



Douglas M. Walker

The Economics of Casino Gambling

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With 23 Figures and 25 Tables

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For my parents and Carla.

Preface

Casino gambling has become a popular widely available form of entertainment. The industry has spread rapidly in the last twenty years, but there has been little scientific analysis of the social and economic effects of gambling. This is starting to change, as more than a handful of researchers have begun examining the economic effects of casinos and gambling. I began studying the economic effects of gambling with a focus on casinos in 1996. This book is the product of my research during the past ten years.

My goal in writing this book is to give a balanced, mainstream, comprehensive economic analysis of the casino industry. If I am successful, this will be a unique contribution to the gambling literature that will be a valuable resource to gambling researchers in a variety of disciplines, as well as policymakers and the general public.

Although it does not cover every aspect of “the economics of casino gambling” the book provides a fairly comprehensive discussion of the issues and the debates ongoing in the literature. The focus of the book is the economic effects of casino gambling, particularly the economic growth and the social costs that may accompany legalized casino gambling.

This is a book on economics but the fundamental concepts needed to understand the analysis in the book are outlined in the appendix. Therefore, researchers in law, medicine, psychology/psychiatry, political science, public administration, and sociology, as well as laypeople, should find this book accessible and interesting. The reader should come away with a solid understanding of how mainstream economists view the effects of casino gambling.

Unlike some contributors to the literature, I make a sincere attempt to acknowledge other perspectives and to alert the reader to specific areas of debate. To be sure, there is disagreement even among economists about the effects of casino gambling. These areas of debate receive considerable attention throughout the book. It is left to the reader to decide which perspectives seem most reasonable and convincing based on the available evidence. My hope is that this volume will provide an informative, interesting, and even controversial, discussion of the economics of casino gambling.

Although this book is published under a single name, it is the product working with several others. In particular, I wish to thank John D. Jackson and Andy H. Barnett for their contributions, without which this book could not have been written. In particular, Jackson was a co-author on papers from which Chaps. 4 and 5 were written, and Barnett was co-author on the paper which serves as the foundation for Chaps. 6 and 7.

I would also like to acknowledge William R. Eadington, who has been at the forefront in economics of gambling research. My understanding of the industry has been greatly enhanced by his work.

I am grateful to Robert B. Ekelund and John D. Jackson, who as my professors and friends have provided invaluable help and inspiration throughout my career. I owe my career to them.

Thanks to Chris Lowery and Henry Thompson, who proofread the manuscript and provided many helpful comments. J.J. Arias and Melanie Arias also gave helpful advice on parts of the manuscript. Finally, I thank Niels Peter Thomas and Barbara Karg at Springer for their help in bringing this book to fruition.

Despite my acknowledging these people, I recognize that they do not necessarily agree with my analysis and opinions. Naturally I accept complete responsibility for the content, including any errors, of this book.

Douglas M. Walker
December 2006

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1 Introduction

Since the early 1990s, casino gambling has become one of the most popular entertainment industries in the United States. Casinos are also prevalent in countries like Australia, Canada, China (Macau), South Korea, and the United Kingdom. Other countries are currently considering the introduction of casinos, e.g., Japan, Taiwan, and Thailand. A recent report (Zimmerman 2005) estimates that worldwide casino gambling revenues will reach \$100 billion by 2009. Even now, casino gambling is one of the most important leisure industries in the world. Table 1.1 presents the gross casino revenue in selected countries for 2003.

Table 1.1. Gross casino gaming yield in 2003, selected countries

Country	Revenue (millions \$)	Country	Revenue (millions \$)
Argentina	319.7	Malaysia	216.0
Australia	1,661.8	Malta	177.9
Austria	259.2	Mauritius	93.1
Bahamas	225.3	Monaco	388.7
Belgium	46.3	Morocco	23.8
Belize	59.7	Netherlands	789.4
Cambodia	74.2	New Zealand	265.3
Canada	3,704.9	Poland	228.4
Chile	33.8	Portugal	339.7
Costa Rica	368.3	Philippines	494.0
Croatia	29.6	Puerto Rico	49.1
Cyprus	101.7	Russia	780.0
Czech Republic	562.8	Slovakia	95.8
Egypt	295.9	South Korea	606.9
France	2,874.0	Spain	486.7
Germany	1,205.5	Sweden	225.1
Italy	600.5	Switzerland	416.6
Lebanon	285.6	United Kingdom	1,119.5
Macau, China	3,471.9	United States	26,397.5

Source: GBGC Global Gaming Review 2004/2005

The expansion of the casino industry has not been without controversy. Indeed, although politicians and voters are attracted by the tax revenues, economic growth, and employment effects promised by casino promoters, there is growing concern for the social costs that may accompany casino gambling. Complicating the issue has been a lack of quality research on the economic and social effects of casino gambling. There have been very few empirical analyses of the industry and its effects. Studies that have appeared in journals often have methodological flaws rendering their conclusions questionable.

This book is an examination of the economic and social costs and benefits of legalized casino gambling. It represents one of the first comprehensive treatments of the industry.

1.1 Outline of the book

As the reader may already suspect, gambling research is interdisciplinary. All social scientists interested in the casino industry, or in problem gambling behaviors, can benefit from an understanding of the economics of casino gambling. In order to make the book accessible to as many readers as possible, I have provided an introduction to some basic tools of economics. This discussion appears in the appendix.

The book is organized into two major parts. The first part (Chaps. 2–5) deals with the potential economic benefits from legalizing casinos, while the second part (Chaps. 6–8) deals with the potential economic and social costs of casinos.

Chapter 2 examines the general economic growth effects of casino gambling. This work is based on Walker (1998a, 1999) and Walker and Jackson (1998). Chapter 3 examines some common misconceptions about economic growth that have appeared in the casino literature. In Chap. 4, empirical evidence is presented on the growth effects of gambling in the U.S. This analysis is from Walker and Jackson (1998, 1999). Although the data run only through the mid-1990s, the analysis provides a foundation for future empirical research on the U.S. (using more recent data) or on other jurisdictions.

Chapter 5 deals with the relationships among the various gambling industries (casinos, horse and greyhound racing, lotteries, and Indian casinos) in the U.S. These interindustry relationships are important to consider in attempts to maximize tax revenues from legalized gambling. Although the analysis is for the U.S. industries, the methodology could easily be ap-

plied to other jurisdictions or countries. This analysis is taken from Walker and Jackson (2007a).

Chapters 6 and 7 examine the potential social and economic costs associated with casino gambling. The foundation of these chapters is Walker and Barnett (1999) and to a less extent, Walker (2003, 2007b). These chapters provide a comprehensive discussion of the various social cost issues that have been hotly debated in the literature during the past decade.

Chapter 8 describes some of the complicating factors of the casino economics literature. The discussion includes some general problems in gambling research, as well as specific examples from the literature. Parts of this discussion come from Walker (2001, 2004, 2007a, 2007b).

Chapter 9 discusses issues fundamental to government policy decisions: property rights and freedom of choice.

2 Casino gambling and economic growth

2.1 Introduction

One of the primary reasons for governments introducing casino gambling is the purported economic benefits from casino development. Among these benefits is economic growth. Over the last half-century, policies that promote economic growth have become an integral part of public sector economic activity. In the U.S., state government attempts to attract industry via tax breaks and financial incentives have been the object of considerable research attention. But the apparent inability of either of these sets of policies to sustain successful outcomes over time has led state policy makers to explore alternative avenues. Writing in the 1930s, Joseph Schumpeter noted that one method of spurring economic growth is to provide a new good to the consuming public. Since legalization of a previously illegal activity is tantamount to introducing a “new good” to the public menu of consumption possibilities, there should be no surprise that a growth policy that has seen increasing popularity is legalized gambling.

The past two decades have witnessed an explosion of U.S. state legalization of betting on horse racing, dog racing, lotteries, casino games, and so on. Even now, states consider legalizing additional types of gambling. Since gambling (locally provided, at least) is sometimes considered a “bad” by the electoral majority, some offsetting benefit to its provision must be offered to justify legalization. That benefit, politicians argue, is economic growth resulting from increased (export or local) spending, tax revenues, and employment. Eadington (1993) writes, “The fact that there is a strong latent demand for gambling – that, given the option, many people will choose to gamble – has not by itself been a sufficient reason for moving from prohibition to legalization.” He explains,

In order to be politically acceptable, the legalization of casino gaming – as well as other forms of commercial gaming – are usually linked to one or more “higher purposes” that can benefit from an allocation of a portion of the created economic rents and overcome the arguments against gambling. Such higher

purposes may be tax benefits, investment stimuli, job creation, regional economic development or redevelopment, and revenue enhancement for deserving interests. (Eadington 1993, p. 7)

Because the availability of casino gambling, in particular, has been strictly limited, regions that were early to legalize casinos could expect highly profitable industries and increased tax earnings and employment. Most of the literature deals with the U.S. experience, and that is the focus here.

There are numerous success stories of legalized casino gambling in the U.S. Las Vegas is certainly the most famous. Tunica County, Mississippi provides another interesting example. It had been known as the “poorest county in the nation” and the focus of many poverty studies. Webster Franklin, director of the Chamber of Commerce of Tunica, testified to the effects of the casinos at a 1994 congressional hearing. He explained how most of the studies on his county suggested government aid as the remedy for most problems. Yet government aid did not help lower the 26% unemployment rate. Franklin (1994, pp. 18–20) explains the effects of casinos:

In January 1992, per capita income in the county was \$11,865; ...53% of residents received food stamps... Since casinos have been legalized, however, land once valued at \$250/acre now sells for \$25,000/acre... The county’s planning commission has issued more than \$1 billion worth of building permits... Because of the increased government revenues, property taxes have been lowered by 32% in recent years... Unemployment has dropped to 4.9%... The number of welfare recipients has decreased 42%; the number of food stamp recipients has decreased by 13%... In 1994 the county recorded the highest percent increase in retail sales of all Mississippi counties: 299%.^[1]

Other studies tend to confirm the phenomenal growth that has occurred in Mississippi. The November 1993 issue of *U.S. News & World Report* ranked the state #1 for economic recovery due to gaming (Olivier 1995, p. 39). In the wake of Hurricane Katrina in 2005 that devastated the Gulf Coast, the Mississippi casino industry appears to be making an extraordinary recovery.²

¹ This is a summary of the main points raised by Franklin.

² It is unclear the extent to which the industry is receiving federal aid. Certainly the casinos held insurance. In any case, the casinos are rebuilding and have been doing well. The Mississippi State Tax Commission reports that in July 2005, the month prior to Hurricane Katrina, the state’s gross gaming revenue was \$237.6 million (including \$101.7 million from Gulf Coast casinos). The July 2006 gross gaming revenue was \$222.7 million (including \$74.4 million from the Gulf Coast).

There are also states and cities that have had less successful experiences with casinos. Many researchers believe the casinos in Atlantic City, for example, have largely failed to revitalize that economy. In some countries, the casinos are so small and few that they could hardly have an effect on local economies. An example of this would be casino gambling in Belgium. While casino gambling has just recently been legalized in some countries, in the U.S. the expansion seems to have slowed, with 11 states currently hosting legal non-Indian casino industries and 28 states with Indian casinos. Perhaps this slow-down is because of uncertainty of the real economic effects of legalization. What determines whether or not casinos will have a positive effect on economic growth?

Quality academic treatments of the economic effects of legalized gambling are still rare. Proponents of the industry – usually the industry itself and politicians – argue that legalizing gambling will create new employment and boost tax revenues in a region, state, or country. Although they have obvious conflicts of interest, the claims have some merit although the magnitude of the benefits is debatable. But there are other potentially more important arguments for legalizing casino (or other forms of) gambling. These are often ignored, even by gambling proponents.

This chapter provides an outline of some of the potential sources of growth from legalized casino gambling. Along with Chap. 3, this discussion should provide the reader with a solid understanding of economic growth as it relates to legalized casinos.

2.2 Increased employment and wages

When a community is considering legalizing casino gambling, one of the major benefits expected is an increase in local employment and the average wage rate. Yet, analyzing the effect of a new industry to a community can be tricky. Does the new industry create new jobs on net, or are jobs merely shifted among industries? This is an important issue that is commonly raised by researchers (e.g., Grinols 2004). Is the community better or worse off if the gambling industry “cannibalizes” existing industries? It is possible that a community would benefit through increased wages or increased competition among employers for qualified employees. This would occur, for example, because the casino industry is more labor-intensive than many other tourist or service industries. Even if other industries are harmed by the presence of casinos, employment and average wages may increase as a result of the introduction of casinos. The effects of gambling on local labor markets have not received adequate attention in

the economics literature. Clearly, the effect of casinos could be different in different economies.

Overall, there are probably significant employment benefits from the expansion of gambling industries at least in small economies. Often a new industry will attract an inflow of labor from neighboring areas. This inflow of labor effectively shifts the production possibilities frontier (PPF) outward, as shown in Fig. 2.1, increasing productive capacity in the area.

In the event no new labor is attracted to the area, some researchers have argued that “there is no net gain to the economy from shifting a job from one location to another, unless it increases profits to the economy” (Grinols and Mustard 2001, p. 147). This view ignores the effects the expanding industry has on consumer welfare. If the new job creates more value for consumers than the old job, consumers certainly benefit. Furthermore, Grinols and Mustard (2001) ignore the fact that workers who switch jobs to work at casinos must benefit from the new job, otherwise they would not have accepted it. Indeed, casino jobs must be the best employment opportunity available for all casino employees or they would work somewhere else. This benefit is certainly difficult to estimate in monetary terms, but its abstract nature does not mean it is irrelevant.

It is possible that casinos could enter an area, cannibalize all other industries, and then lower wages and benefits so that the new jobs are worse than the old jobs. However, there is no empirical evidence of this.

The extent of the positive employment effects from casinos depends on the circumstances of the case in question. But like any other industry, we would expect that increased competition for labor should benefit workers. If employers wish to hire capable and productive workers, they must offer wages competitive enough to attract them from other industries. Unfortunately, there has been relatively little research on the labor market effects of the casino industry. This is an important issue that deserves more attention from independent researchers.

2.3 Capital inflow

Another effect of legalized gambling is the potential inflow of capital. The building of huge casinos is an example of this capital inflow. This capital expansion in effect expands the PPF, as illustrated in Fig. 2.1. Once casinos are established, the potential for other firms to enter the market and succeed may rise or fall. It would depend, to an extent, on local market conditions.

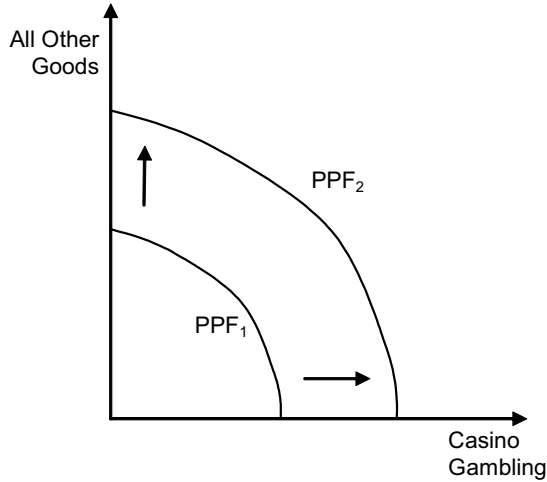


Fig. 2.1. Economic growth from the inflow of productive resources

Less capital-intensive industries (lotteries or race tracks) may have the same effects, but to a lesser extent than casinos. Empirical research on the effects of capital inflow due to legalized gambling is scarce, but conceptually, its effect would be similar to that of labor inflow.

The alternative view, of course, is that the expansion of casinos simply reduces capital dedicated to expanding other industries in the local economy. Still, one could argue that the industry that best pleases consumers will be that most likely to expand and succeed in the long run.

2.4 Increased tax revenues

Most researchers, politicians, media reporters, and citizens believe that the tax revenues from gambling are one of the primary benefits of legalized casinos. Indeed, this is one of the major selling points of casinos.³ However, from a purely economic perspective, tax revenue should not be considered a net benefit of any policy. The reason is that the taxes gained by

³ The casino industry has hired accounting firms to perform “economic analyses” of casino expansion. These studies often speculate on the employment, wage, and tax effects of casino expansion. However, the validity of these studies (e.g., Arthur Andersen 1996, 1997) is questionable. Funded research is discussed in more detail in Chap. 8.

government come at the expense of the taxpayer. In other words, the benefits to one group are offset by costs to another group.

Even so, voters or politicians in a state/province/country may decide that certain types of taxes are preferable to others. For example, if there is the choice between an “avoidable” tax like a tax on lotteries or casino owners where taxes fall on the consumers or sellers of specific “sin” goods and an “unavoidable” tax like a sales tax, then many people may prefer the lottery tax or taxes on casino revenues over a general sales tax.⁴ The popularity of casinos as a fiscal policy tool has something to do with politicians wanting to generate tax revenue in a relatively painless way. Taxes on casinos are likely to face less opposition than increasing a general sales tax. Overall, taxpayers would prefer avoidable rather than unavoidable taxes, so in this sense gambling taxes could be considered a benefit. In cases where casinos are located on state or country borders, much of the tax revenue may accrue from outsiders. In this case, the tax revenue can be counted as a benefit to the local population who may see their own tax burdens decrease as a result of casino expansion.

Obviously, good records exist for tax revenue making it relatively easy to measure. In determining the net tax benefits from casinos, as with other purported benefits from casino expansion, it is necessary to consider the *net* change in tax revenue, not simply the absolute taxes paid by casinos.

2.5 Import substitution

Perhaps one of the strongest arguments for legalizing casinos in a particular state, region, or country, is that the citizens enjoy gambling and they are currently going outside to gamble. If instead they had the opportunity to gamble at a casino in their home area, the local benefits would be greater.⁵ So instead of “importing” gambling services (i.e., purchasing these services from outside providers) they substitute the imports with locally provided gambling services. This may result in positive economic effects from casino expansion, including capital development, increased demand in labor markets, and increased tax revenue. The tax revenue “kept

⁴ From the consumer perspective, a sales tax *is* avoidable, but not easily, and much less so than a casino tax.

⁵ This issue is mentioned by most researchers, including gambling opponents, as one of the most important benefits from legalizing casinos. However, whether this effect is long-term or short-lived is an issue that has not been empirically examined.

home” is one of the primary arguments used by supporters of legalized casinos.⁶

The basic issue here is that the economic benefits will be kept at home rather than going to foreign casino markets. But as casinos become more widespread, the touristic economic benefits would be expected to decline. In the extreme case with casinos prevalent everywhere, the amount of tourist casino gambling would be minimal. In this case, casino opponents argue that little or no economic benefits will result from adding new casinos. Whether “local” gambling creates economic benefits is discussed below.

2.6 Increased “trade”

Trade, either inter-regional or international, can serve an important role in fostering economic growth. In one sense, trade with outsiders is no fundamentally different than any other mutually beneficial voluntary transaction. However, trade often receives special attention from policymakers, especially in tourism based economies. Tourism can be thought of as an export. Still, as Tiebout (1975, p. 349) explains, there are other important factors that determine economic growth:

There is no reason to assume that exports are the sole or even the most important autonomous variable determining regional income. Such other items as business investment, government expenditures, and the volume of residential construction may be just as autonomous with respect to regional income as are exports.

Nourse (1968, pp. 186–192) gives another account of exports and their role in economic growth.⁷ He explains that increases in the demand for an exported product lead to increases in demands for inputs to that industry. The increased factor demand pushes factor prices up, attracting additional resources to the industry from other regions and industries. As resources move in, factor prices drop back in line and migration stops. As a result of this process, the region now has more capital and labor resources. In effect, the production possibilities frontier for the region has shifted outwards – economic growth. This growth is consistent with North’s concession that,

⁶ A current example can be seen in Taiwan, considering developing casinos on Penghu Island. One argument used by supporters is that the casinos will raise tax revenue from those Taiwanese who currently travel to Macau, South Korea, or elsewhere to gamble.

⁷ Also see Hoover and Giarratani (1984) and Emerson and Lamphear (1975, p. 161).

although “the fortunes of regions have been closely tied to their export base...it is conceivable that a region with a large influx of population and capital might simply ‘feed upon itself’ and thereby account for a substantial share of its growth” (North 1975, p. 339, note 34).

In analyzing how economic growth occurs, we must consider not only exports and demand, but also imports and supply-side issues. We could alternatively base our casino analysis, as Hoover and Giarratani (1984, pp. 329–330) note, on a “*supply-driven model* of regional growth [which] takes *demand* for granted...and thus makes regional activity depend on the availability of resources put into production.” They stress that the sole focus on either exports or a supply driven model “is one-sided and can be seriously misleading; for full insight into real processes, both need to be combined.”

When considering the economic effects of casinos, it is imperative to have an understanding of growth theory. Exports *and* imports can be important in a region’s growth. However, an industry need not export to have a positive effect on economic growth. A region – like a firm or an individual – may experience economic growth from numerous sources, including imports, capital inflows and, more generally, increased transactions or spending.

2.7 Increased transactions volume

More fundamental than benefits from trade with “foreigners” (or individuals from outside a particular region) are the benefits from simple exchange. Perhaps the most significant source of economic benefits related to legalized gambling is an increase in consumer and producer surplus, yet these are rarely mentioned in the literature.⁸

When the availability of gambling is increased, the number of mutually beneficial, voluntary transactions increases. This a fundamental source of economic growth. After all, each additional transaction increases the wealth of the two individuals involved, while typically harming no one. Note that I am saying that the wealth of the gambler increases, even though he is (on average) losing money with each transaction (bet) at a casino. His overall well being increases because he makes the rational decision to place a bet, aware of the negative expected value of the bet. He must therefore be receiving satisfaction or “utility” from the activity of gambling.⁹

⁸ These concepts are introduced in the appendix.

⁹ See Marfels (2001).

Schumpeter ([1934] 1993, p. 66) lists five primary sources of economic development:

- (1) The introduction of a new good – that is one with which consumers are not yet familiar – or of a new quality of a good. [New casinos are examples of this.]
- (2) The introduction of a new method of production, that is one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially.
- (3) The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before. [This applies to casino gambling in many markets.]
- (4) The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
- (5) The carrying out of the new organisation of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position.

A common feature of each of these paths to growth is that each implies an increase in the number of mutually beneficial, voluntary transactions. Though this is perhaps the most important benefit of legalized gambling (because the process leads to increases in per capita income and overall economic growth for society) it is one that is rarely mentioned by politicians, the casino industry, or many researchers, perhaps because it is rather abstract.

It is worth explaining the seemingly obvious nature of mutually beneficial market transactions, and why casino gambling may bring economic benefits even if it does not attract tourists. In market transactions, both the consumer and producer expect to benefit or they would not willingly engage in the transaction. The producer seeks profit (producer surplus, the excess of price over cost), and the consumer receives consumer surplus (the excess of value over price paid).

Let us use the terminology “domestic” and “foreign” to refer to the location of the buyers and sellers. These terms may be taken literally if we are talking about two countries. However, it would also apply if we are considering the effects on a locality, state, or region.

Consider exports first. Even casino opponents agree that casino “exports” or the attraction of tourists will result in economic benefits. Exports benefit domestic sellers and foreign consumers. There is a positive net effect for the domestic economy. Imports benefit foreign sellers and domestic consumers, and there is a positive net domestic economic effect. Finally, with a local transaction, both the domestic seller and buyer benefit. This is arguably the type of transaction that yields the greatest benefit for

the domestic economy, but it depends on the size of the PS and CS from the transaction.¹⁰

This is an important perspective on transactions that must be kept in mind, especially in light of the more common (and wrong) mercantilist perspective (see Chap. 3).

