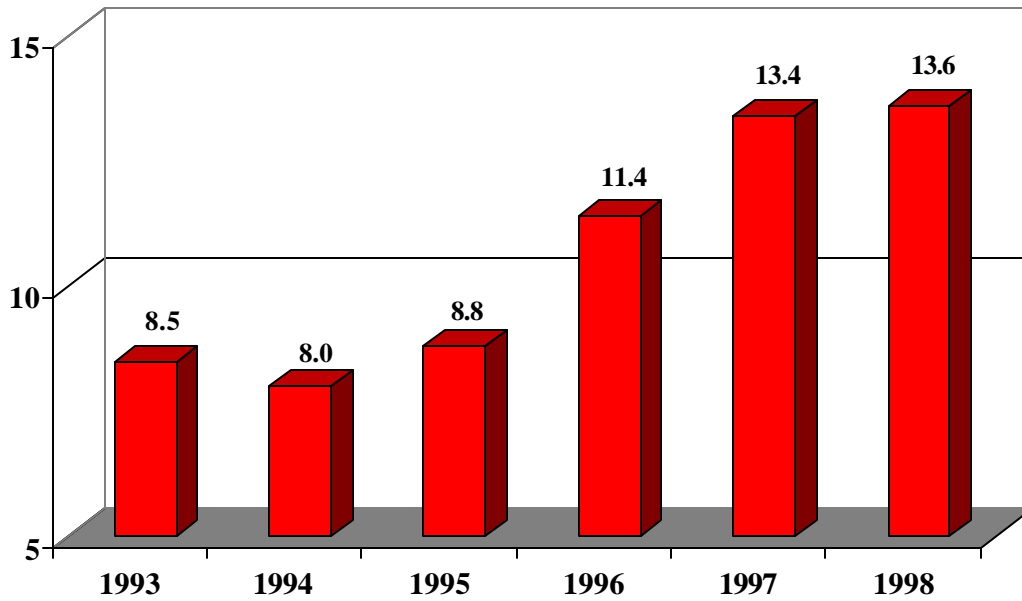
U.S. Total Gross Wagering: $677 Billion

*Includes Legal Bookmaking and Card Rooms.   Source: *International Gaming & Wagering Business* , August 1999.

Figure 3

Nonbusiness Bankruptcy Filings
per 1,000 Households

Sources: Administrative Office of the U.S. Courts; U.S. Bureau of the Census.

Figure 4

Casino and Collar Counties in the U.S., 1992-1998
(Study Sample represents 90% of non-Indian AGR in 1998)

County Type
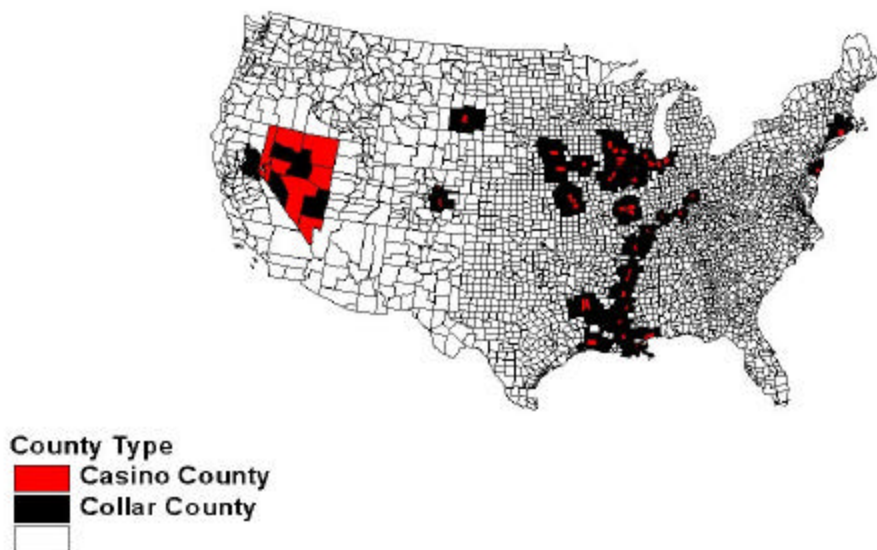- Casino County
- Collar County

Figure 5

Predicted Change in 1998 Filing Rates, Restricted-gambling-activity Scenario
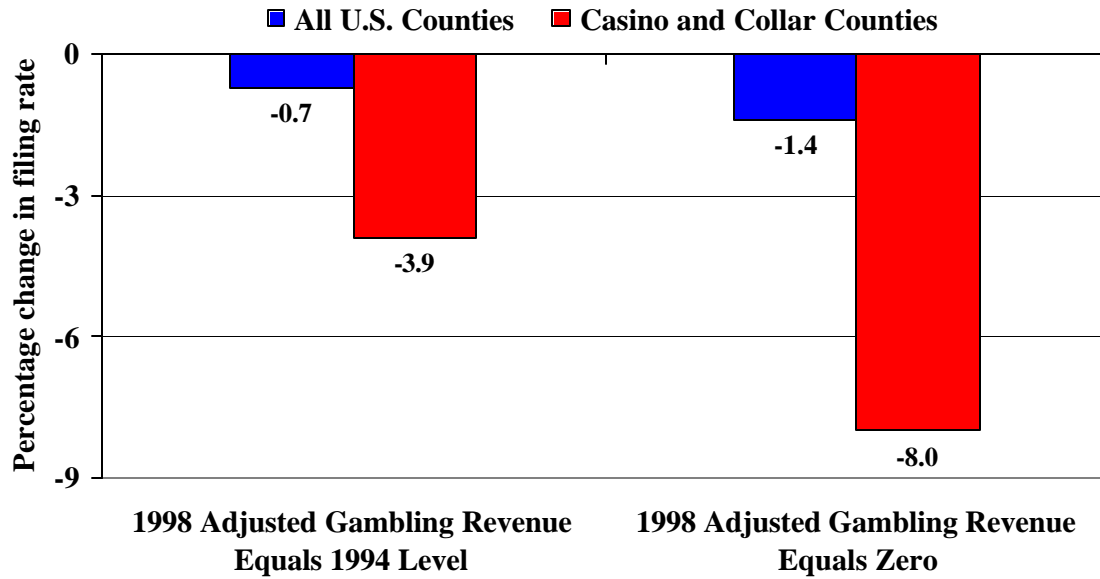
Table 1

Trends in Adjusted Gross Revenues (Consumer Spending)
(*Percent change year-over-year*)

	1998	1997	1996	1995
Casinos				
Nevada/NJ Slot Machines	6.3	4.4	2.8	7.4
Nevada/NJ Table Games	-2.0	3.7	-2.1	8.1
Deepwater Cruise Ships	7.4	4.3	2.3	-5.0
Cruises-to-nowhere	25.6	9.8	11.1	50.0
Riverboats	18.2	11.3	19.2	42.7
Other Land-Based Casinos	10.9	3.6	4.1	18.6
Other Commercial Gambling	3.3	-0.6	-0.4	30.1
Non-Casino Devices	5.4	17.2	5.5	29.7
Subtotal	8.5	7.2	6.3	17.2
Indian Reservations				
Class II	4.5	4.5	80.8	7.6
Class III	21.8	25.1	33.1	19.8
Subtotal	19.5	21.9	38.8	18.2
Lotteries				
Video Lotteries	16.2	23.6	44.4	34.1
Other Games	0.0	0.6	4.7	7.0
Subtotal	1.1	1.8	6.3	7.9
Pari-Mutuels				
Horse Total	1.9	2.0	3.5	4.5
Greyhound Total	-2.4	-6.1	-11.4	-4.2
Jai Alai Total	-6.6	-21.2	-4.4	-8.5
Subtotal	1.2	0.5	0.9	2.8
Charitable Games	2.3	6.2	-2.3	8.2
Charitable Bingo	1.6	-0.2	-2.2	-0.8
Card Rooms	5.6	2.3	-10.3	5.0
Legal Bookmaking				
Sports Books	-13.7	17.4	-3.8	-35.2
Horse Books	-187.9	-34.7	-54.5	-39.7
Subtotal	-25.6	11.3	-14.9	-36.2
*Internet Gambling**	117.1			
Total	6.6	6.3	8.0	11.5

Note*: Since Internet gambling operates internationally, its revenues are not included in U.S. totals.

Source: Calculated from data in *International Gaming & Wagering Business*, various August issues.

Table 2

Data Sources

Variable	Source
Annual county-level bankruptcy filings	SMR Research. Filings totals are derived from U.S. Administrative Office of the Courts, 1993-1998.
Annual county-levels of various types of debt, delinquencies, and number of revolving accounts	Trans Union (TU) TrenData ® data base, 1992-1998.
Annual county-level data on population and income	Dept. of Commerce, Bureau of Economic Analysis (BEA) 1992-1997. Projections for 1998 based on state growth rates.
Annual state-level unemployment rates	Bureau of Labor Statistics (BLS), local area unemployment statistics, 1992-1998.
Annual county-level data on proportion of households with some health insurance coverage and proportion of individuals divorced or separated (Note that some areas combine several counties)	Annual Current Population Surveys (CPS) of persons and households, March surveys, 1992-98; U.S. Bureau of the Census.
Price indexes used to convert debt, income and housing dollar amounts into "constant" (1998) dollars and to adjust 1990 Census housing values to reflect housing inflation	Annual Bureau of Labor Statistics CPI-U and housing index component.
County-level data on household size, age distribution, value of housing, and size in square miles	1990 U. S. County Census data.
Adjusted casino gambling revenues (wager minus payout) for counties with at least one casino, by year. Also, for counties without a casino but adjacent to or within 50 miles of a casino county, total adjusted gambling revenues of the casino counties nearby	Various state agencies with oversight responsibility for gaming activities.