2.8 Consumer surplus and variety benefits

Each voluntary transaction involves consumer and producer surplus (CS and PS) as described in the appendix. There may be no greater benefit from legalized casino gambling than the enjoyment consumers receive from the activity. After all, consumers vote on their favorite goods and services with their spending. The consumer benefits from gambling are likely to be much greater than tax revenue or employment growth benefits from casinos. Several authors have acknowledged this (Eadington 1996; APC 1999; Walker and Barnett 1999; Collins 2003) but most researchers discount or ignore it (Grinols and Mustard 2001; Grinols 2004). Yet, consumer benefits are critical to understanding how the availability of gambling can benefit society.

There are at least two potential sources of consumer benefits from casino gambling. Normally, consumers benefit when increased competition in markets leads to lower prices. This is one source of consumer surplus, illustrated in two examples. First, sometimes casinos advertise particular games and offer better odds than competing casinos. If the effective price of playing the casino games falls, then CS rises. Second, casinos are often bundled with other products like hotels and restaurants. To the extent casino competition increases competition in the local restaurant and hotel markets, whether through price decreases or quality increases, the casinos provide more benefits to consumers in the form of CS. These benefits have been ignored in most cost-benefit of gambling studies.¹¹

There have been some recent empirical studies on the issue. For example, in studying the U.K. horse racing industry, Johnson, O'Brien, and Shin (1999) test for a utility component to gambling. When betting on a horse, a person has the choice of paying a 10% tax on the wager or on the return (if his horse wins). The authors show that the first choice is always best from

¹⁰ The domestic benefits of this transaction may be higher because there are likely lower transport costs and because both parties to the transaction are domestic.

¹¹ In the case of casinos, many researchers have instead focused only on the "cannibalization" effects.

an expected wealth perspective. However, as the size of wagers rises, the tendency to choose a tax on the return rises. This suggests a “consumption value” of gambling that rises as the size of the wager rises.

The other consumer benefit that has been ignored by most researchers relates to product variety. When casino gambling is first introduced to a state, it has the effect of increasing the product choices for consumers. This “variety benefit” could be significant but it is difficult to measure.¹² In his recent book, Grinols (2004) ignores both of these potential benefits from gambling and instead focuses on “distance consumer surplus.” He argues that one of the few benefits of the spread of casinos in the U.S. is that gamblers do not have to travel as far to reach a casino. But this benefit seems trivial compared to the other potential benefits of casino expansion.

Some of the largest benefits of gambling defy measurement. As a result, many researchers focus on more obvious benefits of gambling, like employment and tax revenues. If research is to improve in quality, these consumer benefits must be considered.

2.9 Potential for immiserizing growth

The above discussion suggests that the introduction of a new firm or industry – including casino gambling – that caters to consumer demands tends to increase economic well being. However, it is conceptually possible that economic growth can cause a *decrease* in welfare – so called immiserizing growth. This would be graphically represented as in Fig. 2.2, by an expansion of the PPF.¹³ Yet, through a process of trade and price adjustments, the society ends up on a lower indifference curve (IC) than it was originally.

This potential was first identified by Bhagwati (1958). The context is that of international trade when a country specializes in the production of a particular good. If specialization in oil increases the world supply to such an extent that it places significant downward pressure on the world price, overall welfare in the country may decrease as a result of specialization and trade. The same could apply to a regional or state economy that specializes in the production of gambling services.¹⁴ Although this is techni-

¹² Some economists have examined this effect. For examples, see Hausman (1998), Hausman and Leonard (2002), Lancaster (1990), and Scherer (1979).

¹³ Fig. 2.2 is from Carbaugh (2004, p. 74).

¹⁴ This possibility requires trade. As a result of trade, the region or country is able to consume on an IC beyond the PPF. This is the reason trade is beneficial to individuals and countries. As the casino industry expands the region attracts more

cally possible, examples of immiserizing growth are very rare, since very specific criteria must be met.¹⁵ For a discussion, see Bhagwati (1958) and Carbaugh (2004, pp. 73–74) or Husted and Melvin (2007, pp. 288–289).

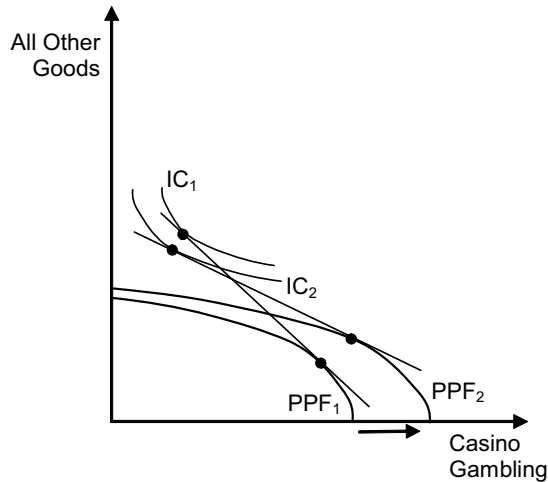


Fig. 2.2. Immiserizing growth

2.10 Conclusion

Economic growth and increased welfare are not solely dependent on exports or monetary inflows to a region. Rather, they depend fundamentally

tourists (Fig. 2.2). The region develops a stronger comparative advantage in casino gambling and the opportunity cost of production in that industry falls relative to the other industry. This explains why the slope of the line tangent to PPF_2 is lower than the slope of the tangency to PPF_1 .

¹⁵ To fully understand the implications of the immiserizing growth theory, one must have an understanding of international trade theory. Carbaugh (2004, p. 73) explains, “The case of immiserizing growth is most likely to occur when (a) the nation’s economic growth is biased toward its export sector; (b) the country is large relative to the world market, so that its export price falls when domestic output expands; (c) the foreign demand for the nation’s export product is highly price-inelastic, which implies a large decrease in price in response to an increase in export supply; and (d) the nation is heavily engaged in international trade, so that the negative effects of the terms-of-trade deterioration more than offset the positive effects of increased production.”

on mutually beneficial exchange. *Any* industry that increases consumer options will increase social welfare as long as the consumption is not harmful to others. And even in the case that the consumption does harm third parties, overall welfare may still increase.

It is true that some industries may suffer as a result of introducing a new industry (gambling or other) into an economy. This effect can be represented by a movement along the PPF for the economy (as shown in Fig. 2.3). Jobs will be lost in some industries, but are made up in others. This transition is a normal occurrence in market economies; as new industries and firms enter markets, others will leave. Transition is a necessary component of the process of economic development.

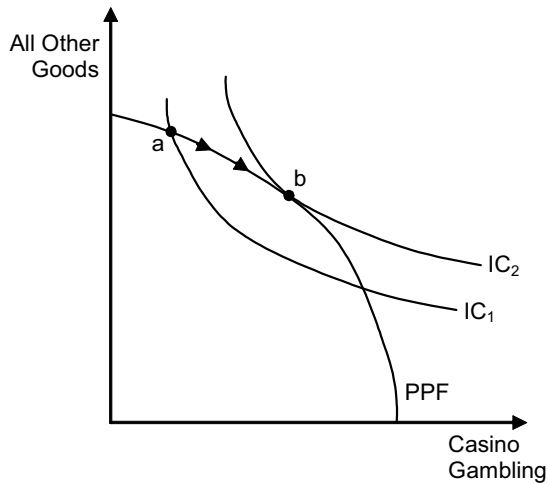


Fig. 2.3. Movement along the PPF, with an increase in welfare

The economic growth effects of casino gambling are not without controversy. Chapter 3 is an analysis of the arguments that suggest that casino gambling does *not* provide economic benefits. In some cases, these arguments are valid, but in other cases there are flaws. The result is that some legitimate sounding arguments turn out to be completely baseless.

The net effects of introducing a new good such as casino gambling are examined in Chap. 4. The idea that casinos must “export” in order to have any positive effect on economic growth is commonly held, but empirical evidence suggests that exports are not necessary for growth. When jurisdictions consider the legalization of gambling, they should look at more than how many tourists they expect to draw. What effect will the capital and labor inflow have on the local or regional economy? How will local

consumers benefit from the introduction of a good previously unavailable in the area? These questions must be addressed if policy makers and the voting public are to be better informed.

3 Misconceptions about casinos and growth

3.1 Introduction

The economic effects of casino gambling have been examined in a number of U.S. states and regions, and in other countries, by a number of authors.¹ Despite the volume of studies on the effects of gambling, there is no consensus among researchers. This chapter focuses on different arguments related to the economic growth effects of casino gambling.

A majority of gambling researchers during the past 15 years argue that expansion in the gambling industry has led to decreases in other industries, resulting in little overall economic stimulus.² This argument appears to be particularly convincing to politicians and voters. In any case, there is a grain of truth to the argument but it is not as simple as suggested. We examine these issues in detail in this chapter.

There are four varieties of the argument that casino expansion comes at the expense of other industries, resulting in no net positive economic effect:

- (i) “industry cannibalization”
- (ii) the “factory-restaurant” dichotomy
- (iii) export base theory of growth
- (iv) money inflow (mercantilism)

The reader will notice the four ideas are close relatives, so the presentations of the different arguments and the responses overlap somewhat.

¹ Many of the early studies on states in the U.S. are cited by Walker (1998a). Much more on Indian casinos can be found in Eadington (1990). For numerous testimonials by representatives from around the country, see U.S. House (1995). For a more recent comprehensive discussion, see Eadington (1999).

² The potential social costs caused by pathological gambling (discussed in Chap. 6) are also important.

3.2 Industry cannibalization

One of the most common arguments about legalized gambling is that any additional economic activity spurred by gambling comes at the expense of activity in other industries. That is, the introduction of gambling merely shuffles spending among industries so any positive employment or income from gambling are offset by losses in existing industries that see lower sales volume and decreased employment. This idea is typically referred to as “industry cannibalization” or the “substitution effect,” and is described by Gazel and Thompson (1996), Goodman (1994a, 1995b), Grinols (1994a, 1994b, 1995a, 2004), Grinols and Mustard (2001), Grinols and Omorov (1996), and Kindt (1994). For other discussions of the issue, see Eadington (1993, 1995a, 1995b, 1996), Ewart (1995), Goodman (1994b), Rose (1995), and Walker and Jackson (2007a).

It is clear that legalized gambling may replace other businesses. This is always the case when one producer offers a product or service that consumers prefer to those previously available. “Cannibalization” – the result of *competition* – is the normal and healthy part of the market process that helps ensure consumers get the products they most desire. From a social welfare perspective, the significant issue is not whether some firms are replaced by others but whether the introduction of the new product increases total societal wealth. Detlefsen (1996, pp. 14–15) explains,

Invocation of the substitution effect [argument] in this context not only presumes a static, zero-sum economy in which no business can grow except at the expense of other firms.³ It mistakenly implies that certain types of commercial activities, such as casino gambling, create no new “real” wealth and provide no “tangible” products of value. That view overlooks the key point that all voluntary economic exchanges presumably are intended to improve the positions and advance the preferences of *both* parties (in other words, improve their social welfare). That the gains from such exchanges (particularly in a wealthier, service-oriented economy in which a greater portion of disposable income is consumed for recreational activities) are not easily quantifiable in every case is beside the point. After all, the only true measure of the value of entertainment-oriented goods and services in the diverse U.S. economy ultimately remains in the spending preferences expressed by individual consumers.

³ The “zero sum economy” is unrealistic because it ignores the fact that there are always more and different things that consumers would like. When a particular industry fails, productive resources (land, labor, capital, energy, managerial skills) are freed up to produce in other industries.

This issue can be analyzed in the context of the PPF model introduced in the appendix. The model sheds light both on the employment and welfare effects of increased gambling activity within an economy. With existing unemployment, it is possible that there would be no significant “cannibalization” if currently unemployed individuals are hired by the new industries. If there is near full employment initially, then the situation would appear as in Fig. 3.1. In this case, it is true that there will be a reallocation of productive resources among industries.⁴

The consumers’ choice to consume more gambling and fewer other goods implies movement along the PPF toward more gambling (from *a* to *b*). Employment in casinos increases, while it falls in other industries. Generally, the effects of this movement along the PPF are about neutral with respect to overall employment.⁵

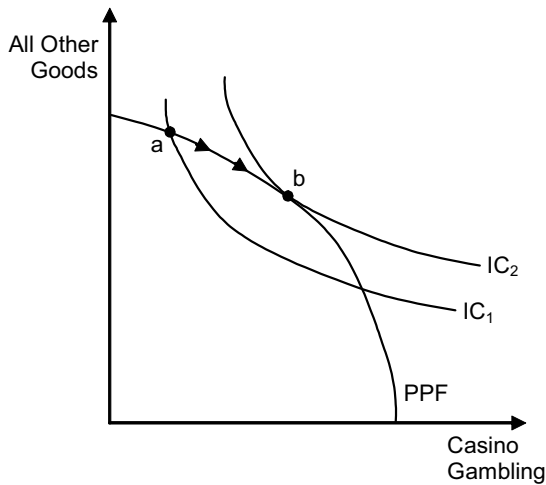


Fig. 3.1. Movement along the PPF, with an increase in welfare

However, if there is initially unemployment then it is conceptually possible that expansion in one industry could increase overall employment even if the other industry shrinks. For example, if the casino industry is labor intensive and expands while other entertainment industries (e.g., movie thea-

⁴ The figure is shown assuming no growth in the overall productive capacity of the economy

⁵ Obviously, this statement depends on several assumptions, and is not always true. In the context of international trade, however, empirical studies suggest that it is generally true (Krugman 1996, p. 36).

ters) are capital intensive and contract then overall employment might increase with the adjustment. The average wage rate is likely to increase as a result of this adjustment, as new industries must offer higher wages to attract workers from their existing jobs.

More importantly, the industry cannibalization argument ignores the fact that pure shifts in employment due to consumer preferences increase welfare. Production is shifted from less- to more-preferred goods and services. This is illustrated by the movement of consumers to a higher indifference curve (Fig. 3.1). This adjustment makes some displaced workers unhappy, but it is a necessary part of economic development in capitalist societies (Roberts 2001).

The PPF model can be more enlightening if we incorporate the government restrictions of the casino industry. Consider Fig. 3.2 that represents the production of casino gambling and all other goods in the U.S. The PPF for 1978 represents the situation in which casinos are legal only in Nevada and New Jersey. By 1990, some economic growth has occurred, both in terms of casino and non-casino industries (PPF_{1990}). PPF_{2005} shows moderate non-gambling industry growth and a massive expansion of legalized casino gambling due to the changing legal status of casinos across the U.S.

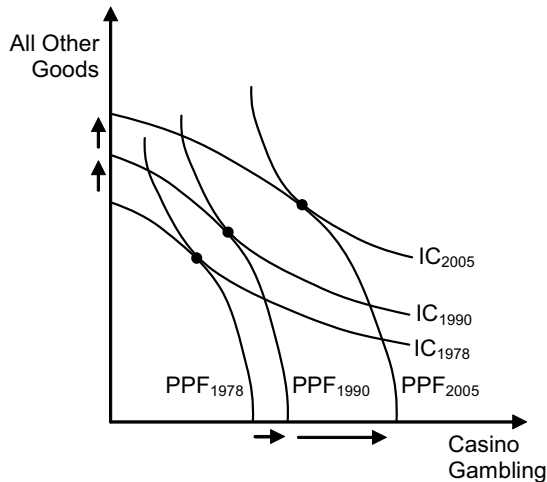


Fig. 3.2. Economic growth in the casino and other sectors over time

Depending on the relative preference for casino gambling, it is likely that expansion of the activity has increased social welfare as illustrated. In a case with extremely flat ICs this would not occur. (It would also not occur if gambling was a “bad” to consumers.) But evidence of significant in-

creases in gambling volume suggests U.S. social ICs are not very flat. If the ICs were flat, which would suggest a very weak preference for gambling relative to other goods and services, the tangencies in Fig. 3.2 would be nearly vertically aligned. But the substantial increase in gambling industry revenues from 1978 to 2005 implies no such vertical alignment.⁶ The expansion of gambling *is* due, at least in part, to consumer preferences for the activity despite the arguments of many anti-gambling advocates.⁷

3.3 The factory-restaurant dichotomy

Advocates of the cannibalization argument suggest economic growth from legalized gambling is unlikely under any circumstance. A less strict form of the argument is the factory-restaurant dichotomy because it allows economic growth when outsiders are the gambling customers (when goods/services are exported). The terms “factory” and “restaurant” have been used to describe the effects of “export” casinos and “local” casinos, respectively:

A factory, when it locates in an area, sells to the rest of the country. Its payroll, materials purchases, and profits spent locally are new money to the area that represents tangible goods produced. On the other hand, adding a new restaurant that caters to local population in an area simply takes business from local firms [i.e., industry cannibalization]. The question for a particular region therefore is: Is a casino more like a factory or a restaurant? In Las Vegas, casinos are more like factories because they sell gambling services to the rest of the Nation. In most other parts of the country, gambling is like a restaurant, however, drawing money away from other businesses, creating no economic development, but leaving social costs in its wake. (Grinols 1994b, p. 9)⁸

Also consider these quotations supporting this view:

- Providing gambling to residents transfers money from one local pocket to another and from one local sector to another, but does not lead to a net increase in regional demand. (Grinols and Omorov 1996, p. 80)

⁶ We are ignoring social costs created by gambling, but these are not relevant for understanding whether the industry expansion alone causes an increase in welfare.

⁷ For example, see Gross (1998) and Goodman (1994a, 1995b). Advertising and the lobbying efforts of the gaming industries obviously will affect the expansion of gambling.

⁸ Also see Grinols (1995b, pp. 7–9; 2004, Chap. 4).

- But only *new* spending associated with a gambling venture, like spending by tourists who come into a region to gamble or new jobs, actually brings new money into the local economy. [This has a positive spending multiplier effect.] But when local people substitute spending on gambling for their other expenditures, this *induced* impact has a negative multiplier effect of decreasing spending on other forms of recreation and businesses in the area. (Goodman 1994a, p. 50)
- A casino acts like a black hole sucking money out of a local economy. No one cares if you suck money out of tourists, but large-scale casinos that do not bring in more new tourist dollars than they take away from local players and local businesses soon find themselves outlawed. (Rose 1995, p. 34)

Goodman (1995b, p. 25) admits that

in those rare instances where a casino was located in an area with a negligible economic base and few jobs to begin with – an impoverished rural area...or a severely depressed area...there could be a significant positive economic transformation...since there are almost no preexisting local businesses to be negatively affected.

But the fact that there is no industry cannibalization does not adequately explain the economic growth.

It is true that most people who gamble in Nevada are from other states. Indeed, many casinos worldwide are designed to be resort attractions (Macau). However, this is not always the case, so perhaps the restaurant-factory analogy is appropriate to some extent. But even if we accept that the dichotomy may have theoretical legitimacy, the conclusions are certainly debatable. Do Grinols, Goodman, and the others believe that a new restaurant opening in town is a bad thing? If consumers like the new restaurant better than existing ones they should be allowed to “vote with their money.” If spending is unregulated, the producers who best please consumers will be rewarded with profitable futures. These researchers suggest that more choice in entertainment, by itself, is a *bad* thing simply because it means more competition for existing entertainment firms. The competing entertainment firms will be cannibalized. Of course casinos will attract dollars that otherwise would have been spent elsewhere, but so does Wal-Mart and the neighborhood hardware store.

Just because some industries are harmed, the introduction of casinos cannot be described as “bad” for society. In the unlikely case that casino revenues do represent consumer spending that is solely “reshuffled” from other local businesses in a zero sum game, Evart (1995) asks, “So what?”

Why is the redistribution of expenditure caused by casinos any worse or any better than the redistribution that was caused when the Falcons^[9] moved into [Atlanta]?” She argues that opposing casinos on this basis “is in contrast to other consumer products which meet consumer demand or expand consumer choice, even though they put existing businesses out of business.” She cites the introduction of VCRs and movie rentals and asks why their effect on movie theaters and other entertainment firms was not met with alarm. Harrah’s Entertainment argues a similar point: if it was true that “casinos have positive local economic impacts only to the extent that ‘non-local’, out-of-state players...are attracted by opportunities to gamble,” then “it would be true for other forms of spending. That is, spending on movies could only help a local economy if moviegoers are ‘non-local, out-of-state’” (Harrah’s 1996, p. 1).

The factory-restaurant argument begs the question: Was society harmed when the horse-drawn buggy industry was cannibalized by the automobile industry or when DVDs replaced VHS tapes? With countless other examples, we could show that it is often in society’s interest for particular industries to decline. This is what Schumpeter (1950, Chap. 7) referred to as “the process of creative destruction.”¹⁰

3.4 The export base theory of growth

Much of the doubt about legalized gambling fostering economic growth is based on the idea that a good or service must be “exported” for it to be beneficial to the regional economy. The factory-restaurant dichotomy is based on this idea, a simplified exposition of it. This argument is formally referred to as the export base theory of economic growth. On the surface the theory may seem applicable to the case of legalized gambling. Indeed, in the previous chapter, we discussed the potential growth effects from trade. But on closer examination, the fit of this theory to casino gambling is not so straightforward.

Exports do play a large role in the development of some economies, to be sure. For example, on many Caribbean islands tourism is the primary industry. Tourism can be considered an export because most of the consumers are not locals. Obviously a large influx of tourists means an increase in consumer spending. Textbook economics suggests that this type of activity is beneficial for the economy because it will lead to increases in

⁹ The Atlanta Falcons is a professional football team.

¹⁰ This issue is discussed by Ekelund and Hébert (1997, pp. 479–480).

national income.¹¹ Common sense suggests that tourism means more money coming into the local economy. For some countries, regions, or cities, exports may seem to be the only significant source of economic activity. But in the U.S., the volume of exports (goods and services) as a percentage of gross domestic product (GDP) is only about 11% (Kreinen 2002, p. 7).

The export base theory of economic growth is supported by many researchers for a variety of circumstances outside of legalized gambling. Consider Riedel (1994, pp. 51–52):

The case for an export promotion strategy rests not so much on principles of theory as on what works in practice. Of all the stylized facts about development, by far the most robust is the empirical relation between overall economic growth and export growth.

It is worth noting that Riedel believes that “most of what constitutes an export promotion policy is removing, or offsetting, obstacles that government itself put in the way of exporting” (Riedel 1994, p. 55). This certainly applies to the case of legalized gambling since it faces significant government restrictions.

Although this idea makes some intuitive sense, the typical application to gambling is flawed.¹² Contrary to what one reads in the casino industry research, few (if any) growth theorists believe that exports are *solely* responsible for growth. Tiebout (1975, p. 352) explains,

Formally speaking, it is the ability to develop an export base which determines regional growth. Yet in terms of causation, the nature of the residentiary [restaurant-type] industries will be a key factor in any possible development. Without the ability to develop residentiary activities, the cost of development of export activities will be prohibitive.

Even if one does accept the general idea that exports are critical for regional economic growth, there are difficulties with the theory. For example, how does one differentiate an export (“basic”) industry from a local (“residentiary”) industry? This distinction can be rather difficult; some in-

¹¹ The Keynesian macroeconomic model sets national income, $Y = C + I + G + (X - M)$, where C is consumption spending, I is investment spending, G is government spending, X is exports, and M is imports. Hence, a *ceteris paribus* increase in exports leads to an increase in expenditures or national income.

¹² For explanations of the theory’s flaws, see Vaughan (1988), Hoover and Giarratani (1984), and Walker (1998a, 1998b, 1999).

dustries perform both basic and residentiary functions (Thompson 1968, pp. 44–45). What is the requisite range of export goods?¹³

Upon closer examination, the export base theory of growth alone cannot explain the economic effects of casino gambling. In their growth theory text, Hoover and Giarratani (1984, p. 319) use a simple example to discredit the theory's simplest form:

Consider...a large area, such as a whole country, that comprises several economic regions. Let us assume that these regions trade with one another, but the country as a whole is self-sufficient. We might explain the growth of each of these regions on the basis of its exports to the others and the resulting multiplier effects upon activities serving the internal demand of the region. But if all the regions grow, then the whole country or "superregion" must also be growing, despite the fact that it does not export at all. The world economy has been growing for a long time, though our exports to outer space have just begun and we have yet to locate a paying customer for them. It appears, then, that *internal* trade and demand can generate regional growth...

Tiebout (1975, p. 349) gives a similar explanation:

A further consideration will help to point up the error of identifying exports as the sole source of regional income change. In an exchange economy one person considered in a spatial context may be entirely dependent on his ability to export his services. Probably this is true of a neighborhood area, except for the corner grocer. For the community as a whole, the income originating in non-exports increases. In the United States economy, exports account for only a small part of national income. Obviously, for the world as a whole, there are no exports.

Yet, Grinols (1995a, p. 11) illustrates an example of the misconception that we live in a zero sum society where exchanges are win-lose and not mutually beneficial: "It is a logical impossibility for every area to win at the others' expense when gambling is present in every region. For the nation as a whole there will be no net economic development from the spread of gambling." Grinols is mistaken because he apparently views exports as the only source of economic growth.

If these are valid arguments – if exports are not solely responsible for growth – then conclusions from the casino literature must be reconsidered.

¹³ Range is defined as "the farthest distance a dispersed population is willing to go in order to buy a good offered at a place. This range will take on a lower limit if there is competition from another center" (Berry and Horton 1970, p. 172).

3.5 Money inflow (mercantilism)

Another, very simplistic, form of the export base theory can be seen in researchers who have wrongly emphasized the importance of money inflow to a region and its impact on economic development. Examples of this fallacy include Grinols and Omorov (1996), Ryan and Speyrer (1999), Thompson (1996, 2001), Thompson and Gazel (1996), and Thompson and Quinn (2000). An example is provided by Grinols (1995a, p. 11):

Whether any business adds to the economic base or diminishes it depends on whether the business draws more new dollars to the area that are then spent on goods and services in that area. To benefit the local economy these new dollars must exceed the number of dollars the business causes to be removed from the area. Because casinos have artificially high profit margins, are often owned by out-of-area investors, and frequently take dollars from the area's existing tourist base rather than attracting new tourists, the effect of gambling in many cases is to diminish the economic base and cost jobs. The possibility, dependent on the net export multiplier theory and regional input-output multiplier analysis is not in dispute among responsible economists.

The argument that an inflow of money to a region leads to economic growth seems to make intuitive sense, like the alleged unemployment created by importing goods.¹⁴ For example, it would seem that an American purchasing a Japanese-manufactured car would cause a loss in Detroit jobs. But this perspective ignores half of the trade equation.

As another example, consider Thompson and Gazel (1996, p. 1), who write,

We wished to identify monetary flows to and from the local areas around the casinos...and also the monetary flows to and from the state as a whole. Quite simply, we were asking from where the money comes and where the money goes.... The money gambled was a positive factor for the state and local economies, if the players were from out-of-state.

They conclude (p. 10), "Casinos have drawn monetary resources away from depressed communities and away from individuals who are economically poor...."

Thompson (1996, 2001) and Thompson and Quinn (2000) argue that an economy can be modeled similar to a "bathtub." The model is used to analyze the economic effects of video gaming machines in South Carolina:

¹⁴ For a discussion on this issue, see Krugman (1996) and Roberts (2001).

The model portrays gambling enterprise as a bathtub for the economy with money running into and out of the bathtub as if it were water... A local or regional economy attracts money. A local or regional economy discards money. If as a result of the presence of gambling enterprise more money comes into an economy than leaves the economy, there is a net positive impact. However, if more money leaves than comes in, then there is a net negative impact. (Thompson and Quinn 2000, pp. 3–4)¹⁵

Perhaps the most fundamental point to be made against their argument is that market transactions occur only when the participants both expect to benefit. The amount of money exchanged is of little relevance. If I go buy a box of cereal from the grocery store, for example, I value the cereal more than the money, and the store values the money more than the cereal. We both win from the transaction. But according to Thompson and Quinn, any transaction in which “money leaves” (i.e., *any* purchase of goods or services paid for with money) is bad. This flies in the face of economic sense.

The argument about monetary inflows also ignores non-monetary benefits of casino legalization. Specifically, individuals receive CS from most goods and services. In addition, the focus on monetary flows ignores the effects of increased production on labor and capital markets.

The “money inflow” argument seems to be an example of mercantilist thought.¹⁶ Blaug (1978, pp. 10–11) explains,

The leading features of the mercantilist outlook are well known: bullion and treasure as the essence of wealth; regulation of foreign trade to produce an inflow of specie; promotion of industry by inducing cheap raw-material imports; protective duties on imported manufactured goods; encouragement of exports, particularly finished goods; and an emphasis on population growth, keeping wages low. The core of mercantilism, of course, is the doctrine that a favourable balance of trade is desirable because it is somehow productive of national prosperity.

Carbaugh (2004, pp. 27–28) explains mercantilist thought as well as the arguments that discredited it. Because the mercantilists focused on having a positive trade balance (exports > imports) they supported government restrictions in imports and the promotion of exports when possible. This policy would have the effect of increasing the inflow of money into an economy. Because money was viewed as wealth by the mercantilists, these

¹⁵ One must wonder about their understanding of mutually beneficial transactions. Consider their statement that “a local economy *discards* money” (emphasis added).

¹⁶ See Ekelund and Hébert (1997).

trade policies naturally followed. Blaug (1978, p. 12) explains, “the idea that an export surplus is the index of economic welfare may be described as the basic fallacy that runs through the whole of the mercantilist literature.” Put differently, the mercantilists wrongly equated money with capital (Blaug 1978, p. 11).

David Hume provided one of the most devastating attacks on mercantilism. Hume argued that a trade surplus is sustainable only in the short run since the inflow of money into a country would act to increase prices (since there is more money chasing the same goods). Higher prices in the country mean imports become relatively attractive while home country exports become less attractive to foreigners. We would expect an increase in imports and a decrease in exports. The result is the long-run elimination of a trade surplus as prices adjust. Furthermore, this adjustment requires a net outflow of money. In essence, the mercantilist concern for monetary inflow is futile. Ekelund and Hébert (1997, p. 43) explain “Hume argued that in effect, money is a ‘veil’ that hides the real workings of the economic system, and that it is of no great consequence whether a nation’s stock of money is large or small, after the price level adjusts to the quantity of it.” This does not mean that exports have no beneficial effect on an economy. After all, selling to outsiders does have benefits to domestic sellers.

Another major problem with mercantilism, as identified by Carbaugh (2004, p. 28), is that it represents a static view of the world. Thompson, Quinn, and Grinols view the economic pie as constant in size. In the context of the bathtub model, money coming into the tub is a benefit to the economy in question and harms the region from where the money came. This implies that all transactions are zero sum. Clearly this is a flawed view of market transactions. As Smith (1776) and Ricardo (1817) showed, specialization and trade result in benefits for society.¹⁷ The same is generally true of all transactions that are voluntary. Participants expect the transactions to be mutually beneficial or they would not be willing participants.

Perhaps some simple everyday examples can be useful in pinpointing the problems with the money inflow perspective. Consider the argument by Thompson and Quinn (2000, p. 4):

Gaming establishments need many supplies. Many of these are purchased from sources outside of the area. This is money lost. So too are profits that go to outside owners. Some gaming owners may reinvest monies in the local economy, but few have incentives to do so.

¹⁷ This does not mean that no one is harmed by specialization and trade. But overall, the benefits outweigh the harm.

They offer a specific example, video gaming machines purchased from out of state:

There are 31,000 machines [in South Carolina]. Each costs \$7,500. They have a life of from three to five years. Assuming a five year life, they carry a value of \$1,500 per year each, or collectively \$46,500,000. The machines are for all intents and purposes manufactured out of state. We can assume that \$46,500,000 leaves the state each year because of the machines. (Thompson and Quinn 2000, p. 10)

This is only one component of the cash outflow from South Carolina due to gaming machines. When they total all of the estimated outflows, they conclude

The money leaving the state – from direct transactions – equals \$133.3 million compared to \$122 million coming into the state. In direct transactions, the state’s economy loses. For the state as a whole, we can see that each dollar (\$1.00) brought into the state as a result of the machines leads to a direct loss of one dollar and nine cents (\$1.09). (Thompson and Quinn 2000, pp. 11–12)

This argument should raise red flags with readers. Consider when people in South Carolina purchase a car. Few cars are manufactured in the state. Most are produced in Detroit and Japan, let us say. Each car purchased then results in an outflow of money from the state. According to Thompson and Quinn’s theory, then, each car purchase has a negative impact on the state’s economy. Even in the case where a BMW car factory locates in South Carolina, according to Thompson and Quinn, there would not be economic benefits unless BMW reinvested all the “money” earned by the factory back into the state. Aside from these problems, this view also ignores capital inflows and the effects of the factory on the labor market, not to mention the utility from driving new cars.

The Thompson and Quinn argument seems quite similar to an argument made by anti-gambling advocate Robert Goodman. In his book *The Last Entrepreneurs* (1979) Goodman explains what he believes to be the ideal economic structure.¹⁸ He argues that economies should strive to be self-sufficient. He explains the plight of a region that specializes too much:

Since [a] booming manufacturing region has few incentives to develop its agricultural or energy technology, it falls progressively farther behind the agricul-

¹⁸ Interestingly, Goodman is a professor of architecture, writing on economics. The issue of researchers writing outside their areas of expertise is addressed in Chap. 8.

tural or energy-specialized regions in its ability to do so. It is trapped in its own production specialization in order to generate the dollars it needs to buy the food and other resources for its survival. (Goodman 1979, p. 183)

The Goodman argument, taken to the extreme case of an individual, suggests that self-sufficiency is the ideal situation. This conclusion is in direct conflict with modern economics. Self sufficiency implies poverty. We are much wealthier by specializing and trading, compared to the alternative of producing our own food, sewing our own clothing, building our own homes, developing our own pharmaceuticals, and so on. This was one of the fundamental insights of early economists like Adam Smith and David Ricardo.

If we are supposed to be concerned with the cash outflow that results from transactions with outsiders, should we be concerned with cash outflows from a particular individual? If cash leaving a state is harmful to that economy, is cash leaving a particular household harmful to it? This would appear to be a logical argument based on the Thompson and Quinn model. Obviously it leads to problems, since any purchase of goods or services increases the welfare of the individuals who undertake the transaction. Indeed, the money inflow model proponents (mercantilists?) appear to have it exactly backwards. Any voluntary cash transaction must lead to an increase in welfare for the involved parties. This would imply that cash outflows lead to increased welfare. Many of the monetary flow models that purport to measure the economic effects of gambling fail to recognize this basic point. Any conclusions based on these models should be viewed with extreme skepticism.

3.6 Conclusion

This chapter has examined some of the most common arguments given in opposition of casino development. Basically, the argument is that the casino industry simply cannibalizes other industries leaving no net positive economic effect of casino gambling. The different versions of the argument have unique twists. Overall, these perspectives represent a very narrow view of casino gambling. The proponents of these types of arguments tend to be staunchly opposed to casino gambling. The previous chapter examined some of the potential sources of economic growth from casino gambling. Yet, authors who cite the arguments discussed in the present chapter rarely acknowledge any legitimate economic growth effect from casino gambling.

The arguments presented here have been conceptual in nature. There have been very few studies that have empirically examined the actual growth effects from casino gambling. Chapter 4 is an empirical analysis of the economic growth effects of casino gambling in the U.S. It is the only study of its kind to have been published in the peer reviewed economics literature.

4 Evidence on the growth effects of gambling

4.1 Introduction

It should be clear that there is uncertainty and disagreement in the literature regarding the economic effects of legalized gambling. While some argue gambling cannibalizes other industries, gambling advocates disagree. Some papers analyze particular states during specific years (mostly the early 1990s) but few studies have attempted a comprehensive analysis of the economic effects of gambling in the U.S. or in other countries.

The purpose of this chapter is to develop an empirical model of the economic growth effects of gambling. The results will provide information that can be useful to researchers, politicians, and concerned citizens. Section 4.2 fleshes out the empirical question and provides background for its application to two of the major types of gambling, casinos and greyhound racing. Section 4.3 presents a non-technical chapter summary for readers who may not be familiar with Granger causality or methods of time series analysis. The description in this section should enable readers to skim or skip the mathematical notation in the remainder of the chapter without loss. For readers who would like a technical description of the methodology, Sect. 4.4 provides it. Specifically, Granger causality techniques are used to test whether casino gambling causes growth or vice-versa. The same methodology is used in an analogous set of tests for gambling at greyhound racetracks and on lotteries. The empirical results for all industries are presented in Sect. 4.5.

4.2 The empirical question

Many researchers, politicians, and advocacy groups argue that the expansion of legalized gambling cannibalizes other industries. Basically, the argument is that spending on newly legalized gambling completely crowds out spending on alternative locally produced goods, leading to no increase

in total spending. From a growth perspective, legalized gambling would be at best a zero sum game. On the other hand, there are numerous factors, aside from exports, which contribute to economic growth. This debate over legalized gambling and economic growth hinges crucially on the implications of two testable hypotheses: (1) “Does the introduction of legalized gambling lead to economic growth?”, and given an affirmative answer, (2) “Is it necessary to export gambling to obtain growth?”

The purpose of this chapter is to provide answers to these questions through empirical testing of the relationship between state economic growth and two industries in the U.S.: casino gambling and greyhound racing. Lotteries are treated separately because it is typically offered state-wide at many locations, and is therefore significantly different from the other two industries. Answers to these questions will also address the more general question of whether introducing a new good into an economy tends to cause economic growth. This analysis could be repeated in other areas or countries.

The factory-restaurant dichotomy is related to the first question. If the dichotomy is valid, if casinos can be factories in a few states but only restaurants in most others, then we should expect no consistent results. The issues of “import substitution” and “defensive legalization” are closely related to the factory-restaurant dichotomy. It is legitimate to expect state governments to consider the legalization of gambling simply to try to keep consumer dollars in the state. Eadington explains, “if the presence of casinos in the region allows regional residents to gamble at local casinos rather than becoming tourists to casinos in other regions, the economic impact from spending so generated is the same as it would be for tourists”¹ (Eadington 1995a, p. 52).

The casino and greyhound racing industries have different market thresholds and ranges.² This allows us to address the second question, regarding the export base theory of growth. The casino industry likely has a much larger threshold and range than does the greyhound racing industry. Consider that casinos keep a much lower percentage of consumers’ bets, about 2% to 5% on average. Racetracks, on the other hand, keep about

¹ This view is supported by growth theorists Hoover and Giarratani (1984, p. 319): “If a region can develop local production to meet a demand previously satisfied by imports, this ‘import substitution’ will have precisely the same impact on the regional economy as an equivalent increase in exports. In either case, there is an increase in sales by producers within a region.”

² Threshold is the minimum number of consumers required to support the industries. Range refers to the area over which the industry draws customers. For more information, see Berry and Horton (1970).

18% to 20% of each dollar bet. The fact that casinos keep much less of each dollar bet indicates that it has a much higher threshold compared to greyhound racing. Coupled with the fact that casino net revenues are many times larger than racetrack revenues, this suggests that casinos draw from a much larger range. For a given export range, even if casinos draw substantially more local customers than greyhound tracks, the casinos draw higher revenue, and most likely export in greater magnitude. Advertising and “clustering” patterns support this conclusion. There are many nation-wide advertisements by Las Vegas, Atlantic City, and Mississippi casinos. Casinos hope to attract tourists from afar. Such national advertisements for greyhound racing are extremely rare, although it is often advertised locally. In addition, casinos often cluster together. Such agglomeration economies are not to be expected unless the producers are selling in national markets. This provides anecdotal evidence that the industries themselves view the range of casino gambling as much greater (national) than that for greyhound racing (regional at most).

This is not to suggest that casinos export but greyhound racing does not. Even the smallest crossroads gasoline station exports when an out-of-state (or out-of-country) automobile stops for gas. Rather, the suggestion is that a consistent finding that both activities “cause” growth indicates that exports may not be a fundamental factor in generating that growth due to the starkly different thresholds and ranges of the two goods. Specifically, a comparison of the empirical results for the two industries will help to answer the second question posed. If the casino industry causes growth but the greyhound industry does not, we may conclude that exports have a significant impact on economic growth since the industry with the smaller range does not show evidence of driving economic growth. On the other hand, if both industries have a similar positive impact on growth, then we may conclude that exports may *not* be crucial since even with little or no export base, greyhound racing is found to be an engine for growth. The third possible finding is that greyhound racing causes growth but casinos do not, a result that would be difficult to explain. Of course there is a fourth possibility, that neither industry has a significant impact on growth. This would be the finding if proponents of the cannibalization theory are correct, that gambling industries merely replace other industries.

4.3 Non-technical explanation of Granger causality

The analysis in this chapter takes data from various U.S. states with legalized casinos, greyhound racing, and lotteries. Data on gambling include

casino revenue, greyhound racing handle, and lottery sales.³ Per capita income in each state is collected for the years during which the states have a particular type of gambling.

In order to analyze the effect of the legalized gambling on state level per capita income, several adjustments must be made to the data. The goal of “Granger causality” analysis is to determine the relationship between the series of data. There are three sets of data analyzed: (i) casino revenue and per capita income (ten states, 1991–96, quarterly data); (ii) greyhound racing handle and per capita income (18 states, 1975–95, annual data); and (iii) lottery sales and per capita income (33 states, including D.C., 1975–95, annual data). Note that some of the states are dropped when they are determined to not have enough observations to yield information. Although the data analyzed run only through 1995 or 1996 and the models cover relatively short time periods, this work can provide a foundation for subsequent researchers to further investigate these relationships in the U.S. or elsewhere.

In order to isolate the relationship between the two series of data in each of the three cases, several adjustments to the data are necessary. First, the effect of variation due to state-specific factors must be removed, so that odd differences among the states do not cause the appearance of a systematic relationship between variables. These are the state dummies discussed in the subsequent sections. The effect of time must also be removed. Otherwise, for example, we might expect both casino revenues and per capita income within a state to be rising as time passes in a time trend. Without adjusting for this tendency, the increase in both revenue and income might appear to be a causal relationship between the two, when in fact it is due solely to other factors affecting both variables through time.

Once adjustments to remove time and state-specific effects have been made, we are left with “pure” data on the processes that explain per capita income and gambling volume. Next we test for a causal relationship. A common econometric test is called Granger causality. While there is no statistical mechanism that can *prove* a causal relationship, Granger causality is perhaps close. Granger causality looks at time series data through numerous time periods and isolates the relationship between variations in the series of data. So if the time trend and state-specific effects have been

³ Handle refers to the total of the bets placed, not the amount won or the amount kept by the racetrack. Similarly, lottery ticket sales are measured, rather than sales net of jackpots paid. Casino revenue refers to the amount the casino keeps after all winning bets have been paid. These are the standard measures of volume in the respective industries. For a more detailed explanation, see Walker and Jackson (2007a).

removed from the data series, and the two still seem to move together, there may be a causal relationship between the two. One way of saying this is that changes in one of the series (x) precede changes in the other (y) in some systematic way. Then x “causes” y .

The Granger causality test has four potential outcomes. For the example just given above, either

- (i) x causes y
- (ii) y causes x
- (iii) both i and ii
- (iv) none of the above

Whatever the results of the Granger test, it does not give any information on why there is a relationship.

The statistically significant results of the analyses are that casino gambling Granger causes per capita income, greyhound racing Granger causes per capita income, per capita income Granger causes lottery sales, and lottery sales Granger cause per capita income when the lottery state is isolated, surrounded by mostly non-lottery states. In the cases of casinos and greyhound racing, it appears that “exports” are not necessary for economic growth to occur.

The analysis suggests that legalized gambling can help stimulate economic growth. In the case of lotteries, the analysis suggests that lotteries are “normal” goods – increases in income lead to increased purchases. But in the case of isolated lottery states, it would appear that cross-border purchases by citizens from other states have a stimulative effect on the state economy.

4.4 Granger causality with panel data

While there is no precise way to establish the direction of causal behavior, statistical causality has been defined and several tests developed for its presence. The definition and test of choice in the recent economics literature seem to be those suggested by Granger (1969).⁴

Granger causality has proved a useful means of evaluating the potential sources of aggregate economic growth in recent empirical work. Balassa (1978), Jung and Marshall (1985) and Xu (1998) consider the relationship between exports and growth; Joerding (1986) and Kusi (1994) analyze the

⁴ Granger was awarded the Nobel Prize in Economics in 2003.

relationship between military spending and economic growth; Conte and Darrat (1988) look at the size of the government sector and economic growth; and Ramirez (1994) has shown that real government investment Granger causes real private investment in Mexico. This wide applicability makes Granger causality a natural technique to employ in causal inquiry.

Granger's methods, however, are not directly applicable to the problems at hand. These techniques were originally intended to apply to a set of linear covariance-stationary time series processes. This suggests that we should test for Granger causality on gambling revenue and per capita income on a state-by-state basis. Unfortunately (for this study, at least), only two of the ten states with legal non-reservation casino gambling had casinos prior to 1990, and fully two-thirds of the states having legal greyhound racing adopted post-1985. Establishing the requisite stationarity on a state-by-state basis and appealing to the asymptotic properties of a number of the associated estimators and tests cannot be justified due to the brevity of the time series. For this reason the data are pooled for each activity, creating a panel consisting of a time series of observations for each of a cross section of states.

The statistical analysis of panel data using time series methods is still in its infancy. Holtz-Eakin, Newey, and Rosen (1988) relates directly to the estimation and testing of vector auto-regressive models such as those needed to apply Granger's procedure to panel data. There have been several studies that look at the related problem of unit roots in panel data. Works by Breitung and Meyer (1994), Frances and Hobjin (1997), MacDonald (1996), Strazicich (1995), and Wu (1996) fall into this category.

4.4.1 Synopsis of Granger's procedure

The application of Granger causality to panel data is not straightforward. A brief review of the general methodology of Granger causality is followed by a detailed discussion of the modifications imposed in order to apply it to panel data.

According to Granger, a variable $\{X_t\}$ causes another variable $\{Y_t\}$ if, with information on all factors affecting both $\{X_t\}$ and $\{Y_t\}$, the current value of Y_t can be predicted more accurately using past values of X (i.e., X_{t-j} , $j=1, \dots, J$) than by not using them. More precisely, define $\{A_t\}$ as the set containing all possible information affecting $\{Y_t\}$ except information on $\{X_t\}$. Also define the mean square (prediction) error of Y_t given A_t as $\sigma^2(Y_t|A_t)$. "Granger causality" states that X causes Y if

$$\sigma^2(Y_t|A_t, X_t) < \sigma^2(Y_t|A_t) \quad (4.1)$$

Since adding a statistically significant set of variables reduces the error variance in least squares regression, traditional t - and F - tests are available to test for Granger causality.