Table 3

Casino Gambling Sample Characteristics

Year	Adjusted Gross Gambling Revenue ($billion, current)	Number of Casino Counties
1992	9.7	25
1993	11.3	31
1994	13.9	44
1995	16.6	50
1996	17.9	55
1997	19.5	57
1998	21.1	57

Counties with Casinos: 59

CO: Gilpin; Teller
CT: New London
IA: Clayton; Clinton; Des Moines; Dubuque; Lee; Polk; Pottawattamie; Scott; Woodbury
IL: Jo Daviess; Kane; Madison; Massac; Rock Island; St. Clair; Tazewell; Will
IN: Dearborn; Harrison; Lake; La Porte; Ohio; Vanderburgh
LA: Bossier; Caddo; Calcasieu; East Baton Rouge; Jefferson; Orleans
MO: Buchanan; Clay; Jackson; Pemiscot; Platte; St. Charles; St. Louis; St. Louis City
MS: Adams; Coahoma; Hancock; Harrison; Tunica; Warren; Washington
NJ: Atlantic
NV: Churchill; Clark; Douglas; Elko; Humboldt; Lyon; Nye; Storey; Washoe; White Pine
SD: Deadwood

Table 4

Determinants of County Bankruptcy Filing Rates: 1993 to 1998

Independent Variable	Mean (no log) (Std. error)	Coefficient (z-statistic)
Log of number of debtors per household	1.0528 (0.142)	0.186 (3.16)**
Log of prior year's number of debtors per household	1.053 (0.077)	0.254 (4.47)**
Log of average consumer debt per debtor	12,322.56 (2,597.18)	0.049 (2.11)*
Log of prior year's average consumer debt per debtor	11,628.54 (2,612.92)	0.188 (4.73)**
Log average mortgage debt per mortgage debtor	90,069.36 (40,378.35)	0.093 (2.22)*
Log of prior year's average mortgage debt per mortgage debtor	88,537.82 (40,433.45)	0.165 (4.19)**
Log of average number of revolving accounts per revolving user	3.9556 (0.560)	0.445 (4.88)**
Log of prior year's average number of revolving accounts per revolving user	3.7909 (0.560)	0.527 (6.24)**
Log of proportion of accounts at finance companies	.1880 (0.0518)	1.449 (6.79)**
Log of prior year's proportion of accounts at finance companies	.1816 (0.0509)	0.429 (2.17)*
Log of prior year's average value of housing	97391.48 (62271.31)	-0.145 (1.69)
Log of prior year's average household income	66403.99 (16846.10)	-0.932 (6.32)**
Change in log of average household income from prior year	1.0170 (0.020)	-0.569 (3.76)**
Prior year's state unemployment rate	6.1012 (1.495)	0.017 (2.11)*
Change in state unemployment rate from prior year	-0.4903 (0.508)	0.021 (4.43)**
Log of prior year's population density in terms of households per square mile	0.8027 (2.648)	0.099 (7.29)**
Log of prior year's proportion of adults who are divorced/separate	0.087 (0.016)	0.547 (3.00)**
Log of prior year's proportion households with some health insurance	0.7668 (0.052)	-0.244 -1.94
Log of proportion of adults over age fifty	0.3454 (0.063)	-0.092 -1.18
Log of adjusted gross gambling revenue (in thousands) per household for counties with legalized gambling	.1694 (2.231)	0.118 (6.27)**
Log of adjusted gross gambling revenue (in thousands) per household for counties neighboring a county with legalized gambling	.9572 (9.674)	0.036 (3.67)**
Dummy for counties in five states where wages exempt from garnishment	0.1806 (0.385)	-0.41 (11.03)**
Dummy for counties in eight states with unlimited home exemption	0.1938 (0.395)	0.024 -0.67

Table 4 (continued)

Independent Variable	Mean (no log) (Std. error)	Coefficient (z-statistic)
Year 1994 dummy	0.1667 (0.373)	-0.109 (9.06)**
Year 1995 dummy	0.1667 (0.373)	-0.077 (3.15)**
Year 1996 dummy	0.1667 (0.373)	0.097 (3.25)**
Year 1997 dummy	0.1667 (0.373)	0.207 (5.16)**
Year 1998 dummy	0.1667 (0.373)	0.196 (4.03)**
Constant		7.402 (6.38)**
Mean and std. dev. of dependent variable - Bankruptcy filing rate per 1,000 households	10.68 (5.49)	
Number of Observations	18,306	
Wald χ^2 (26)	7,7454.7	

The results reported are for a log-linear panel-data model using generalized estimating equations (a Poisson, random effects regression model) assuming first-order autoregressive correlation within counties. The Huber/White/sandwich estimator of variance is used to calculate "robust" z-statistics. The data is weighted by the average (over the time period) number of households in a county to obtain estimates reflecting the national bankruptcy rate. Note that the displayed means are weighted means of the non-log version of the variable. The sample is restricted to counties for which we have complete data for the 1993 to 1998 period on bankruptcy filing rates and debt data. Such a restriction dropped 30 counties from our analysis.

* Significant at 5% level; ** Significant at 1% level.