The testing procedure is straightforward. Assuming $\{X_t\}$ and $\{Y_t\}$ are a pair of linear covariance stationary processes, they can be written as

$$X_t = \sum_{j=1}^k \beta_j X_{t-j} + \sum_{j=1}^m \delta_j Y_{t-j} + \varepsilon_{1,t} \quad (4.2)$$

$$Y_t = \sum_{j=1}^m \gamma_j Y_{t-j} + \sum_{j=1}^k \theta_j X_{t-j} + \varepsilon_{2,t} \quad (4.3)$$

where the β_j , δ_j , γ_j , and θ_j are unknown parameters to be estimated, and $\varepsilon_{1,t}$ and $\varepsilon_{2,t}$ are white noise. Applying least squares regression techniques to estimate these two models yields four types of Granger causality tests: (i) X causes Y if we can reject $H_0: \theta_1 = \theta_2 = \dots = \theta_k = 0$; (ii) Y causes X if $H_0: \delta_1 = \delta_2 = \dots = \delta_m = 0$ can be rejected; (iii) if both null hypotheses can be rejected, feedback (simultaneous determination of X and Y) is indicated; and (iv) if neither null hypothesis is rejected, X and Y are independent.

Typical caveats for the procedure relate to the structure of the hypothesis tests (one actually rejects Granger non-causality rather than accepting Granger causality) and to whether variables other than lagged values of $\{Y_t\}$ should be included in $\{A_t\}$.⁵ The most important caveat, however, relates to stationarity of the two series. Without stationarity, common trends could result in spurious regressions having perverse causality implications, such as business cycles causing sunspots.⁶ Wold's theorem tells us that a stationary time series process can always be written as the sum of a self-deterministic component and a moving average component of possibly infinite order (Granger 1980, p. 60). If $\{Y_t\}$ is stationary, it is possible for $\{A_t\}$ to include only its past values thereby eliminating the ambiguity in specifying $\{A_t\}$ noted above.

⁵ It is perfectly legitimate to include variables other than lagged values of X_t and Y_t in the two regressions. For example, see Conte and Darrat (1988). But including such variables "muddies the causality waters" since X could cause Y through affecting some other included variables, rather than directly.

⁶ See Sheehan and Grieves (1982) and Noble and Fields (1983).

4.4.2 Modifying the procedure for panel data

As suggested earlier, the extension of these procedures to pooled time series cross section data is not straightforward but our data paucity problem necessitates this type of model. Walker and Jackson (1998) first developed this methodology, which has subsequently been used elsewhere (e.g., Granderson and Linvill 2002). A three-stage procedure is used: (i) filtering trend and state specific effects from the data, and (ii) selecting the appropriate time series process that generates each variable. After making these adjustments we conduct the Granger causality tests.

Stage one

Perhaps the best way to visualize the problems involved and to understand the attempted solutions is to consider the way that we array the data on each variable. Consider a general gambling revenue variable REV_{it} . Later we examine the specific variables, e.g., casino revenue, CR . We have i states ($i=1, \dots, I$) with legalized gambling and t time periods ($t=1, \dots, T$) on a particular state. In all of the subsequent analyses, we “stack” these data by state, and within each state we organize the data in ascending order of time. Thus, it is routine to find the last observation on revenue for state i , REV_{iT} , followed by the first observation for state $(i+1)$, $REV_{i+1,1}$. The following discussion of filtering the data should make it clear that the order in which the states are stacked is not a matter of concern, but the obvious discontinuities involved in proceeding from the last period’s observations in one state to the first period’s observation in the next, requires some adjustment in the ordinary time series methodology.

The most obvious adjustment is filtering out state-specific and trend effects from the vector of observations on REV_{it} . We pursue this requirement by regressing REV_{it} on: (1) a constant term; (2) a set of $(I-1)$ state dummy variables (to account for state specific effects); (3) a time trend ($t=1$ is the beginning observation for each state) to account for a common trend in the data; and (4) interaction variables computed by multiplying each state dummy by the trend variable (to allow for different trends for each state). If the data are quarterly, seasonal adjustment (via a set of quarterly dummies) is also appropriate. Finally, a dummy variable equal to unity for the first observation of a new state is included to promote continuity of the pooled variable. The residual from this regression $REVR_{it}$ should be free of state specific, trend, and other idiosyncratic anomalies. We refer to this residual as the filtered series.

At this stage, it is appropriate to test the filtered series for stationarity. Recall the primacy of stationarity as a condition for the legitimate applica-

tion of Granger's causality tests.⁷ A number of procedures is available to test for the presence of stationarity or lack thereof, as denoted by the presence of a unit root in the series: Dickey-Fuller, augmented Dickey-Fuller, and Phillips-Perron are three popular unit root tests. Since the filtered revenue series is a detrended, zero-mean series, the choice among these alternative tests is not likely to be crucial. Nevertheless, the Phillips-Perron test is chosen since it is robust with respect to the number of lagged differenced variables included in the test equation. If the unit root tests allow us to reject non-stationarity, we proceed to the next step in the analysis; otherwise we continue to respecify the filtering equation until we are able to reject non-stationarity.

The modifications so far serve three purposes. First, filtering out unspecified state-specific effects and state-specific trend effects should eliminate any concern about the order in which the state data are stacked, particularly since the filtered measure is stationary. Second, filtering out trend effects should eliminate any concern that the results are attributable to a common trend between the revenue and income variables. Third, stationarity of the filtered series guarantees that any innovation in the series, whether state specific or attributable to another time-independent factor, is of temporary duration. Thus, ruling out (or reducing the likelihood of) permanent shocks, common trend, and common factor problems, gives us reason to believe that any causality found between gambling revenue and per capita income is not caused by exogenous forces.

Stage two

With filtered revenue and income series, the next step is to determine as precisely as possible what autoregressive process generates each series.⁸ This stage amounts to an application of Box-Jenkins procedures to each filtered variable. The intent is to continue to add lags in the variables to the specification of the generating process until we obtain a white noise residual. We employ correlograms and partial correlograms to aid in specifying the generating process, along with Box-Pierce Q -statistics to detect white noise residuals. Here parsimony is our guide, choosing the shortest possi-

⁷ This may be an overstatement. Holtz-Eakin et al. (1988, p. 1373) suggest that a large number of cross-sections make it possible for lag coefficients to vary over time. Of course, there is always the question of how large is "large." It is unlikely that the eight to 14 cross sections here are "large" numbers.

⁸ Technically, all Wold's theorem guarantees is that a stationary series can be specified by an ARMA process. While a moving average error process cannot be ruled out *a priori*, it turns out for our problem that adding enough lagged terms will yield a white noise residual in all cases.

ble set of lags such that no significant (10% level) autocorrelations exist among the residuals as judged by Q -statistics for the first 36 lags.

While this step is not traditional, it is done with a purpose. If we can identify the process generating a filtered series so that residuals of the estimated process are white noise, we can be reasonably certain that we have extracted all possible information on the current value of the variable from its past values. There is no temporally systematic effect left to explain. Then, if lagged values of another a new variable are added to the model and if it provides a statistically significant improvement in explaining filtered income, it is legitimate to claim that revenue “causes” income. This stage introduces a problem concerning lagging the data that comes to fruition in the third stage of the analysis.

Stage three

The second stage of the analysis provided all of the information needed to accurately specify the regression equations. The final stage of the analysis is to estimate the vector autoregressions implied by Granger causality testing and to perform the requisite hypothesis tests. Assuming that the second stage indicated that filtered per capita income ($PCIr_{it}$) was generated by an $AR(k)$ process and filtered gambling revenue ($REVR_{it}$) was generated by an $AR(m)$ process, the sequels to Eqs. (4.2) and (4.3) are:

$$PCIr_{i,t} = \sum_{j=1}^k \beta_j PCIr_{i,t-j} + \sum_{j=1}^m \delta_j REVR_{i,t-j} + \varepsilon_{1,t} \quad (4.4)$$

$$REVR_{i,t} = \sum_{j=1}^m \gamma_j REVR_{i,t-j} + \sum_{j=1}^k \theta_j PCIr_{i,t-j} + \varepsilon_{2,t} \quad (4.5)$$

The corresponding hypothesis tests are $H_0: \delta_1 = \delta_2 = \dots = \delta_m = 0$ to test whether $REVR$ Granger causes $PCIr$, and $H_0: \theta_1 = \theta_2 = \dots = \theta_k = 0$ to test whether $PCIr$ Granger causes $REVR$. The models are estimated by ordinary least squares regression⁹ and the tests are standard F -tests of the joint hypotheses.

We conclude the discussion of the modifications of traditional Granger causality analysis deriving from the use of panel data with consideration of a point mentioned earlier. Lagging variables uses up considerably more degrees of freedom than one might first expect because of the stacked

⁹ Since the explanatory variables are the same for both models, there is no difference between OLS and seemingly unrelated regression estimates whether or not $\varepsilon_{1,t}$ is correlated with $\varepsilon_{2,t}$.

panel data. If we lag the data, say, three periods to estimate the appropriate autoregressive process in stage two, we lose $3I$ (not 3) degrees of freedom when employing panel data on I states since *each state's* data must be lagged three periods. The reason for these extra lags is not statistical. Recall that we establish at stage one that the process is stationary. Rather, the extra lags are economically motivated: it makes no economic sense to allege that the early period observations (say $t=1, 2, 3$) in state $i+1$ are explained by the later period observations (say $T-2, T-1, T$) in state i . But that is precisely what we assume does happen if we do not drop the first three observations for state $i+1$ and similarly for all other states. The gain in degrees of freedom from pooling time series and cross-sectional data may not be nearly as much as one might expect at first blush.

This problem is even more exaggerated at stage three of the analysis. If REV_r is found to be $AR(m)$ and PCI_r is found to be $AR(k)$ from stage two where $k > m$, then we must drop the first k observations from *each state* after lagging to avoid an economically meaningless set of parameter estimates for Eqs. (4.4) and (4.5). This means that, *inter-alia*, for a state to remain in the model after the filtering stage, it must have at least $k+1$ observations.¹⁰ This, in turn, implies an iterative procedure between the three stages of analysis until a useable sample of data can be determined.

Clearly, the application of Granger causality techniques to panel data is not altogether straightforward. Nonetheless, a careful analysis along the lines outlined above can provide reliable and useful information concerning causal relationships between state gaming revenues and economic growth. We now turn to our empirical analysis of these questions.

4.5 Empirical results

Certainly consumer welfare is enhanced by the availability of new goods and services. But do these new opportunities have a measurable effect on economic growth? Legalized gambling provides a unique opportunity to test this. If industries with different ranges are tested and compared, we can evaluate the importance of exports on economic growth. Using the methodology developed in the previous section, the empirical results are presented for casino gambling, greyhound racing, and lotteries.

¹⁰ A state would be dropped from the model in the filtering stage if $n < v$, where v is the number of explanatory variables, excluding other states' dummy and interaction variables.

4.5.1 Casino gambling

Quarterly real casino revenue and real per capita income data are collected on ten states, listed with beginning year and quarter¹¹: Colorado (1991.4), Illinois (1992.3), Indiana (1995.4), Iowa (1992.4), Louisiana (1993.4), Mississippi (1992.3), Missouri (1994.3), Nevada (1985.1), New Jersey (1978.2), and South Dakota (1991.3). Data on all states run through the fourth quarter of 1996 (i.e., 1996.4). A total of 248 observations are available. Because casino gambling is a relatively new industry in most states, there are not enough observations to analyze each state individually. A first pass through the testing procedure indicates that estimating the Granger causality equations would require a ten quarter lag; i.e., dropping ten observations per state. Since Indiana had only five observations and Missouri 11, both states are dropped from the model. There are 232 observations on the other eight states' casino revenue (*CR*) and per capita income (*PCI*).

The first step in our application is to filter the series, as illustrated:

$$\begin{aligned}
 PCI_t = & \text{constant} + \text{trend} + \text{first-year dummy} + \text{pre-1990} \\
 & + \text{quarterly dummies} + \text{state dummies} \\
 & + \text{state-trend interaction terms} + \text{error}
 \end{aligned}
 \tag{4.6}$$

$$\begin{aligned}
 CR_t = & \text{constant} + \text{trend} + \text{first-year dummy} + \text{quarterly} \\
 & \text{dummies} + \text{state dummies} + \text{error}
 \end{aligned}
 \tag{4.7}$$

A state dummy for all but one of the states should remove any effects from stacking the data and from fixed effect state-specific differences in measurement. A time trend and quarterly dummy variables are included to remove any time-dependent trends or seasonal components that might be included in the processes. Seven state-trend interaction terms are used to remove any state-specific trends in the data. South Dakota is the state lacking the dummy and interaction variables, the base state. Because stacking the data for the states results in a “spike” at the first observation of a new state, we add a “first year dummy” variable (the first observation for each state is 1, 0 for all other observations). Since per capita income data come from two different sources, we add a dummy variable “pre-1990” for observations in the *PCI*_{*t*} equation prior to 1990 in order to distinguish the

¹¹ Quarterly per capita income data are calculated using personal income data (Department of Commerce) and linearly interpolated annual census population estimates.

sources and to account for any recording differences from those sources. This dummy affects only Nevada and New Jersey in the per capita income filtering equation. Finally, there are stochastic disturbances in the “error.”

The testing process begins with the filtering regressions. Then, testing the filtered variables, $PCIr$ and CRr , for unit roots, the Phillips-Perron (PP) test indicates the hypothesis of a unit root can be rejected. Both series are stationary at the 1% level ($PP_{CRr} = -8.324$; $PP_{PCIr} = -4.594$; critical value = -2.575). The next step is to determine the time series process that generates each of the filtered variables. Box-Jenkins methods indicate that $PCIr$ can legitimately be viewed as being generated by an $AR(7)$ process and CRr by an $AR(9)$. Note that for the remainder of the procedure, we must drop the higher lag-number of observations (i.e., 9) from each state. This leaves us with 160 total observations, compared to 232 in the original model specification.

Finally, we alternately regress the stationary filtered series, $PCIr$ and CRr , on their own respective lagged values and on past values of the other variable, and then test whether the coefficients on the other lags are jointly significantly different from zero. Defining C as the constant term, we estimate

$$PCIr_{i,t} = C + \sum_{j=1}^7 \psi_j PCIr_{i,t-j} + \sum_{j=1}^9 \pi_j CRr_{i,t-j} + \mu_{1,t} \quad (4.8)$$

and for filtered casino revenue,

$$CRr_{i,t} = C + \sum_{j=1}^9 \phi_j CRr_{i,t-j} + \sum_{j=1}^7 \lambda_j PCIr_{i,t-j} + \mu_{2,t} \quad (4.9)$$

In the case of Eq. (4.8), we test $H_0: \pi_1 = \pi_2 = \dots = \pi_9 = 0$. If the null hypothesis is rejected, then casino revenue Granger causes economic growth. Failure to reject the null means there is no evidence of a causal relationship in this direction. For Eq. (4.9), we test $H_0: \lambda_1 = \lambda_2 = \dots = \lambda_7 = 0$. Analogous to the case above, rejection of the null implies economic growth Granger causes casino gambling. Failure to reject would imply increased per capita income does not cause increases in casino revenues. Since we can reject the former null hypothesis but not the latter, the results in Table 4.1 indicate that casino revenue Granger causes economic growth (significant at the 1% level) and not conversely.

Table 4.1. Casino model Granger causality results

Hypothesis	F-statistic (F*)	Probability (F>F*)
$\pi_1=\pi_2=\dots=\pi_9=0$ (CRr does not cause PCIr)	2.577	0.009
$\lambda_1=\lambda_2=\dots=\lambda_7=0$ (PCIr does not cause CRr)	0.404	0.898

Several points concerning these results are worthy of note. As many politicians and the casino industry suggest, the product does have a positive effect on growth. We have taken precautions to ensure that Nevada does not dominate the empirical results. Recall that data on Nevada are included only back until 1985, while New Jersey goes back to its beginning, 1978, and all other states to theirs, the early 1990s. When the model is split and component models are tested, the results are consistent with those presented in Table 4.1.¹²

Second, with regard to the factory-restaurant dichotomy, the entire industry appears to be a factory – not just Nevada, as Grinols (1994b) has suggested. If a few states were the only factories, we would not expect such significant results in the overall model, since other alleged restaurant states comprise about half of the observations in the model. If there did not exist a causal relationship in these states, one would expect this to add sufficient variation to the model to prevent rejection of non-causality hypothesis.

The results in this section should not be expected merely because gambling revenues are theoretically a component of per capita income. If that reasoning were valid, we should have found Granger causality in the other direction as well. Simply because two variables may be expected to move in the same direction over time does not imply that one detrended variable is causing the other.

Overall, these results suggest that there is a positive causal relationship from the introduction of legalized casino gambling (a new good) to economic growth. Comparing this to the results of similar tests on greyhound racing will give us better information on the validity of the export base theory of economic growth.

¹² For example, New Jersey and Mississippi were tested together, yielding results similar to those in Table 4.1. A complete discussion can be found in Walker (1998a).

4.5.2 Greyhound racing

The legalization of greyhound racing was not as explosive as that of casino gambling. In some states racing has been legal since the 1930s while others have legalized it as recently as the 1980s. *Annual* data are collected on per capita income and gross handle (*HAN*, dollar amount of bets placed at the tracks) for greyhound racing in 18 states.¹³ In most cases, the greyhound data were supplied by the individual racing commissions. For those states whose commissions were uncooperative, data were found in the *Annual Statistical Summary of Pari-Mutuel Racing* published by the Association of Racing Commissioners International.

The procedure from casino gambling is repeated to analyze the greyhound racing industry. Variables included in the filtering equations were a constant, trend, the “new state” variable, and the state dummy and trend-dummy interaction terms, all described earlier. Of course, no quarterly dummies are needed since the data are annual. Initially, there were 222 observations on the 18 states. Preliminary tests for proper lag length yielded a number which required four states dropping from the model for lack of sufficient observations: Kansas, Texas, Vermont, and Wisconsin. Each of these states had only five to seven observations. The end result is a pooled data set covering 14 states, consisting of 195 observations. The states included are listed below, using data through 1995. The first year of data for each state is indicated: Alabama (Mobile and Birmingham counties only; 1975), Arizona (1984), Arkansas (1975), Colorado (1985), Connecticut (1985), Florida (1985), Idaho (1985), Iowa (1985), Kansas (1989), Massachusetts (1985), New Hampshire (1975), Oregon (1975), Rhode Island (1985), South Dakota (1982), Texas (1990), Vermont (1985–1992), West Virginia (1985), and Wisconsin (1990). As in the casino tests, the data used in this model are adjusted for inflation.

After filtering the variables, we test for unit roots. The Phillips-Perron test statistic on *HANr* is -7.97, and on *PCIr*, the statistic is -6.35. With a critical value at the 1% level of -2.58, the hypothesis of a unit root can be rejected for both series.

A Box-Jenkins analysis of the filtered residuals indicates that *PCIr* was generated by an AR(4) process and *HANr* by an AR(3). The final step is to conduct the Granger causality test. This involves estimating the following models and conducting the requisite *F*-tests.

¹³ Annual data are used here primarily because quarterly are not available. This does not cause complications because greyhound racing has been legal much longer (generally) than casino gambling.

$$PCIr_{i,t} = C + \sum_{j=1}^4 \psi_j PCIr_{i,t-j} + \sum_{j=1}^3 \pi_j HANr_{i,t-j} + \mu_{1,t} \quad (4.10)$$

$$HANr_{i,t} = C + \sum_{j=1}^3 \phi_j HANr_{i,t-j} + \sum_{j=1}^4 \lambda_j PCIr_{i,t-j} + \mu_{2,t} \quad (4.11)$$

The F -test results are presented below in Table 4.2. The result that greyhound handle Granger causes per capita income is significant at standard levels. There is no evidence of bilateral causality.

Table 4.2. Greyhound model Granger causality results

Hypothesis	F-statistic (F*)	Probability (F>F*)
$\pi_1=\pi_2=\pi_3$ (HANr does not cause PCIr)	3.657	0.014
$\lambda_1=\lambda_2=\lambda_3=\lambda_4$ (PCIr does not cause HANr)	0.841	0.501

As with the casino gambling model, we attempt to investigate whether a single state or small group of states is responsible for the results. This is done by splitting the sample into two component parts, one with states that have had greyhound racing for a relatively long period of time back through 1975, the other with states that have only more recently legalized the activity. Both sets of analyses exhibited results highly consistent with those of Table 4.2. For the long series states, the F -statistic for testing the null hypothesis that $HANr$ does not cause $PCIr$ is 4.77 and the F -statistic for testing the null that $PCIr$ does not cause $HANr$ is 0.70. For the short series, the respective F -values are 7.30 and 0.93.¹⁴

The results indicate that greyhound racing, like casinos, Granger causes per capita income at the state level. Because of the different thresholds and ranges of the industries, these results taken with the casino results suggest that exports are *not* necessary for economic growth.

¹⁴ The interested reader may see Walker (1998a) for the full analysis and results.

4.5.3 Lotteries

Lotteries are different because they are administered by governments. In addition, their “locations” are much more numerous than casinos or race-tracks, and they do not imply large inflows of capital or labor. Nevertheless, there are still similarities between lotteries and the other gambling industries, and analysis of them can provide some useful information.

Lotteries have become popular fiscal policies because of the “voluntary” nature of the revenue collection. Well over 30 states have adopted lotteries, making it possible for them to reduce taxes and/or increase spending on popular programs. There have been numerous studies on the economic effects of lotteries, most of which focus on public finance issues.¹⁵ The average take-out rate (tax rate) on lottery ticket sales is about 50%. There is also a large cross-border purchase component to lottery markets (Garrett and Marsh 2002).

For the lottery model, 490 observations are collected on real gross lottery sales and real per capita income for the following states, from the year indicated through 1995: Arizona (1982), California (1986), Colorado (1983), Connecticut (1972), Delaware (1976), Washington, DC (1982), Florida (1988), Idaho (1990), Illinois (1975), Indiana (1990), Iowa (1986), Kansas (1988), Kentucky (1989), Maine (1975), Maryland (1974), Massachusetts (1972), Michigan (1973), Minnesota (1990), Missouri (1986), Montana (1988), New Hampshire (1970), New Jersey (1971), New York (1970), Ohio (1975), Oregon (1985), Pennsylvania (1973), Rhode Island (1975), South Dakota (1988), Vermont (1979), Virginia (1989), Washington (1983), West Virginia (1986), and Wisconsin (1989).

The modifications discussed in Sect. 4.4.2 are applied to the lottery model. We must filter the data using the following types of variables: (1) state dummies that remove state-specific effects; (2) a trend variable to eliminate any effects of common trends that may exist between the variables; (3) trend-dummy interaction terms to remove state-specific trends that may exist in the data; and (4) a variable to remove the effect of stacking the data. The filtering equations for the two data series are analogous to those in the previous models. The dependent variable panels are state per capita income data (PCI_t) and state lottery revenue (LR_t). Some states must be dropped from the analysis because they do not have enough ob-

¹⁵ Clotfelter and Cook (1991) and Borg, Mason, and Shapiro (1991) are the most comprehensive studies to date. Also see Alm, McKee, and Skidmore (1993), Borg and Mason (1993), Erekson, Platt, Whistler and Ziegert (1999), Gulley and Scott (1993), Kaplan (1992), Mikesell (1992), Ovedovitz (1992), Thalheimer (1992), and Thornton (1998).

servations to support the requisite number of lag periods. The states dropped from the model are California, Florida, Idaho, Indiana, Iowa, Kansas, Kentucky, Minnesota, Missouri, Montana, Oregon, South Dakota, Virginia, West Virginia, and Wisconsin.

The residuals ($PCIr$ and LRr) from the filtering equations are used for the remainder of the analysis. The next step is to test for stationarity. Using the Phillips-Perron test, the test statistic on the residuals from the $PCIr$ filtering equation is -5.20; for the residuals from LRr , the statistic is -6.43. With a critical value of -2.57, the hypothesis that a unit root exists may be rejected in both cases (1% level). Given both series are stationary, the next step is to specify the process that generates each series.

The iterative process to determine the appropriate lag-length for the variables indicates that five lag periods are the minimum required for the residuals from $PCIr$ to become white noise. For LRr , six lag periods are necessary. According to the correlogram data, there appears to be no significant autocorrelation among the observation periods when these lag lengths are used.

Finally, we may specify the Granger causality test. The required regressions are:

$$PCIr_{i,t} = C + \sum_{j=1}^5 \psi_j PCIr_{i,t-j} + \sum_{j=1}^6 \pi_j LRr_{i,t-j} + \mu_{1,t} \quad (4.12)$$

$$LRr_{i,t} = C + \sum_{j=1}^6 \phi_j LRr_{i,t-j} + \sum_{j=1}^5 \lambda_j PCIr_{i,t-j} + \mu_{2,t} \quad (4.13)$$

The F -test on whether or not lottery revenue causes economic growth is performed on $H_0: \pi_1 = \pi_2 = \dots = \pi_6 = 0$. That is, the hypothesis is that the π_j coefficients are not (jointly) significantly different from zero. If this hypothesis may be rejected, there is Granger causality. The hypothesis used to test for causality from $PCIr$ to LRr is $H_0: \lambda_1 = \lambda_2 = \dots = \lambda_5 = 0$.

The results from these regressions are summarized in Table 4.3. There is significant evidence (1% level) that increases in per capita income cause increases in lottery ticket purchases. This supports the proposition that, generally, lottery tickets are normal goods. It is also consistent with the findings by Caudill, Ford, Mixon, and Peng (1995) that higher income states are more likely to introduce lotteries in the first place. There is no evidence to suggest that lottery ticket revenue spurs economic growth (i.e., the F for testing $\pi_1 = \pi_2 = \dots = \pi_6 = 0$ is statistically insignificant at any reasonable level).

Table 4.3. Lottery model Granger causality results

Hypothesis	F-statistic (F*)	Probability (F>F*)
$\pi_1=\pi_2=\dots=\pi_6=0$ (LRr does not cause PCIr)	0.474	0.828
$\lambda_1=\lambda_2=\dots=\lambda_5=0$ (PCIr does not cause LRr)	4.87	0.0003

Isolated state lottery model

Mikesell (1992) found that in lottery states, counties bordering the state line of non-lottery states have higher per capita lottery ticket sales than internal counties. The magnitude of the effect of cross-border lottery ticket purchases could be an important consideration for state governments deciding whether to implement or retain lotteries. Will introducing a lottery in order to keep money in the state (i.e., “defensive lotteries”) have any effect on economic growth? In order to get information on the importance of exporting lottery tickets (for economic growth) the proportion of bordering lottery states to total bordering states is used to separate the “isolated” states from the original model.

Each lottery state in the original model is listed in Table 4.4 along with its surrounding states. Those states for which no more than half of the adjacent states have lotteries are considered to be “isolated” and are tested as

Table 4.4. Lottery states and their bordering states

State:	Bordering states
[AZ]:	CA, NV*, UT*, NM*
CA:	OR, NV*, AZ
[CO]:	UT*, WY*, NE, KS, OK*, NM*
CT:	RI, MA, NY
DE:	MD, NJ, PA
DC:	VA, MD
[FL]:	GA, AL*
IL:	IN, IA, MO, KY, WI
IA:	MN, WI, IL, NE, MO
KS:	CO, NE, MO, OK*
ME:	NH
MD:	DC, VA, WV, PA, NJ
MA:	NY, CT, NH, RI, VT
MI:	IN, OH, WI
MO:	KS, OK*, AR*, KY, IL, IA
[MT]:	ID, WY*, SD, ND*
NH:	VT, ME, MA
NJ:	DE, PA, NY
NY:	VT, CT, NJ, PA, MA
OH:	KY, MI, IN, WV, PA
OR:	WA, ID, CA, NV*
PA:	NY, NJ, WV, MD, DE
RI:	CT, MA
SD:	ND*, NE, IA, MN, MT, WY*
VT:	NY, NH, MA
WV:	VA, KY, OH, PA, MD

Notes: * indicates no lottery. [] indicates isolated state.

a group, in an attempt to measure the effect of exports on economic growth.¹⁶ There are only four isolated states: Arizona, Colorado, Florida, and Montana.

The isolated states have a total of 43 observations. The same variables as before are used in the filtering equations (of course, minus inappropriate dummy and interaction terms). On *PCIr*, the Phillips-Perron statistic is -3.27; for *LRr*, it is -5.74. Because the critical value at the 1% level is -2.62, the unit root tests show that the filtered data series are stationary. Analysis of the correlograms indicates that the appropriate lag length for the *PCIr* series is two periods. For *LRr*, it is three periods. The Granger causality test for the isolated model involves

$$PCIr_{i,t} = C + \sum_{j=1}^2 \psi_j PCIr_{i,t-j} + \sum_{j=1}^3 \pi_j LRr_{i,t-j} + \mu_{1,t} \quad (4.14)$$

$$LRr_{i,t} = C + \sum_{j=1}^3 \phi_j LRr_{i,t-j} + \sum_{j=1}^2 \lambda_j PCIr_{i,t-j} + \mu_{2,t} \quad (4.15)$$

According to the results from this model (presented in Table 4.5) there is weak evidence of bilateral causality (10% level). Contrary to the results in the full model, there is some evidence of a causal relationship from lottery sales to economic growth as long as the state is “isolated.” This finding suggests that the export base theory of growth applies, at least weakly, to lotteries.

Table 4.5. “Isolated” lottery state model Granger causality results

Hypothesis	F-statistic (F*)	Probability (F>F*)
$\pi_1=\pi_2=\pi_3=0$ (LRr does not cause PCIr)	2.51	0.099
$\lambda_1=\lambda_2=0$ (PCIr does not cause LRr)	2.96	0.067

¹⁶ The level of 50% for isolated is chosen because it is the minimum that would allow a reasonable sample size.

4.6 Summary and conclusion

Effusive rhetoric surrounds attempts by state governments to legalize various gaming activities. Those in favor of legalization argue that, among other potential advantages, the new gambling activity will promote state economic growth. Opponents argue that the economic growth argument is without merit. Typically neither side offers any empirical evidence.

4.6.1 Casino gambling and greyhound racing

In the first part of the analysis, two questions were addressed related to the economic growth effects of legalizing gambling: (1) Does legalized gambling contribute to state economic growth? If so, (2) Is it necessary for gambling to be exported for economic growth? These questions were addressed with Granger causality analysis of panel data on casino gambling, greyhound racing, and per capita income at a state level.

We can conclude that casino gambling and greyhound racing Granger cause state per capita income. The hypotheses that casino and greyhound gambling do not Granger cause state per capita income are rejected. There is no evidence that causality also runs in the other direction. These results suggest that “yes” is the answer to question (1). Our results imply that adding a new good to a state’s consumption menu does indeed spur state economic growth. Certainly, we have no evidence to the contrary in this analysis.

Regarding question (2) on the export base theory, recall that the two gambling activities have disparate thresholds and ranges. Based on our results, it does not appear that exports play the crucial role that they often are alleged to play in the state growth process. This latter inference is not intended to suggest that exporting goods and services does not result in state economic growth. After all, casino gambling has both a threshold and range exceeding the size of the states where casinos are offered, and we found that it causes state economic growth. On the other hand we found the same results for greyhound racing with a much smaller threshold and range. We may conclude that exports of the newly legalized gambling activity may be sufficient but not necessary for the gambling industry to result in state economic growth.

While we have addressed the question of whether growth results from legalized gambling, we have not attempted to explain the channels through which the legalization of a gambling activity translates into economic growth. Is it the construction of casinos and racetracks that expand a state’s capital stock? Perhaps there is a redistribution of income from con-

sumers with high marginal propensities to consume (MPCs) (losers) to entrepreneurs with lower MPCs (winners), resulting in a continually expanding capital stock. Is it the immigration attendant to the higher wages attributable to this expanded state infrastructure? Is it an increase in the velocity of spending resulting from consumers having an additional product to purchase? Is it the result of a Keynesian-type government spending multiplier effect attributable to what the state does with its additional revenue? Exactly how does legalized gambling spur economic growth? This question warrants more empirical attention now that there is evidence of a relationship between the variables.

4.6.2 Lotteries

Lotteries are an extremely popular way for politicians to try to ease fiscal constraints. No previous analyses have considered the relationship among lotteries, isolation, and economic growth. While data constraints prevent testing an extraordinarily large sample, the results here indicate that in cases where lottery states are isolated, economic growth may be one of the effects of the lottery. A simple explanation of this is that the lottery acts as any other fiscal policy. The more revenue brought in from out-of-state, the greater the effect of the fiscal policy. This makes sense, since it is akin to taxing out-of-state residents. If you can tax them for in-state spending, the net positive effect in your state will be greater.

It appears that the export base theory of growth applies to lotteries. Defensive lottery adoption, in an effort to keep spending at home, appears to be ineffective with regard to state economic growth. Ironically, only non-isolated states are tempted by the defensive legalization argument, yet these are precisely the states for which there are no significant growth effects from lotteries. Admittedly, economic growth *per se* may not be the sole purpose of lotteries. Nonetheless, the information presented here should be taken into consideration by governments currently debating the merits of lotteries, who, as Caudill et al. (1995) found, are more likely to adopt lotteries if surrounding states already have.

4.6.3 Conclusion

This chapter provides some early empirical evidence that, indeed, legalized gambling does have a positive impact on state-level economic growth. These results are much more general than other investigations that tend to analyze the experience of just a single state or for a very short time period. Still there are many issues that demand further empirical analysis, espe-

cially considering the fact that the empirical analysis here relies on data through only 1995 or 1996. The work in this chapter offers a foundation for subsequent empirical research.¹⁷

¹⁷ Walker and Jackson (2007b) is an update of their earlier study (1998), which relies on annual casino data from 1991–2005. Their preliminary results suggest that the economic growth effects from casino gambling are short-lived.

5 Relationships among U.S. gambling industries

5.1 Introduction

In recent years the fiscal pressure on many governments has increased significantly. This pressure has resulted in efforts to cut spending, raise taxes, or otherwise balance government budgets. Some states, regions, and countries have turned to legalizing casinos as a way to raise “voluntary” tax revenue. For example, in the U.S. at least 22 states have recently been considering introducing or expanding gambling operations to supplement state coffers (*USA Today* 2003), including ten states that had casino-specific initiatives on the ballot in 2004 (Anderson 2005).¹ Several countries are currently considering casino legalization, including Japan and Taiwan. Although voters may be more amenable to legalizing or expanding gambling than to tax increases or spending cuts, the overall economic effects of gambling are unclear.

This chapter focuses on tax revenue issues. Gambling industry profits are usually taxed at higher rates than other businesses, so even when gambling causes reduced spending in other sectors overall tax revenue may increase. However, tax revenue may not be the only concern, as there may be significant social or external costs from gambling, discussed in Chap. 6.

A key to understanding the effectiveness of legalized gambling as a fiscal policy tool is the relationship among gambling industries. Although Chap. 4 examined the relationship between gambling and economic growth, it ignored relationships among the gambling industries. Obviously, how the industries affect each other (as well as non-gambling industries)

¹ Levine (2003) describes the gambling debate taking place in many states. In addition to introducing new industries, some state governments have been considering raising tax rates on existing gaming industries (Husband 2003). In an extreme example, the governor of Illinois was reportedly considering a state takeover of all casinos, “to operate them for the state’s profit” (Kelly 2003). Instead, in 2003 the state imposed the country’s highest marginal tax rate on casino revenues, 70%. In 2005 the rate was lowered to 50%.

will affect their relationship to economic growth and tax revenue. Casino gambling is the primary focus here, but the effectiveness of casino gambling as a tax revenue policy depends critically on how it relates to other gambling industries. If casinos and lotteries are complementary, for example, a lottery state can benefit by introducing casinos. If horse racing and casinos cannibalize each other, a racing state may not want to introduce casinos. The relationships between the various gambling industries have not received much attention in the literature.

In this chapter, seemingly unrelated regression (SUR) estimation is used to examine if and how the various gambling industries affect each other. The U.S. provides an ideal case for analysis because data are publicly available and because it has well established gambling industries in a variety of states. Four industries are analyzed, from 1985–2000: casinos, greyhound racing, horse racing, and lotteries. The model uses industry volume as the dependent variable, with volume from the other industries, adjacent state industries, and a variety of demographic characteristics as explanatory variables. The results show that certain industries “cannibalize” each other (casinos and lotteries; horse and dog racing) while other industries help each other (casinos and horse racing; dog racing and lotteries; horse racing and lotteries).

This analysis is based on Walker and Jackson (2007a), which provides the first evidence on the general relationships between the different gambling industries in the U.S.² No other studies, to my knowledge, have appeared for other countries. With information on the interindustry relationships, policymakers and voters can be more comfortable with their decisions regarding whether to expand gambling in their jurisdictions as well as the resulting economic and tax effects. This paper provides a critical foundation for studying these issues. Of course, the results here may not apply to other jurisdictions.

The chapter continues with a literature review in Sect. 5.2. The data used to test the relationships among gambling industries are described in Sect. 5.3. The model and results are described in Sect. 5.4; and Sect. 5.5 includes a discussion of the results and potential extensions, especially related to tax policy.

² Other published studies have focused more narrowly on estimating demand for individual gambling industries or have examined pairs of industries within single states.

5.2 Literature review

Gambling industries worldwide have undergone a fascinating transformation during the past two decades.³ Nowhere is this more evident than in the U.S. Most interesting and controversial has been the expansion of casino gambling to 11 states in the 1990s. Even now, little is known about the economic growth effects of expanding gambling industries. However, legalized gambling is receiving increased attention in the economics literature despite data limitations.⁴ Numerous studies have been published which focus on the demand for a particular type of gambling, the effect of one industry on another's revenues or on the state's tax revenue. In many cases, the papers have examined a single county or state, or a small group of states, and only during a short time frame.⁵

Several papers focus on the effects of gambling industries on state tax revenues. Anders, Siegel and Yacoub (1998) examine the effect of Indian casinos on transactions tax revenue of one Arizona county. They find that tax losses from the retail, restaurant, bar, hotel, and amusement sectors were significant when casinos were introduced. Siegel and Anders (1999) examine Missouri sales tax revenues as a result of introducing riverboat casinos. Overall they find that aggregate taxes are not affected, but taxes from certain amusement industries fall. Popp and Stehwien (2002) examine county tax revenue in New Mexico and find that casinos have a negative effect on tax revenues within the county. But the effect of neighboring county casinos is somewhat odd in that the first casino has a negative effect while the second one has a positive effect on county tax revenues.

Other authors have focused more specifically on the inter-industry relationships. Davis, Filer, and Moak (1992) test the factors that determine whether or not and when a state will adopt a lottery. Among other things, the authors find that state lottery revenue is higher the smaller the state's pari-mutuel industry and the smaller the percentage of bordering states that

³ For a detailed discussion, see Eadington (1999) or McGowan (2001).

⁴ This problem is particularly evident in the case of Indian casinos which are prevalent in 28 states but are not required to publicly disclose data.

⁵ Lotteries have received more research attention than the other gambling industries. However, much of the lottery research has focused on the factors affecting the decision to adopt a lottery, including fiscal pressures. Relevant studies include Alm et al. (1993), Caudill et al. (1995), Mixon, Caudill, Ford, and Peng (1997), Erekson et al. (1999), Glickman and Painter (2004), and Giacomassi, Nichols, and Stitt (2006). Others have more general analyses of lotteries, most notably Clotfelter and Cook (1991) and Borg et al. (1991). For the most part, these studies do not address the relationships between lotteries and other gambling industries.

have lotteries. Mobilia (1992) finds that a lottery dummy is negative and significant for pari-mutuel attendance but not for per attendee handle. Thalheimer and Ali (1995) find that lotteries reduce racetrack handle. However, the state that has both lotteries and racetracks benefits in terms of overall tax revenue. Ray (2001) finds that horse racing and casino dummies have significantly negative effects on total state greyhound handle. Siegel and Anders (2001) find the number of slot machines in Arizona Indian casinos has a significantly negative effect on lottery sales but horse and dog racing have no effect on the lottery. Elliott and Navin (2002) examine the probability of lottery adoption and the determinants of lottery sales. They find that casinos and pari-mutuels harm the lottery and that adjacent state lotteries have a small negative effect on lottery sales. The number of Indian casinos in a state and riverboat casinos in neighboring states do not significantly affect lottery sales. The note by Fink and Rork (2003) extends this work by taking into account that states self-select when legalizing casinos. Low-revenue lottery states are more likely to legalize casinos and this partly explains the negative relationship between casinos and lotteries. Kearney (2005) finds that spending on lottery tickets is financed completely by a reduction in non-gambling expenditures, implying that other forms of gambling are not harmed by a lottery.

Table 5.1 provides a summary of many of the studies which give information on the interindustry relationships. The table indicates the years examined, the scope of the study (e.g., one track or two states), whether the relationships were analyzed mainly with dummy variables, and key findings of the studies. The literature provides some important information about the relationships among gambling industries. The most common findings are that an industry either harms another industry or does not affect it. No study has found that different gambling industries help each other.

There are three important caveats regarding this area of research. First, the studies examine various often short time periods and tend to be limited to individual or small groups of states. It is difficult, if not impossible, to generalize from these studies to other regions or times. Second, most papers only provide a one-way test of the relationship between industries. For example, papers testing the effects of lotteries on pari-mutuels typically do not analyze the effect of pari-mutuels on lotteries. As a result, the literature lacks information on how some of the industries affect others. Third, many of the studies account for the existence of other gambling industries only through dummy variables. This ignores the volume of gambling in the industries.

Table 5.1. Review of literature on interindustry relationships

Paper	Years	States/ counties	Primarily uses dummies?	Findings ^a
Anders, Siegel, and Yacoub (1998)	1990–96	1 county (AZ)	Yes	Indian casinos harm other entertainment
Elliot and Navin (2002)	1989–95	All states	No	Casinos and pari- mutuels harm lotteries
Kearney (2005)	1982–98	All states	No	Lotteries do not harm other forms of gam- bling
Mobilia (1992)	1972–86	All racing states	Yes	Lotteries harm horse and dog racing
Popp and Stehwien (2002)	1990–97	33 counties (NM)	Yes	Indian casinos harm other entertainment
Ray (2001)	1991–98	All dog racing states	Yes	Horse racing and casi- nos harm dog racing
Siegel and Anders (1999)	1994–96	1 state (MO)	No	Casinos harm other en- tertainment
Siegel and Anders (2001)	1993–98	1 state (AZ)	No	Slots harm the lottery; horse and dog racing do not affect the lottery
Thalheimer and Ali (1995)	1960–87	3 tracks (OH,KY)	No	Lottery harms horse racing

^a “Other entertainment” refers to non-gambling industries, such as restaurants, hotels, and bars.

To rectify these research issues, the present model covers all states and the District of Columbia during the 1985–2000 period. We examine how each of four industries (casinos, lotteries, dog racing, horse racing) affects the others. Finally, when analyzing the inter-industry relationships, we rely on state-level industry volume, rather than using simple dummies to represent the industries’ presence. This combination of features makes this analysis unique in the gambling literature.

5.3 Data

The main goal in this chapter is to determine the relationships among various gambling industries in the U.S. A variety of demographic and industry volume data were collected for all states plus Washington, D.C., for 1985–2000. There are a total of 816 observations for each of the variables, classified in three groups, discussed below.

5.3.1 Gambling volume variables

The gambling volume data for each industry in each state are summarized in Tables 5.2–5.6.⁶ The beginning year for the availability of each type of gambling in each state is indicated. An asterisk (*) indicates the availability of gambling in the state for the entire 1985–2000 period. In some states greyhound and horse racing were not available continuously. In these cases the years racing was available are listed. Some forms of gambling are exempt from the analysis (charity and private gambling, non-casino and race-track video-poker or slot machines⁷).

⁶ The sources for the industry data follow. Lottery ticket sales come from *La-Fleur's 2001 World Lottery Almanac*, 9th edition. TLF Publications, 2001. Casino revenues are from the American Gaming Association and various states' gaming commissions. Greyhound and horse racing handle are from the 1985–2000 issues of *Pari-Mutuel Racing*, published by the Association of Racing Commissioners International. The 1985–90 dog and horse racing data and the 1995–2000 horse racing data were reported as handle. For horse and greyhound racing from 1991–94, handle was calculated using the total pari-mutuel takeout and effective takeout rate (handle = total pari-mutuel takeout / effective takeout rate). The same process was used to calculate greyhound racing handle from 1995–2000. Thus all racing data are reported with a consistent measure. All of the above volume data are adjusted for inflation using the CPI from the Bureau of Labor Statistics (1982–84=100). Annual state population estimates are from the Bureau of the Census. The states' annual Indian casino square footage was calculated using the casino listing at www.casinocity.com. At the time this was written, this source listed 126 Indian-owned casinos in the U.S. Square footage and opening dates were collected from the casinos' web pages or by phone calls to the casinos.

⁷ Slot machines and video poker at racetracks, so called "racinos," are a relatively new phenomenon appearing in some states. Due to their relative newness and the inherent difficulties in classifying these non-racing bets (as racing handle or casino revenue?), this machine gambling is omitted from this analysis. For a discussion of racinos, see Eadington (1999, p. 176) and Thalheimer and Ali (2003, p. 908).

Table 5.2. Lottery availability in the U.S., 1985–2000

State	First year	State	First year	State	First year	State	First year
AL		IL	*	MT	1988	RI	*
AK		IN	1990	NE	1994	SC	
AZ	*	IA	1986	NV		SD	1988
AR		KS	1988	NH	*	TN	
CA	1986	KY	1989	NJ	*	TX	1992
CO	*	LA	1992	NM	1996	UT	
CT	*	ME	*	NY	*	VT	*
DE	*	MD	*	NC		VA	1989
DC	*	MA	*	ND		WA	*
FL	1988	MI	*	OH	*	WV	1986
GA	1993	MN	1990	OK		WI	1989
HI		MS		OR	*	WY	
ID	1990	MO	1986	PA	*		

Notes: Unless otherwise indicated, data run through 2000.

* indicates lottery present from 1985 to 2000.

Table 5.3. Horse racing availability in the U.S., 1985–2000

State	First year	State	First year	State	First year	State	First year
AL	1987, 1989–2000	IL	*	MT	*	RI	1991
AK		IN	1994	NE	*	SC	
AZ	*	IA	*	NV	1989	SD	*
AR	*	KS	1988	NH	*	TN	
CA	*	KY	*	NJ	*	TX	1989
CO	*	LA	*	NM	*	UT	
CT	*	ME	1985–1989, 1991–2000	NY	*	VT	1985–1997
DE	*	MD	*	NC		VA	
DC		MA	*	ND	1989	WA	*
FL	*	MI	*	OH	*	WV	*
GA		MN	1985–1992, 1994–2000	OK	*	WI	1996
HI		MS		OR	*	WY	*
ID	*	MO		PA	*		

Notes: Unless otherwise indicated, data run through 2000.

* indicates horse racing present from 1985 to 2000.

Table 5.4. Greyhound racing availability in the U.S., 1985–2000

State	First year	State	First year	State	First year	State	First year
AL	*	IL		MT		RI	*
AK		IN		NE		SC	
AZ	*	IA	*	NV		SD	*
AR	*	KS	1989	NH	*	TN	
CA		KY		NJ		TX	1990
CO	*	LA		NM		UT	
CT	*	ME		NY		VT	1985–1992
DE		MD		NC		VA	
DC		MA	*	ND		WA	
FL	*	MI		OH		WV	*
GA		MN		OK		WI	1990
HI		MS		OR	*	WY	
ID	1988	MO		PA			

Notes: Unless otherwise indicated, data run through 2000.

* indicates greyhound racing present from 1985 to 2000.

Table 5.5. Casino availability in the U.S., 1985–2000

State	First year	State	First year	State	First year	State	First year
AL		IL	1991	MT		RI	
AK		IN	1995	NE		SC	
AZ		IA	1992	NV	*	SD	1989
AR		KS		NH		TN	
CA		KY		NJ	*	TX	
CO	1991	LA	1993	NM		UT	
CT		ME		NY		VT	
DE		MD		NC		VA	
DC		MA		ND		WA	
FL		MI	1999	OH		WV	
GA		MN		OK		WI	
HI		MS	1992	OR		WY	
ID		MO	1994	PA			

Notes: Unless otherwise indicated, data run through 2000.

* indicates casinos present from 1985 to 2000.

Table 5.6. Indian casino availability in the U.S., 1985–2000

State	First year	State	First year	State	First year	State	First year
AL		IL		MT	1993	RI	
AK		IN		NE		SC	
AZ	*	IA	1992	NV		SD	*
AR		KS	1996	NH		TN	
CA	*	KY		NJ		TX	
CO	1992	LA	1988	NM	1987	UT	
CT	1992	ME		NY	*	VT	
DE		MD		NC		VA	
DC		MA		ND	1993	WA	*
FL	*	MI	1993	OH		WV	
GA		MN	*	OK	*	WI	*
HI		MS	1994	OR	1994	WY	
ID	1995	MO		PA			

Notes: Unless otherwise indicated, data run through 2000.

* indicates Indian casinos present from 1985 to 2000.

As indicated above, we are interested in the volume of each type of gambling in each of the states. The data for greyhound racing, horse racing, and lotteries are “handle per capita,” the total dollar value of bets placed divided by the state population.⁸ The data for casino volume are “revenue per capita,” the amount the casino keeps after paying winning bets divided by state population.⁹ Finally, for Indian casinos we use Indian-owned casino square footage as a proxy for gambling volume. Since In-

⁸ In the case of lotteries, this is ticket sales per capita.

⁹ Revenue per capita is used rather than handle per capita because casino revenue cannot be reliably converted to handle. For example, suppose a person walks into a casino and buys \$100 worth of chips and plays until she loses the \$100. The total handle could range from \$100 to any higher amount. It would be \$100 if she lost a single \$100 hand of black-jack. But suppose she plays and wins several thousand dollars, but later loses it all. The total handle in this case is in the thousands of dollars, even though she only lost \$100 of her own money. This example illustrates why an estimate of casino handle would be unreliable. Even if it was possible to convert revenue to handle, say by using some multiple, this adjustment would not affect relative coefficient estimates in any meaningful way.

dian casinos are not required to report revenue or handle data, this is perhaps the best measure available.¹⁰

5.3.2 Adjacent-state variables

Whether the various gaming activities act as substitutes or complements to each other, the presence of these activities in neighboring states can lead to border crossings by consumers that may cause potentially dramatic effects on the volume of a particular gaming activity in a given state. Certainly, failure to account for these effects in some way can lead to a serious misstatement of the effects of other in-state gaming activities on the volume of the activity in question. State border crossings by consumers have received considerable attention, especially in the bootlegging and tobacco tax literature.¹¹ They have also recently found their way into the literature on state lotteries by Garrett and Marsh (2002) and Tosun and Skidmore (2004).

There is no obvious “best” method for accounting for adjacent-state purchases of gambling services. The available measures include

- (i) aggregate volume of adjacent state gambling
- (ii) aggregate per capita adjacent state gambling volume
- (iii) percentage of adjacent states to allow a particular type of gambling

The first measure is problematic because a higher level of adjacent state gambling volume may be the result of a larger population or a higher volume of tourists, or a combination of the two.

The second measure, per capita adjacent state gambling volume, is problematic because summing per capita measures across neighboring states results in a meaningless number. A higher sum may result from more gambling, more neighbors, or fewer residents. The interpretation of these two options is also difficult.¹²

¹⁰ I inquired with Harrah’s Entertainment, one of the largest U.S. casino operators, who also manages numerous Indian-owned casinos. They confirmed that there is a general industry formula for the number of slot machines and table games as a function of square footage. For this reason, Indian casino square footage is a satisfactory, albeit imperfect, measure of Indian casino volume.

¹¹ For example, see Saba, Beard, Ekelund, and Ressler (1995) and references therein.

¹² Other attempts to measure the intensity of adjacent-state gambling have similar difficulties. The primary concern here is the *availability* of gambling in nearby states.

The third measure presents the fewest potential problems although it is the most general of the measures. To account for cross-border effects in this study, we follow Davis et al.'s (1992) example and utilize the percentage of adjacent states with a particular form of gambling during each year.¹³ While this measure will not perfectly reflect the amount of cross-border gambling, its interpretation is unambiguous and less problematic than other measures. What it does well is indicate the nearby gambling options of residents in a particular state. Its limitation, of course, is that it does not measure the intensity with which these options are offered by the surrounding states. Table 5.7 lists the states adjacent to each state.

Table 5.7. States and their adjacent states

State	Adjacent states	State	Adjacent states
AL	MS, TN, GA, FL	NE	CO, WY, SD, IA, MO, KS
AZ	CA, NV, UT, CO, NM	NV	CA, OR, ID, UT, AZ
AR	TX, OK, MO, TN, MS, LA	NH	VT, ME, MA
CA	OR, NV, AZ	NJ	DE, MD, PA, NY, CT
CO	AZ, UT, WY, NE, KS, OK, NM	NM	AZ, UT, CO, OK, TX
CT	NY, MA, RI, NJ	NY	PA, VT, MA, CT, NJ
DE	MD, PA, NJ	NC	SC, TN, VA, GA
DC	VA, MD	ND	MT, MN, SD
FL	AL, GA	OH	IN, MI, PA, VW, KY
GA	AL, TN, NC, SC, FL	OK	NM, CO, KS, MO, AR, TX
ID	OR, WA, MT, WY, UT, NV	OR	WA, ID, NV, CA
IL	MO, IA, WI, IN, KY	PA	NY, NJ, MD, WV, OH, DE
IN	IL, MI, OH, KY	RI	CT, MA
IA	NE, SD, MN, WI, IL, MO	SC	GA, NC
KS	CO, NE, MO, OK	SD	WY, MT, ND, MN, IA, NE
KY	MO, IL, IN, OH, WV, VA, TN	TN	AR, MO, KY, VA, NC, GA, AL, MS
LA	TX, AR, MS	TX	NM, OK, AR, LA
ME	NH	UT	NV, ID, WY, CO, NM, AZ
MD	VA, WV, DC, PA, NJ, DE	VT	NY, NH, MA
MA	RI, CT, NY, VT, NH	VA	NC, TN, KY, WV, MD, DC
MI	WI, IN, OH	WA	OR, ID
MN	SD, ND, WI, IA	WV	KY, OH, PA, MD, VA
MS	LA, AR, TN, AL	WI	MN, MI, IA, IL
MO	KS, IA, IL, KY, TN, AR, NE, OK	WY	ID, MT, SD, NE, CO, UT
MT	ID, ND, SD, WY		

Note: Alaska and Hawaii are omitted.

¹³ As an example, in 2000, Florida's adjacent state lottery observation would be 0.5, since Georgia had a lottery that year and Alabama did not.

5.3.3 Demographic variables

Some studies have used surveys to get a general demographic picture of the typical gambler (Gazel and Thompson 1996; Harrah's 1997; American Gaming Association [AGA] 2006). Variables on population and demographic characteristics, such as education, income level, age, and religious beliefs, may be helpful in explaining variations in gambling volume across states and industries.

There has been somewhat conflicting evidence on the level of education and the tendency to gamble. Obviously those with more education are more likely to understand the negative expected return from games of chance. However, Harrah's (1997) and the AGA (2006) find that casino players tend to have an above average level of education. Clotfelter and Cook (1990) find that lottery play falls as education level rises. As a proxy for education levels, we include as a variable in the models the percentage of citizens over 25 years old holding bachelor degrees. This variable may be related to the income variable as income and education levels tend to move together.

Eadington (1976) suggests that gambling may be perceived by lower-income people as a means of achieving a higher level of income. Evidence on lotteries (Oster 2004) has suggested that lotteries amount to a regressive tax. In an effort to test this proposition, the estimated percentage of people in the states living in poverty is included as a variable. While it may be true that the poor will tend to spend a larger proportion of their income on gambling, that does not imply that more in this group will lead to higher total gambling revenues for a state. Clotfelter and Cook (1990) find no clear relationship between income level and lottery play. The AGA (2006) reports that the median income of casino players is slightly higher than that of the overall population. State real per capita income is included in the models to determine and account for the effect of average income on the tendency to gamble.

Another important demographic variable may be the age of the population. Retirees may be of particular interest, as Gazel and Thompson (1996) report that older people make up a high proportion of casino gamblers. Harrah's (1997) and the AGA (2006) on the other hand find that the median age of casino players is about the average for the U.S. population. The estimated percentage of people in the states over 65 years old is included as a variable in the model. Although previous evidence seems mixed, the variable may provide information as to who gambles.

Jackson, Saurman, and Shughart (1994) and Elliott and Navin (2002) use a variable for the number of Baptists in a state to help predict the probability of lottery adoption. Baptists are a large and well-organized interest

group opposed to gambling and may have a negative effect on gambling revenues. Following these authors, we include the estimated percentage of Baptists in the states as an explanatory variable.

Finally, the number of hotel employees in each state is used as a rough measure of the volume of tourism in the states during each year.

State per capita income and hotel workers are reported annually.¹⁴ For the data on Baptists, degree holders, older people, and poverty, two years' data are used to derive linear annual estimates for the 1985–2000 period for each state.¹⁵

5.4 Model and results

We are attempting to explain the relationships among gambling industries by modeling the gambling volume in each industry as a function of the volume in the other industries, adjacent state gambling activity, and demographic factors. A panel data model has the advantage of increasing the size of the data set, especially helpful for industries like gambling, which are rather young in some states. The econometric model is chosen based on the fact that the dependent variable (industry volume) in the model is left-censored. Left censoring is more prevalent for the casino and horse racing industries than it is for dog racing and lotteries.¹⁶ Still, it is a problem for all industries. States self-select into legalizing a certain form of gambling. Those that do not elect to allow gambling get “0”s for the revenue variable leading to the censored data. We must account for this censoring in the parameter estimates. This is done with a probit model to explain the probability of legalizing each gambling industry. Following Heckman (1979) we obtain the inverse Mills ratio (IMR) from the probits and include it in the model as an additional explanatory variable for gambling revenue. This

¹⁴ The hotel employee information and per capita income data come from the Bureau of Economic Analysis. The per capita income data are adjusted for inflation using the Bureau of Labor Statistics CPI data.

¹⁵ Annual estimates for these are not available. The years used to derive the estimates vary due to data availability: Baptists (1980 and 1990); degree holders (1990 and 2001); older people (1990 and 2001); and poverty (1992 and 2001). The data come from the Bureau of the Census, with the exception of Baptists, from the *New Book of American Rankings*.

¹⁶ No model is posited for Indian casino gambling since the volume measure for this industry (square footage) is rather crude.

Table 5.8. Sample selection probits

Variable	Casino	Dog racing	Horse racing	Lottery
Constant	-3.565*** (-6.572)	-0.677* (-1.70)	1.343*** (3.24)	-6.266*** (-10.69)
Casino dummy	—	-0.211 (-1.31)	0.505** (2.39)	2.303*** (4.77)
Dog racing dummy	-0.207 (-1.41)	—	1.075*** (7.04)	0.897*** (5.66)
Horse racing dummy	0.434** (2.08)	1.094*** (6.98)	—	1.060*** (6.55)
Lottery dummy	1.202*** (5.10)	0.779*** (5.21)	0.881*** (6.04)	—
Indian casino dummy	0.529*** (3.74)	0.114 (1.04)	0.897*** (6.09)	-0.323** (-2.05)
Hotel workers	40.112*** (7.19)	-10.58 (-1.24)	-0.189 (-0.05)	-83.355*** (-6.96)
Baptists	0.030*** (4.68)	0.004 (0.76)	-0.030*** (-6.92)	-0.037*** (-7.46)
Degree holders	0.019 (1.21)	0.010 (0.81)	0.005 (0.38)	0.046*** (3.01)
Income per capita	-0.695e-5 (-0.19)	-0.920e-4*** (-3.10)	-0.956e-4*** (-2.66)	0.0004*** (10.38)

Notes: The z -statistic is indicated in parentheses below each coefficient.
Significance: *=0.10 level; **=0.05 level; ***=0.01 level.

should correct for censoring bias. The probit models are presented in Table 5.8.¹⁷

In the panel model we use a time trend to account for intertemporal variation within a state and include regional dummies to pick up unexplained heterogeneity across regions as in fixed effect models. These regional dummies turn out to be significant to varying degrees across industries but they do not affect the coefficient estimates or the alternative gambling revenue coefficients appreciably, and the results are reported without these dummies.¹⁸

A system of four equations is estimated where each equation is intended to explain the volume of one type of gambling as a function of volumes of

¹⁷ Although the probit models are intended only to correct for left-censoring of the data, they do give some insight into the probabilities of adopting the various forms of gambling. Obviously their usefulness in this regard is limited because the specification of the models has a different goal.

¹⁸ The results including the regional dummies are available from the author.

other types of gambling, the presence of various types of adjacent state gaming, and state specific demographic factors. The system attempts to explain spending on casinos, dog racing, horse racing, and lotteries. Even after accounting for problems arising from left censoring of the spending measures and the panel nature of the data, we face the problem of a potential relationship among the errors of the four equations. Such a relationship could arise from neglected macroeconomic variables affecting the different equations via their errors in a given year or from differing general attitudes and preferences regarding gambling across states in a given time period. To the extent that this system of equations is a variant of a demand system, the theoretically implied adding up constraints require the sum of the disturbances across equations be zero so there must be some correlation between the disturbances in the different equations (Phlips 1983, 198–199). These types of problems are typically lumped under the heading of “contemporaneous correlation” of the disturbances across equations that can be handled by seemingly unrelated regression (SUR) estimation techniques. This empirical procedure allows us to estimate our four equation model jointly as a system of equations rather than applying OLS to each equation independently, thereby assuring us of more efficient parameter estimates and facilitating the imposition of cross equation parameter restrictions.

The system is similar to, but not identical to, a demand equation system, such as Stone’s linear expenditure system or Theil’s Rotterdam model. Demand systems typically estimate a system of equations in which some measure of quantities demanded are functions of relative prices and real income, so that the estimated coefficients can be interpreted as (Hicksian) compensated own- and cross-price elasticities and income elasticities.¹⁹ This system, on the other hand, involves expenditures (prices times quantities) rather than prices or quantities alone. Gambling, like most service industries, encounters measurement difficulties in attempting to separate prices from quantities, or more particularly, in attempting to measure quantities purchased. While we would like to exploit the similarity to demand systems as much as possible, the analogy is tenuous in at least two areas.

First, in demand systems estimates substitute commodities are typically indicated by positive coefficient estimates on the prices of related goods and complementarity by negative coefficient estimates. In the expenditure system, substitutable (or cannibalizing or competing) gaming activities are defined as ones in which increases in consumer expenditures on one activity result in decreased consumer expenditures on the related activity, or a

¹⁹ These demand systems are often estimated by SUR. For example, see Wooldridge (2002, 144–145) or Greene (2003, 341 and 362–369).

negative coefficient estimate when the latter is a function of the former. Similarly, a complementary relationship among gaming activities arises when increased consumer spending on one activity results in increased expenditures on the related activity as well, a positive coefficient estimate when the latter is a function of the former. Our definition is consistent with the more traditional one only under some fairly restrictive assumptions concerning magnitudes of the price elasticities involved. However, our definition is heuristically valid and it is also perhaps more meaningful if the primary interest is in the tax-revenue-maximizing bundle of games of chance.

Second, in demand systems estimation, the compensated cross-price elasticity estimates are constrained to be symmetric across equations. That is, the compensated cross-price elasticity of demand for good A with respect to the price of good B must be identical to the compensated cross-price elasticity of demand for good B with respect to the price of good A. Imposing such restrictions is not only implied by demand theory, it also results in more efficient parameter estimates. Unfortunately, it is not at all clear that this type of symmetry restriction is appropriate when the equations are expressed in expenditure form. It is reasonable to expect that if a rise in expenditure on casino gambling results in a decreased expenditure on the lottery, then a rise in expenditure on the lottery should also result in a decreased expenditure on casino gambling, i.e., symmetry of signs on the corresponding expenditure variables across the relevant equations. However, there is no reason to suspect that the magnitudes involved would be the same. While there is an empirical rationale to impose symmetry constraints across equations, namely smaller standard errors, there is not the theoretical rationale that is present in demand theory. To gain some insight into how sensitive the estimates are to the imposition of cross equation symmetry restrictions, the equation system is estimated with them imposed and again without them. Tables 5.9 and 5.10 present the respective SUR results.

5.4.1 Discussion of results

Let us briefly consider the results presented in Table 5.9 where the corresponding cross equation industry volume coefficients have been constrained to equality, and Table 5.10 incorporating no cross equation constraints. In comparing the industry volume coefficient estimates, the most important result to note is that there are no sign or significance discrepancies between corresponding coefficient estimates across the two tables, and there is only one notable discrepancy in terms of magnitude. The dog rac-

Table 5.9. SUR model with cross-industry constraints

Variable	Casino	Dog racing	Horse racing	Lottery
Casino	—	-0.020*** (-2.89)	0.277*** (14.18)	-0.104*** (-4.93)
Dog racing	-0.020*** (-2.89)	—	-0.062*** (-6.10)	0.136*** (17.26)
Horse racing	0.277*** (14.18)	-0.062*** (-6.10)	—	0.844*** (67.43)
Lottery	-0.104*** (-4.93)	0.136*** (17.26)	0.844*** (67.43)	—
Indian square footage	151.19*** (3.07)	11.289 (0.90)	154.05*** (3.68)	-86.08* (-1.75)
Adjacent casino	-0.035*** (-3.71)	0.0006 (0.24)	0.087*** (11.27)	-0.065*** (-7.09)
Adjacent dog racing	-0.040 (-0.61)	0.060*** (3.55)	0.085 (1.53)	-0.022 (-0.33)
Adjacent horse racing	0.136*** (6.603)	-0.02*** (-3.59)	-0.269*** (-15.87)	0.227*** (11.36)
Adjacent lottery	0.007 (0.45)	-0.009** (-2.21)	0.128*** (10.00)	-0.118*** (-7.76)
Age >65	-0.297e7 (-0.50)	0.176e8*** (11.29)	-0.541e7 (-1.08)	0.319e7 (0.54)
Baptists	0.489e7*** (4.79)	484006.51* (1.88)	-239954.20 (-0.28)	-0.126e7 (-1.23)
Degree holders	-0.102e8* (-1.722)	-0.240e7 (-1.59)	0.326e7 (0.65)	-0.104e8* (-1.76)
Hotel workers	0.336e11*** (42.95)	0.144e10*** (4.79)	-0.350e10*** (-3.87)	-0.377e10*** (-3.69)
Income per capita	6643.48 (0.83)	1016.18 (0.48)	-16661.41** (-2.48)	47573.32*** (6.04)
Constant	-0.366e11*** (-2.78)	0.305e10 (0.92)	0.853e11*** (7.79)	-0.838e11*** (-6.51)
Year	0.182e8*** (2.75)	-0.162e7 (-0.97)	-0.428e8*** (-7.74)	0.419e8*** (6.46)
Inverse Mills ratio (IMR)	0.402e9*** (20.15)	0.730e8*** (17.54)	0.487e8*** (4.18)	0.655e8*** (4.12)

Notes: The t -statistic is indicated in parentheses below each coefficient.
Significance: *=0.10 level; **=0.05 level; ***=0.01 level.

Table 5.10. SUR model, unconstrained

Variable	Casino	Dog racing	Horse racing	Lottery
Casino	—	-0.019*** (-2.64)	0.234*** (10.04)	-0.115*** (-4.06)
Dog racing	-0.165 (-1.38)	—	-0.956*** (-9.63)	1.642*** (14.46)
Horse racing	0.355*** (9.08)	-0.062*** (-6.01)	—	1.042*** (38.42)
Lottery	-0.079** (-2.33)	0.122*** (15.19)	0.726*** (37.36)	—
Indian square footage	113.04** (2.25)	12.47 (0.99)	180.76*** (4.30)	-151.26*** (-3.03)
Adjacent casino	-0.042*** (-4.26)	0.001 (0.46)	0.087*** (11.23)	-0.083*** (-8.79)
Adjacent dog racing	-0.046 (-0.68)	0.067*** (3.96)	0.213*** (3.74)	-0.244*** (-3.63)
Adjacent horse racing	0.148*** (6.78)	-0.018*** (-3.20)	-0.241*** (-14.07)	0.242*** (11.61)
Adjacent lottery	-0.007 (-0.40)	-0.010** (-2.54)	0.098*** (7.44)	-0.096*** (-6.07)
Age >65	669352.82 (0.10)	0.185e8*** (11.85)	0.200e8*** (3.51)	-0.391e8*** (-5.83)
Baptists	0.516e7*** (5.04)	444286.82* (1.73)	-256651.01 (-0.30)	-0.126e7 (-1.23)
Degree holders	-0.687e7 (-1.14)	-0.277e7* (-1.83)	-0.515e7 (-1.01)	318567.45 (0.05)
Hotel workers	0.339e11*** (42.06)	0.128e10*** (4.23)	-0.320e10*** (-3.17)	-0.299e10** (-2.50)
Income per capita	-1796.71 (-0.21)	2844.01 (1.34)	9334.11 (1.36)	12761.11 (1.54)
Constant	-0.359e11*** (-2.70)	0.218e10 (0.66)	0.693e11*** (6.26)	-0.793e11*** (-6.11)
Year	0.179e8*** (2.667)	-0.120e7 (-0.72)	-0.349e8*** (-6.27)	0.401e8*** (6.12)
Inverse Mills ratio (IMR)	0.395e9*** (19.55)	0.667e8*** (15.88)	0.481e8*** (4.12)	0.833*** (5.18)

Notes: The t -statistic is indicated in parentheses below each coefficient.
Significance: *=0.10 level; **=0.05 level; ***=0.01 level.

ing coefficient in the lottery equation is roughly ten times as large in the unconstrained estimate as in the constrained case. Even though the cross equation restrictions are of questionable theoretical validity, their imposition appears to have no appreciable impact on the industry volume coefficient estimates. In general, the corresponding coefficient estimates across tables are very similar in terms of sign, significance, and magnitude. For this reason we confine the interpretation of the results to the unconstrained case presented in Table 5.10.

The results for the casino revenue model indicate that increases in horse racing handle and Indian casino gambling and decreases in lottery sales in the state tend to significantly increase state licensed casino gambling revenues. The presence of casino gambling in adjacent states significantly decreases and the presence of horse racing in adjacent states significantly increases casino revenues. Only two of the demographic variables affected casino revenues, Baptists and tourism (“Hotel workers”) and both affect it positively. While the tourism result was expected, the Baptist result was a surprise and may simply be the result of Baptists proxying a significant regional (southeast) effect. There is a significant positive trend (“Year”) in casino revenues over the period of the sample. Finally, the significance of the IMR clearly indicates the importance of correcting for left censoring of casino revenues. All other parameters in the model are insignificant.

The results for the dog racing model indicate that increases in lottery sales and decreases in horse racing handle and casino revenues in the state in question statistically increase dog racing handle. Apparently, horse racing and lotteries in adjacent states compete with in-state dog racing since these variables have significant and negative coefficient estimates. There may be agglomeration economies in dog racing since the presence of dog racing in adjacent states appears to significantly increase dog racing handle. Increases in population over 65 and tourism significantly increase dog racing handle at the 1% level while increases in Baptists and decreases in degree holders increase it at the 10% level. The significance of the IMR indicates the importance of correcting for left censoring. All other parameters in the model are insignificant.

The results for the horse racing model indicate that increases in casinos, Indian casinos, and lotteries and decreases in dog racing handle increase horse racing handle. In addition, the presence of casino gambling, dog racing and lotteries in adjacent states increases horse racing handle while the presence of horse racing in adjacent states competes by significantly decreasing horse racing handle. Increases in population over 65 and decreases in tourism significantly increase horse racing handle. The tourism result is surprising but with the possible exception of major races (Triple Crown, Breeder’s Cup, etc.) horse racing does not attract overnight type

tourists. Finally, there is a significant downward trend in horse racing revenues, and the IMR is again significant. All other parameters in the horse racing equation are insignificant.

Results of the lottery model indicate increases in dog and horse racing handle and decreases in Indian casinos and casino revenues increase lottery sales. The presence in adjacent states of casino gambling, dog racing, and lotteries decreases in-state lottery sales, while the presence in adjacent states of horse racing increases them. Further, decreases in population over 65 and tourism significantly increase lottery revenues. In this case, the tourism result is not so odd. At the time of this writing, only six states do not have some form of state-run lottery. While tourists may indeed buy lottery tickets, it is unlikely that they go to a neighboring state and stay over night solely to do so. Finally, there is an upward trend in lottery sales over the sample period, and the IMR is again significant. All other parameters in the lottery equation are insignificant.

5.4.2 Effects of cross-equation constraints

Before turning to a detailed discussion of the cannibalization question, we should address a seemingly puzzling anomaly that is obviated by a careful comparison of the constrained and unconstrained results in Tables 5.9 and 5.10. First note that we only constrain the corresponding industry volume coefficients across equations. No constraints are directly applied to the adjacent state, demographic, and “other” variables’ coefficients. Second, recall that the imposition of these industry volume constraints did not appear to appreciably alter the constrained estimates from their unconstrained counterparts. The constrained coefficients themselves are not the only estimates affected by the imposition of constraints. The unconstrained coefficient estimates can also be affected.

As an example, consider the coefficient estimates for the variable “Age>65” in the constrained and unconstrained casino revenue models. In the constrained model, “Age>65” has a coefficient estimate of -0.297×10^7 and in the unconstrained casino revenue model its estimate is 0.669×10^6 . Neither coefficient is statistically significant. Indeed, with the exception of a few cases for a couple of the demographic variables, the pattern of signs and significance is amazingly uniform across the constrained and unconstrained results. Nevertheless, a point estimate discrepancy of this magnitude is worth noting, and is almost certainly attributable solely to the imposition of the cross equation constraints on the parameter estimates in Table 5.9.

As an illustration, consider the dropping of an important variable from a hypothetical regression. This is nothing more than imposing a constraint to equal zero on the coefficient. Econometric theory tells us that omitting a variable can lead to biased estimates of the remaining variables and that the extent of the bias depends in part on the correlation between the excluded and included variables. In the casino revenue case “Age>65” was apparently highly correlated with one of the constrained variables. This is not always the case. Consider the constrained and unconstrained estimates of the “Baptists” variable in the lottery equation. They are almost identical (almost due to rounding) and they are both insignificant. We can infer from this result that “Baptists” is uncorrelated with any of the constrained variables in the lottery equation of Table 5.9. These types of anomalous results in comparing constrained and unconstrained estimates are not unusual. They are replete throughout the empirical literature on demand system estimation.

In summary, there are no major point estimate discrepancies between corresponding constrained and unconstrained models in any of the statistically significant coefficients in any of the gambling models. Since there is no apparent gain from imposing the cross equation constraints, and since there is a potential for biased estimation if the constraints are not justified, our attention is confined in subsequent discussion to the unconstrained estimates of Table 5.10. A summary of the inter-industry effects from the unconstrained model are presented in Table 5.11.

Table 5.11. Summary of intrastate industry relationships in the U.S. (unconstrained model)

Variable	Model	Casino	Dog racing	Horse racing	Lottery
Casino			–	+	–
Dog racing		(–)		–	+
Horse racing		+	–		+
Lottery		–	+	+	
Indian square footage		+	(+)	+	–

Note: () indicates statistically insignificant at normal levels.

5.5 Policy issues

Our main interest is in discovering whether there are general intrastate relationships among the various gambling industries. It is for this reason that

we focus our discussion of the results on the “industry volume” variables summarized in Table 5.11. The results suggest that horse and dog racing are substitutes. They are similar types of venues, and this result is reasonable. Lotteries and casinos are negatively related. This is consistent with findings by Elliott and Navin (2002) and Fink and Rork (2003). However, lotteries do *not* appear to cannibalize the racing industries. This is somewhat consistent with Kearney’s (2005) finding that spending on lotteries comes at the expense of spending on non-gambling goods and services, but is contrary to the evidence by Gulley and Scott (1989), Mobilia (1992), and Thalheimer and Ali (1995).

The availability of a type of gambling in adjacent states will harm that industry in the state.²⁰ Although many studies have not considered adjacent state effects, these results are consistent with those of Davis et al. (1992), Elliott and Navin (2002), Garrett and Marsh (2002) and Tosun and Skidmore (2004).

The differences in these findings and those of previous studies can be explained by differences in the industries and states considered, time periods, and econometric methodology. Of course a specific state or industry might behave differently than the aggregates studied here. Some of the results are not intuitive. For example, casinos and horse racing help each other, but casinos and dog racing harm each other. Indian casinos tend to complement casinos and horse racing, but harm lotteries. These results may be due the peculiarities in certain states that exert significant influence.

This is one of the first attempts to examine all the industries in all states in an effort to provide a comprehensive understanding the relationships among all the various gambling industries.²¹ The findings here may be used as a starting point for analyzing the expected effects of introducing or expanding gambling industries in a state, region, or country. Although this study is nation-wide, the relationship between two industries in a particular jurisdiction may be different than that indicated here. In addition, this study does *not* examine the relationship between gambling and non-gambling industries. Although some authors have addressed this issue, it has not been dealt with rigorously.

Should a particular jurisdiction legalize casinos, for example? Casinos are more labor intensive and are taxed at a higher rate than many other industries. So even if casinos “cannibalize” other industries, they may provide a net increase to employment and tax revenues. The political concerns

²⁰ The exception to this is dog racing.

²¹ This analysis was first published in *Public Finance Review* (Walker and Jackson 2007a).

surrounding gambling go far beyond the “economic” effects. There is evidence that some problem gamblers may impose social costs on society. Still others may have moral objections to gambling. Although we have not addressed all of these issues, the results provide some econometric evidence applicable to public policy.

The fact that the analysis did not find a clear and consistent cannibalization effect among the different industries suggests that legislators should be careful to study their specific cases prior to acting to introduce or expand gambling in their jurisdiction. Legalizing additional forms of gambling may have either a positive or negative impact on tax revenue and the economy. These issues call for further empirical study.

5.5.1 Tax revenue

Tax policy has a lengthy history in the public economics literature. Various authors have examined “optimal taxes,” including Ramsey (1927), Mirrless (1971), Slemrod (1990), Sobel (1997), and Holcombe (1998). This literature typically deals with setting tax rates in an effort to minimize distortions or maximize welfare or efficiency. However, it would seem that governments are not so much interested in efficiency as they are in revenue maximization, at least when it comes to gambling legalization.²² This seems especially relevant as record budget deficits become more commonplace. Consider the fact that the legal restrictions on gambling are extremely inefficient causing enormous deadweight losses. And since the jurisdictions rarely allow a competitive market in gambling when they do decide to legalize, it is unlikely that their primary concern is efficiency.²³ A much more likely goal or motivation is maximizing tax revenues given regulated gambling industries.

There are a few papers that examine revenue maximization from excise taxes, including Lott and Miller (1973, 1974) and Caputo and Ostrom (1996). Several papers address this issue with respect to gambling. For example, Borg et al. (1993) find that one dollar in net lottery revenue has a cost of 15¢ to 23¢ in other types of government revenue. Fink, Marco, and Rork (2004) find that overall state tax revenues decline with increased lottery sales. However, these studies are more general and do not account

²² See Alm et al. (1993) and Madhusudhan (1996) on using legalized gambling to ease fiscal constraints.

²³ There is a variety of potential social concerns that may accompany legalized gambling, but these are not the subject of this chapter.

specifically for tax revenues from other forms of gambling.²⁴ To illustrate the problem, consider a lottery state that is contemplating legalizing casinos. State revenue from a lottery is about 50% of each dollar bet (Garrett 2001) while the taxes on casino revenues are typically a much lower percentage. Our results indicate that casinos and lotteries cannibalize each other. The magnitude of this relationship among other variables will determine the extent to which tax revenue will change if casinos are introduced in a lottery state.²⁵

If lotteries and casinos were perfect substitutes so that people who lose \$X at newly opened casinos spend \$X less on lottery tickets, then the introduction of casinos would lead to a *decrease* in state tax revenue from gambling. In New Jersey, for example, the revenue from the lottery is 50% per ticket. The state tax on gross casino gambling revenues is 8%. If lotteries and casinos were perfect substitutes, and New Jersey already had a lottery, and if all casino revenue were from lost lottery ticket sales, then we would expect the state's total gambling tax revenues to fall after casinos were introduced. In reality, most states have more complicated mechanisms for casino taxes, it is unlikely that any two industries are perfect substitutes, and the introduction of a new good (casino gambling) to a consumption menu is likely to draw in additional consumers. The example is purely hypothetical.

In any case, the empirical results do not provide the necessary data to confidently predict the net tax effect of introducing another type of gambling. This is because the coefficient estimates in Tables 5.9 and 5.10 are not standard elasticities.²⁶ What the results do provide that is important is information on the signs of the various gambling volume coefficients and their statistical significance, which in turn provides information on whether the gambling industries tend to be substitutes or complements.

5.6 Conclusion

Governments are in a unique situation when contemplating gambling legalization as they control not only the tax rates but also the quantity of gambling. The revenue maximization problem depends on the size and types of existing gambling industries within the state or region, the inten-

²⁴ See Anderson (2005) for a good summary of tax issues that require additional study.

²⁵ Mason and Stranahan (1996) look more generally at the effects of casinos on state tax revenues, but not particularly at revenues from other forms of gambling.

²⁶ This was explained in Sect. 5.4.

sity of their substitutability or complementarity, the prospective size of new industries, and the tax rates applied to the various industries. These issues require additional study.

The rush in the U.S. to legalize gambling in the 1990s was surprising given how little was known about the economic effects of these industries and the relationships between them. The empirical evidence in this chapter can provide a foundation for studying the relationships among the gambling industries and their net tax effects on state or local governments. This is important as many governments are contemplating the introduction or expansion of gambling opportunities in an attempt to deal with fiscal crises, not only in the U.S., but in countries around the world.

6 The social costs of gambling

6.1 Introduction

Perhaps the most controversial issue surrounding the casino legalization debate is the “social costs” that accompany gambling. The casino industry maintains that its product is simply a form of entertainment like going to movies and football games, and consumers are willing to pay a price for entertainment.¹ But many researchers argue that gambling is fundamentally different from other forms of entertainment either because gambling, unlike movies and football games, can lead to addiction,² or because gambling is bad *per se*.³

Addicted or pathological gamblers are purported to inflict high costs on society.⁴ These costs may offset the potential economic benefits that casinos may provide. Studies in which researchers estimate the “social costs” of pathological gambling have been important evidence in debates con-

¹ The development of gambling from “vice” to accepted entertainment is chronicled by McGowan (2001).

² The American Psychiatric Association (APA) estimates that between 1–3% of adults become addicted to gambling (1994, p. 617). There is a significant literature on this issue including the following, cited in Shaffer, Hall, Walsh, and Vander Bilt (1995): Lesieur (1989), Lesieur and Rosenthal (1991), Volberg (1994), and Volberg and Steadman (1988). Also see Eadington (1989, 1993), Goodman (1994a, 1995a), Grinols (1995a), Lesieur and Blume (1987), Shaffer and Hall (1996), Volberg (1996), Volberg and Steadman (1989), and Walker and Dickerson (1996). It is generally accepted that there is a sample of the population that gambles to such an extent that it disrupts their professional or personal lives.

³ This issue is discussed in Chap. 9.

⁴ The social costs usually discussed in the literature refer to those caused primarily by pathological gamblers. This is what is meant by “social costs” and the “social costs of gambling.”

cerning the virtues of legalized gambling.⁵ As would be expected, different investigators have arrived at different conclusions regarding the magnitude of these costs. As a consequence, the social cost issue has been hotly debated in the gambling literature. Recent academic conferences have been dedicated to the issue, illustrating its importance and controversy.⁶

The one fundamental problem that characterizes most social cost studies is the omission of a clear statement of what is being measured. No one clearly defines “social costs.” Instead of starting with objective criteria for what constitutes a social cost, most authors have adopted an *ad hoc* approach asserting that some activities constitute costs to society and then quantifying the impact of those activities.

Goodman’s work (1994a) was one of the most comprehensive at the time of its publication. In his estimate of the social costs of gambling, Goodman includes estimates for income lost by gamblers who lose their jobs, the costs of prosecuting and incarcerating those who commit crimes to support gambling habits, and contributions from family members and others who “bail out” gamblers. In addition to these, he lists other costs that are not as easily quantifiable:

impaired judgment and efficiency on the job, lost productivity of spouses, unrecovered loans to pathological gamblers, divorces caused by gambling behavior, added administrative costs in programs like unemployment compensation, the costs of depression and physical illnesses related to stress, lower quality of family life and increased suicide attempts by gamblers and spouses of pathological gamblers. (Goodman 1994a, pp. 63–64)

Other authors have lists of costs that vary slightly. Table 6.1 presents a partial list of the alleged social costs of gambling, along with some of the authors who address the issue.

Importantly, *none* of the researchers has defined exactly what constitutes a “social cost.” The failure of analysts to use a conceptually sound criterion for identifying social costs has led to a capricious classification of some behavioral consequences of gambling as social costs and the inappropriate omission of other consequences from social cost calculations. A

⁵ It is important to keep in mind that social costs need not result only from *legal* gambling. The discussion here is not meant to be limited to government sanctioned forms of gambling.

⁶ Two such conferences were the Whistler Symposium (2000, Whistler, B.C., Canada), the papers of which were published in *Journal of Gambling Studies*, 2003; and the 5th Annual Alberta Conference on Gambling Research (2006, Banff, Alberta, Canada), papers forthcoming (Williams, Smith, and Hodgins 2007).

Table 6.1. Alleged social costs of gambling, and relevant papers

Alleged social costs	Partial list of sources that address social costs
(1) income lost from missed work	Boreham, Dickerson, and Harley (1996);
(2) decreased productivity on the job	“Casinos in Florida” (1995); Gazel
(3) depression and physical illness related to stress	(1998); Goodman (1994a, 1994b, 1995a, 1995b); Grinols (1994b, 1995a, 2004); Grinols and Mustard (2001); Grinols and Omorov (1996); Gross (1998); Kindt (1994, 1995); LaFalce (1994); Ladd (1995); Lesieur (1995); National Gambling Impact Study Commission (NGISC 1999); National Opinion Research Center (NORC 1999); Nower (1998); Politzer, Morrow, and Leavey (1985); Rose (1995); Rose (1998); Ryan (1998); Tannenwald (1995); “Task Force” (1990); Thompson (1996, 1997); Thompson, Gazel, and Rickman (1997, 1999); U.S. House (1995); Zorn (1998)
(4) increased suicide attempts	
(5) bailout costs	
(6) unrecovered loans to pathological gamblers	
(7) unpaid debts and bankruptcies	
(8) higher insurance premiums resulting from pathological gambler-caused fraud	
(9) corruption of public officials	
(10) strain on public services	
(11) industry cannibalization	
(12) divorces caused by gambling	

clear and explicit definition of “social cost” must be a starting point for any attempt to quantify the negative effects of gambling.

6.1.1 Chapter outline

The purpose of this chapter is to explain the economic perspective on social costs and to critique the gambling literature in light of this perspective. Using the economics paradigm, the measurement of social costs becomes more objective and less a function of researcher whims, preferences, emotional reactions, and political biases. The chapter is organized into five additional sections. Section 6.2 presents the economics definition of “social cost.” In Sect. 6.3 basic economic tools are used to model social costs. Section 6.4 lists and describes many of the legitimate social costs identified in earlier studies. Section 6.5 is an explanation of why several potential effects of pathological gambling cannot be properly defined as social costs. Section 6.6 concludes the chapter.

6.2 The economic definition of “social cost”

There are a number of consequences of gambling that are viewed by some, if not most, individuals as undesirable; many of these are listed in Table 6.1. Unfortunately, many of the “obvious” or “common sense” social costs, upon closer examination, cannot legitimately be considered social costs. Indeed, common sense alone is not an adequate criterion for the determination of what constitutes a social cost. A more objective criterion is required if social cost studies are to be taken seriously.⁷ The obvious question then is what criteria should be used for classifying the consequences of human behavior as social costs. Welfare economics provides one answer to this question.

The definition of social cost is a reduction in social real wealth. The term “wealth” does not simply refer to money stock. Instead, it refers to whatever is valued by individuals. For example, suppose an action harms some members of society and benefits no one. The social cost of the action in this case is the sum of the amounts by which real wealth is reduced for those who are harmed. Suppose, on the other hand, that an action harms some members of society (say by taxing away part of their income) and benefits others (say by providing them with income transfers). Assume further that the collective harm to those made worse off is equal to the gains of the beneficiaries. Since the gains for some members of society are equal to the losses of others, the level of social real wealth is unchanged, and the action produces no social cost or benefit.

This definition of a social cost has not been arbitrarily chosen. It is rooted in the Pareto criterion.⁸ The Pareto criterion states that a change in the state of the world improves social welfare (i.e., produces a social benefit) when that change makes at least one member of society better off while making no one else worse off (Layard and Walters 1978, p. 30).⁹ Obvi-

⁷ Just as objective criteria are useful in estimating the prevalence of pathological gambling, objective criteria are important for the measurement of social costs. Harberger (1971, p. 785) makes this point in the context of welfare economics in general and cost-benefit analyses in particular: “Just as the road-construction standards that a team of highway engineers must meet can be checked by other highway engineers, so the exercise in applied welfare economics carried out by one team of economists should be subject to check by others.”

⁸ The concept is named for Vilfredo Pareto, an early 20th century economist. The Pareto criterion is the central concept in welfare economics. A full understanding of the meaning of social costs, as economists use the term, requires an understanding of this concept.

⁹ This definition is given in any text that addresses welfare economics. For other examples, see Just, Hueth, and Schmitz (1982) or Varian (2006).

ously, this criterion does not provide a practical guide to welfare calculations since any conceivable policy change is likely to leave someone worse off. However, a variant of the Pareto criterion, first proposed by Kaldor (1939) and later by Hicks (1940), can provide guidance in such calculations.

The Kaldor-Hicks criterion states that a change in the state of the world improves social welfare if the change “would enable the gainers to compensate the losers while continuing to gain themselves. The compensation need only be hypothetical, and a Kaldor-Hicks improvement offers only a potential Pareto improvement” (Layard and Walters 1978, p. 32). On the other hand, a given change in the state of the world reduces welfare (i.e., produces a social cost) when those who gain from the change do not have gains sufficient to fully compensate those who lose. In other words, if a change in the state of the world reduces the wealth of some members of society more than it increases the wealth of others, then the aggregate wealth of society is reduced and a social cost (in the amount of the difference) is produced by the change.

A change in the state of the world that simply redistributes wealth from some persons to others without changing the sum of wealth for all individuals taken together would produce neither a social cost nor social benefit. Such redistributions would make some individuals better off and others worse off, but society would be no worse off.¹⁰ This neutrality of wealth transfers in welfare applies even when the transfers are involuntary.¹¹

6.3 Modeling social costs

The definition of social cost as a reduction in social real wealth can be illustrated using the basic tools of microeconomics.¹² Using this framework,

¹⁰ To be strictly correct, interpersonal utility comparisons are problematic. In applied welfare studies, economists nevertheless typically assume that all individuals have approximately identical utility functions. Given this assumption, it is possible to draw unambiguous welfare implications (i.e., measures of social benefits and costs) by aggregating individuals' willingness to pay for policy changes.

¹¹ For related discussions, see Baumol and Oates (1988), Bhagwati (1983), Bhagwati, Brecher, and Srinivasan (1984), Johnson (1991), Krueger (1974), Mueller (1989), Posner (1975), Tollison (1982), and Tullock (1967).

¹² This type of exposition is used by Dixit and Grossman (1984). A slightly more technical presentation would include a discussion of relative prices, input coefficients, and preferences. See any intermediate microeconomics text for more details on the foundations of these models.

the social costs of gambling become clearer, which may help lead researchers toward a consensus. Using the production possibilities frontier (PPF) and indifference curve (IC) framework explained in the appendix, we can represent optimality as the point of tangency between the PPF and highest possible IC. A “social cost” can be represented as an inefficient situation in which production and consumption occurs under the initial PPF or on a lower PPF–IC.

6.3.1 The definition applied

Tullock (1967) used the now famous example of theft to illustrate the concept of social cost. Theft is a transfer of wealth that does not represent a social cost with no net change in the value of resources. Landsburg offers a succinct explanation of Tullock’s point:

stolen property does not cease to exist. When a television set is moved from one house to another, it remains as reliable a source of entertainment as it ever was. This is true even when the new recipient of those services is a thief or a dealer in stolen property. (Landsburg 1993, pp. 97–98)

The transfer of wealth from victim to thief may be unfortunate and is certainly inequitable from the perspective of most members of society. Nevertheless, the value of the stolen property is simply a transfer between thief and victim that does not change aggregate social real wealth.

However, there *are* two social costs associated with theft. First, crime may impose “psychic costs” on the victim that are unrelated to the pecuniary value of the lost property. For example, the victim may feel violated and fearful after a theft.¹³ Second, the existence of theft creates behavior geared toward preventing involuntary wealth transfers.¹⁴ Because some people engage in theft, others in society use scarce resources to prevent theft, e.g., buying locks, burglar alarms, etc.¹⁵ As a result, society must forego other “useful” goods and services and this opportunity cost is a social cost. As Tullock (1967, p. 231) explains, “the existence of theft as a potential activity results in very substantial diversion of resources to fields

¹³ Psychic costs are discussed in Sect. 6.4.3.

¹⁴ Behavior that involves attempts to obtain or prevent wealth transfers is generally referred to as “rent seeking” discussed in more detail in Chap. 7. Also see Johnson (1991) and Mueller (1989) for extensive discussions.

¹⁵ Becker argues that, in the case of a *competitive* crime market, the value of the resources used in producing locks and paying police can be assumed to approximate the social cost of the crime (1968, p. 171, note 3; italics added).

where they essentially offset each other, and produce no positive product.” Note that it is the *existence of theft* not the value of goods stolen which is the source of the social cost.¹⁶

Taxes provide another useful example. Although taxes represent wealth transfers and the value of a tax does not belong in cost-benefit analyses, taxes do cause social costs. Specifically, resources that could be used to produce goods and services are instead used by governments in collecting taxes. In addition, taxpayers change consumption patterns and use resources in an attempt to reduce or avoid their tax burdens by hiring accountants and lawyers.¹⁷

With an understanding of involuntary wealth transfers in theft or taxes, it is clear that voluntary wealth transfers themselves do not generally result in social costs. In the gambling literature, however, the monetary amount of voluntary wealth transfers is usually counted as part of the social cost of gambling. An example is the alleged “bailout costs” (see Sect. 6.5.3) that pathological gamblers impose on society. These bailouts neither create nor destroy wealth, but they simply redistribute it.

Redistributions of wealth, especially when they are arbitrary and involuntary, can produce social costs. However, the social costs produced by such transfers are the value of the psychic, collection, and avoidance costs caused by the transfer that is over and above the value of the transfer itself. In other words, the amount of bad debt, unemployment compensation, or other wealth redistribution is not a measure or a meaningful proxy of social costs.

This provides enough background so that we can use the example of theft to illustrate the economic definition of social cost.

6.3.2 Theft as an illustration of social cost

Let us suppose that society is initially producing at point a on PPF_1 and IC_1 in Fig. 6.1 in a world absent of theft. When we introduce theft, thieves begin using resources to commit crimes creating an incentive for individu-

¹⁶ Similarly, consider a government-imposed price ceiling on gasoline. The result is a line at the gas station. The cost to consumers – time spent in line – is not simultaneously a benefit to anyone else. Hence, it represents a social cost of the government price control.

¹⁷ The amount by which the full cost of a tax exceeds the value of revenues collected is often referred to as the “deadweight loss” or “excess burden” of the tax. Varian (2006, pp. 300–302) provides a (non-technical) graphical and verbal explanation of the deadweight loss from taxes.

als to use resources in an effort to prevent theft. In the model this would mean that real resources are diverted from the production of beer and pizza into producing locks and alarm systems. This change can be represented by a contraction of the PPF (to PPF_2) and movement from a to some point like point b .¹⁸

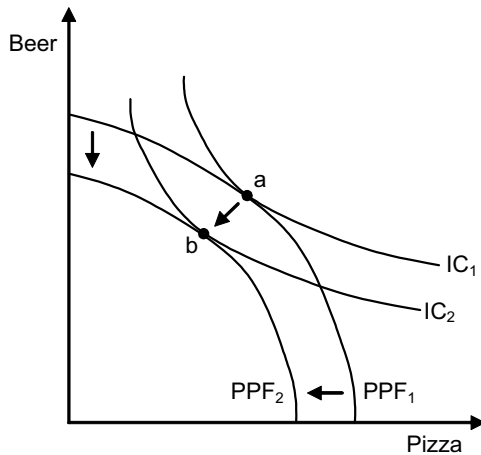


Fig. 6.1. Social cost of theft

The existence of theft means that we have fewer resources with which to produce other things society wants moving the intercept points of the PPF closer to the origin. This causes an inefficiency (at point b) compared to the theft-absent case (at point a). The social cost is the beer and pizza that are now not produced because some resources are used in executing and preventing thefts.¹⁹ Note that the value of the goods or money stolen is *not* the social cost of theft, as the theft is merely a transfer of wealth. Redistribution itself does not entail a social cost since the costs to one individual are offset by benefits to another.²⁰

¹⁸ Dixit and Grossman (1984) use a similar example but do not show a contraction of the PPF. Carbaugh (2004, Chap. 2) explains that the axes in the PPF model give a scale for output *per unit of input resource*. Social costs effectively reduce productive capacity (given input endowments) since production is diverted to some other use, which would be unnecessary in the absence of theft.

¹⁹ In this discussion, we are ignoring any psychic costs to the victims of theft.

²⁰ McGowan (1999) notes this is a utilitarian interpretation of wealth transfers.

6.3.3 Externalities and social costs

“Externality” is a concept closely related to social cost that also leads to confusion in the gambling literature. Specifically, some investigators equate externalities and social costs²¹ while others appear to think that any third-party effect qualifies as a social cost. Both views are misguided.

Externalities occur when the actions of one person impact the welfare of another. Without doubt, pathological gamblers often engage in behavior that has negative effects on others. However, not all negative externalities represent social costs.

Since the 1930s, welfare economists have taken care to distinguish between “technological externalities” and “pecuniary externalities.”²² Technological externalities are defined as those for which the external effect impacts real (i.e., non-monetary) arguments in utility or production functions. In other words, technological externalities impact the ability of an economic actor to transform a given amount of inputs into outputs (utility). A technological externality occurs, for example, when a polluter discharges pollutants into a stream so that a downstream water user must clean the water before it can be used. As a result of the pollution, the amount of real resources required for the downstream producer to produce a given amount of output is increased. The important point is that more resources are required to produce the same amount of the externality affected output. Hence, fewer resources are available to produce other goods, and real wealth is reduced as a result of the pollution.²³

Pecuniary externalities, on the other hand, impact prices and wealth distribution but they do not affect aggregate social real wealth. A pecuniary externality may impact the price of a product and hence the money cost of producing a given amount of that product, but it would not affect the amount of real resources required to produce a given amount of the product. As a consequence, pecuniary externalities may redistribute wealth among members of society, but they do not reduce the aggregate amount of real wealth. For example, when a gambler loses the money that would otherwise have been used to buy groceries for his family, the family is worse off. Because the gambler’s actions reduce their wealth, he imposes

²¹ For example, see Grinols and Omorov (1996), Grinols and Mustard (2001, 2006), LaFalce (1994), and Thompson (1997).

²² Seminal work in this area was by Jacob Viner (1931).

²³ The issue is a bit more complicated than the discussion here implies. Whether society’s wealth is reduced by the pollution depends upon whether the pollution is marginally relevant. For a discussion of the importance of marginally relevant externalities, see Barnett and Kaserman (1998).

an externality on his family. However, since the gambler's actions do not generally impact real arguments in utility functions, the externality is pecuniary. Put another way, the losses of the gambler and his family are equal to the winnings of others²⁴ and there is no loss in aggregate social wealth.

In a nutshell, negative technological externalities are externalities that cause inefficiency in the use of resources and produce social costs as well as costs for the person harmed. Negative pecuniary externalities, on the other hand, cause harm to the affected individual but do *not* produce inefficiencies or social costs. They are simply wealth transfers. An example of the latter occurs when a new employer enters a labor market and drives up wage rates for existing employers.²⁵ The former occurs when a factory discharges waste into the air that harms the health of those down-wind from the polluter.²⁶

In the context of the PPF–IC model introduced in the previous example of theft, a technological externality means that the same inputs result in less output. Put differently, it takes more inputs to yield the same output as in the absence of the externality. This suggests a contraction of the PPF, since it represents the amount of production per unit of input resource available.

The distinction between pecuniary and technological externalities, though extremely important in welfare economics, is generally confused or ignored by those who write on the social costs of gambling. As a result, it is common for gambling researchers to aggregate real technological and pecuniary effects²⁷ to produce sums characterized as social costs.

For example, Grinols and Omorov (1996, p. 52) note that “gambling is associated with significant negative externalities...” They cite as examples “crime-related apprehensions, adjudication, and incarceration costs, as well as social service costs for themselves and their families” (p. 53). Here Grinols and Omorov confuse the issue by their failure to note that crime-related apprehensions, adjudication, and incarceration costs represent tech-

²⁴ The winners are a combination of other gamblers who win and the gaming industry involved.

²⁵ This applies even when, for example, the now higher labor costs drive some existing firms out of business.

²⁶ For more detailed discussions of externalities, particularly the distinction between pecuniary and technological externalities, see Barnett (1978, 1980), Barnett and Bradley (1981), Barnett and Kaserman (1998), and Baumol and Oates (1988, Chap. 3, especially p. 30).

²⁷ Baumol and Oates (1988, p. 30) write, “the price effects that constitute pecuniary externalities are merely the normal competitive mechanism for the reallocation of resources in response to changes in demand or factor supplies.”

nological externalities. These are legitimate social costs. However, the social service costs for the gamblers and costs to the gamblers' families are generally pecuniary externalities that do not represent direct social costs.²⁸

6.3.4 Alleged social costs of gambling²⁹

Most gambling studies do not perform original estimates of social costs. Instead, studies usually simply repeat previous monetary estimates without explaining what costs are included in the estimates, or they present a range of cost figures and call the lower end of the range "conservative." Few studies explain the underlying methodologies. Table 6.2 summarizes some of the social cost studies.³⁰

Each of these studies discusses the high level of costs associated with gambling but none explains what conditions must be satisfied for a consequence of gambling to be considered a social cost. In many cases, they combine technological with pecuniary externalities, ignore certain social costs, and wrongly include other "effects" in their social cost estimates. One further complication is that there appears to be little consistency among researchers for what is or is not included in the estimates.

Generally, costs to individuals do not qualify as social costs unless they are coupled with negative technological externalities. In an early draft, McCormick (1998) provided a useful example: "Suppose I break my leg riding a horse. Is there a social cost? No. The pain, suffering, and loss of income are mine. Jobs, income, taxes, crime, and divorce are not benefits or costs, they are markers and indicators." There are numerous potentially negative effects of pathological gambling that do not qualify as social costs in the economic paradigm.³¹

Among the studies that offer estimates of the social costs of pathological gamblers, the work by Thompson, Gazel, and Rickman (1996, 1997, 1999) is among the most complete and most carefully done. Indeed, they note the shortcomings of previous researchers:

²⁸ Grinols and Mustard (2001) also illustrate confusion about externalities.

²⁹ McCormick's (1998) discussion of "uncompensated social costs" is a useful complement to this section. The private consequences issue is dealt with in more detail by Eadington (2003).

³⁰ In addition, see "Casinos in Florida" (1995), Tannenwald (1995), and U.S. House (1995).

³¹ See Baumol and Oates (1988) for a complete discussion of externalities.

Table 6.2. Examples of social cost studies

Study	Summary
Goodman (1995a)	Goodman explains the “costs to government and the private economy” are estimated at \$13,200 per year per pathological gambler (p. 56). This is the same number used in his 1994 study. He does not explain the criteria by which items are included but does list some of the “costs” included. Much of Goodman’s “research” is based on newspaper articles.
Grinols (1995a)	Grinols has one of the most alarmist and deceptive discussions. He suggests the social costs of gambling are like destruction of wealth amounting to “losses equal to the lost output of an additional 1990:III-1991:II recession every eight to fifteen years, or an additional hurricane Andrew (the most costly natural disaster in American history) every year, or two 1993-level Midwest floods (the largest floods on record for the area) annually.” (p. 7)
Grinols (2004)	Grinols simply takes the average of many of the social cost estimates performed during the 1990s to arrive at an estimate of \$10,330. Surprisingly, he does not even analyze the different cost estimates to determine whether or not they are all measuring the same things or whether they use appropriate methodologies.
Grinols and Omorov (1996)	In this paper the costs are called externalities. The authors use estimates from previous studies: “Focusing only on social costs that can be measured – primarily apprehension, adjudication, incarceration, direct regulatory costs, and lost productivity costs – leads to annual costs per pathological gambler between \$15,000 and \$33,500.” (p. 56)
Kindt (1994, 1995)	Kindt simply discusses previous estimates. He cites a relatively high cost estimate: “The social, business, economic and governmental costs of [pathological gamblers] are potentially catastrophic. The average socio-economic cost per [pathological] gambler per year has been calculated at \$53,000” (Kindt 1995, p. 582). Kindt’s work, usually published in law journals, is decidedly less than scientific.
Task Force (1990)	The social cost of pathological gambling in Maryland is estimated at \$30,000 per gambler per year, in 1988 dollars (p. 59). “Abused dollars” are the basis for these costs.
Thompson, Gazel, and Rickman (1997)	This paper contains an original social cost estimate, \$9,469 per pathological gambler per year, and is regarded by its authors and other researchers as “conservative.” This is a frequently cited study.

Several studies have offered evidence about the societal cost of problem gambling. However, for the most part, we have seen only attempts to either list all the cost factors without analysis and without totaling up the effects, or to offer numbers without any indication of how the numbers were determined. (Thompson et al. 1997, pp. 82–83)

In their study, Thompson et al. (1996, pp. 16–21) give an explanation of each of the “social costs” (“employment costs, bad debts and civil-court costs, thefts and criminal-justice costs, the costs of therapy, and welfare costs”) and their estimation but as in their 1997 study the authors fail to disclose the specific criteria used for determining just what constitutes a social cost.³² Nevertheless, Thompson et al. (1997) are to be commended for being transparent in their estimation procedure. Indeed, their paper is often cited as being one of the most respectable, thorough, and conservative social cost studies.³³ Therefore, where researchers typically provide empirical estimates, I give as an example the estimates from Thompson et al. (1997). Table 6.3 is a reproduction of their social cost estimate.

6.4 Legitimate social costs

According to the social cost definition in Sect. 6.2 there are several legitimate social costs that have been identified by previous researchers. In the following sub-sections, the alleged social costs of gambling, including those listed in Tables 6.1 and 6.3, are evaluated within the context of the tools developed in the appendix.

6.4.1 Legal costs

Some individuals face legal problems as a result of their pathological gambling. For example, a person may steal in order to get money for a gambling habit. This activity can lead to social costs because the resources expended on police, courts, and incarceration could have been spent on other goods or services.³⁴ Importantly, the money stolen or any awards in civil court decisions are not social costs because they represent wealth transfers.

³² More recent comprehensive studies by NORC (1999) and the NGISC (1999) are similar in this respect.

³³ It is for this reason that their work is scrutinized by Walker and Barnett (1999) and Walker (2003).

³⁴ Expenditures on police may also result in positive externalities. For example, an increased police presence on the streets may discourage some amount of crime.

Table 6.3. Annual societal cost per compulsive gambler (\$)

Cost type	Component cost	Total
Employment		2,941
Lost work hours	1,328	
Unemployment compensation	214	
Lost productivity/ unemployment	1,398	
Bad debts		1,487
Civil court		848
Bankruptcy court	334	
Other civil court	514	
Criminal justice		3,498
Thefts	1,733	
Arrests	48	
Trials	369	
Probation	186	
Incarceration	1,162	
Therapy		361
Welfare		334
Aid to dependent children	233	
Food stamps	101	
Total		9,469

Source: Thompson et al. (1997, p. 87)

For legal costs of police, courts, and incarceration to be fully attributed to pathological gambling, there are two requirements. First, the costs must be borne by others, not the pathological gambler.³⁵ Second, pathological gambling must be the sole cause of the behavior (that is, the primary disorder. In reality, many cases are characterized by comorbidity with more than one disorder. This issue is addressed in Chap. 7.

With these caveats, we can reconsider the Thompson et al. (1997) estimates for costs associated with “civil court” and “criminal justice.” To the extent that pathological gambling is the primary disorder, the estimates of \$848 is properly classified as a social cost if it excludes cash awards. However, from the \$3,498 estimate of criminal justice costs, we must subtract the \$1,733 for theft since it is merely a wealth transfer. This leaves \$1,765 that can potentially be considered a social cost related to criminal justice.

³⁵ This does not, however, imply that all government expenditures are social costs. (In many cases, such expenditures represent wealth transfers.)

These legal costs are illustrated in Fig. 6.2. When casinos are legalized and open, movement from a to b might occur. Assuming consumers like casino gambling, this represents an improvement in welfare, as indicated by the movement from IC_1 to IC_2 . However, pathological gamblers that may exhibit criminal behavior creates a need for society's resources to be expended on police, courts, and incarceration. This diversion of resources from other modes of production can be represented by a contraction of the PPF, and a reduction in consumption, say from point b to point c .

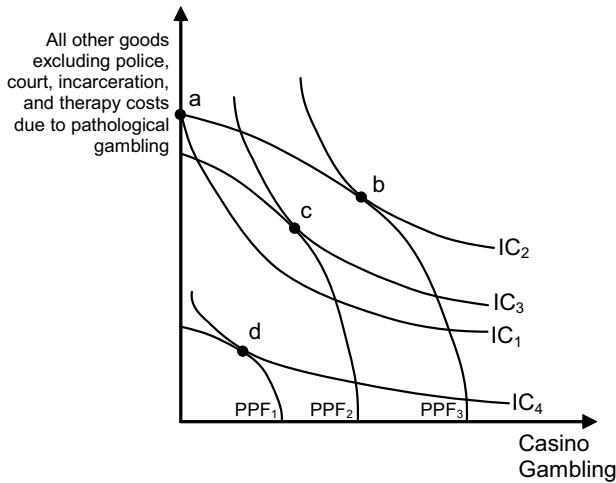


Fig. 6.2. Social costs of pathological gambling

Recall that a social cost is a decrease in social wealth, compared to *what it otherwise would have been*. In the context of the PPF–IC model, this is illustrated by movement to a lower PPF–IC. Though the model is not conducive to precise empirical estimates, it does offer a useful way to conceptualize social costs. Not all negative effects of gambling cause a reduction of real social wealth. It is interesting to note that the model suggests society might be better off at point c with gambling and its social costs than at the original point a with neither gambling nor its social costs.³⁶ Of course, if the social costs of casinos are so great as to move us to point d on IC_4

³⁶ There is an assumption here that pathological gambling occurs only when gambling is legal. Of course, this is not always the case. Society would likely have some of the social costs whether or not gambling was legal, since people could gamble online, in other jurisdictions, or illegally.

then we would be better off prohibiting gambling, assuming the social costs would also disappear.

6.4.2 Treatment costs

Assume that those who seek therapy for their gambling problem would not require treatment in the absence of their gambling problem. Assume further that when a person decides to gamble he believes that he will not pay the therapy costs even if he becomes addicted. Under these questionable assumptions, the \$361 attributed by Thompson et al. (1997) to therapy cost could be considered a social cost. Again, Fig. 6.2 could be used as a representation of this type of social cost. As with legal costs, we can consider this a social cost only if someone other than the treated individual pays for treatment.

6.4.3 Psychic costs³⁷

From an economic perspective, not only have researchers inappropriately classified numerous consequences of pathological gambling as “social costs” as discussed below, they have also omitted several legitimate social costs from their studies. Some of the neglected costs amount to the negative psychological impact on individuals caused by pathological gamblers, while others are associated with government restrictions and the legalization process. Discussion of the latter type is found in Chap. 7 while the focus of the present chapter is more on the costs caused by individual gamblers.

Problem gambling behavior may harm family members, there is no doubt. But some researchers have argued these costs are “internalized” and do not belong in social cost measures (Manning, Keeler, Newhouse, Sloss, and Wasserman 1991; Walker and Barnett 1999). Others are less sure how to deal with the issue but suggest that the costs are probably not internalized (Sloan, Ostermann, Picone, Conover, and Taylor 2004, pp. 220–221). Even if harm to family members is a social cost, it is unclear how to measure it in money terms. There are other examples of harms from gambling that are not easily measured. For example, how should we measure the cost of a divorce caused by problem gambling? Rather than focusing on money measures, perhaps simply noting that family problems are a likely

³⁷ At the Whistler Symposium (2000) several psychologists informally told me that the term “psychic cost” is “offensive.” No offense is intended.

side effect of pathological gambling would be a better way to acknowledge this issue.

Walker and Barnett (1999) discuss the emotional “costs” that may be imposed by pathological gamblers on their friends and family. Emotional harm, to the extent it is caused by the pathological affliction, is a social cost because it can be considered a negative technological externality when relevant arguments are included in a utility function. For example, an interdependent utility function might be $U_a = U(C, U_f, U_r, Z)$, where C is consumption, U_f is the utility of friends, U_r is the utility of relatives, and Z represents all other arguments. If $\delta U_a / \delta U_f$ and $\delta U_a / \delta U_r > 0$ then a psychic cost is imposed on person a when harm occurs to either a friend or relative. The result is lower utility for person a .

Psychic costs are not easily modeled in the context of a PPF–IC model because although some people are less happy they are not necessarily less productive or consuming less. One important question to debate is whether or not this type of psychic cost should be under consideration for policy intervention. After all, people are affected daily by countless psychic costs and benefits.³⁸ In addition, one could argue that psychic costs imposed on family members or friends are “internalized.” Since the individuals have close relationships, they understand and accept that there will be both benefits and costs of such relationships.³⁹

6.5 Items improperly defined as social costs

The underlying key to the development of methodologically sound social cost estimates is an appropriate definition of social cost. Earlier the Walker and Barnett (1999) definition was stated and explained in detail. In this section, many of previously alleged social costs are examined through the lens of that definition. Although many or all of these effects of pathological gambling behavior are unfortunate, this is not sufficient for them to qualify as social costs, decreases in real social wealth. Most of these effects are incorrectly included in social costs estimates. Refer to Tables 6.1 and 6.3 for examples. Simple examples are offered in many cases to illustrate why the classification of some of these effects as social costs is inap-

³⁸ The value of psychic costs could be measured by asking individuals how much they would be willing to pay to avoid them. Surveys asking such questions would need to be very carefully constructed in order to be valid. This particular issue is beyond the scope of this book.

³⁹ See ACIL (1999) on this issue.

appropriate. At the end of the discussion, the various effects that are not true social costs are summarized with succinct explanations.

6.5.1 Wealth transfers

Some researchers have argued that wealth transfers do not change the overall level of societal wealth and do not belong in cost-benefit calculations (National Research Council [NRC] 1999; Walker and Barnett 1999; Collins and Lapsley 2003; Eadington 2003; Federal Reserve Bank of Minneapolis 2003; Single 2003). Others argue that transfers such as bankruptcies, thefts, “bailouts,” and “abused dollars” belong in the equation (Marandya and Pearce 1989; Thompson et al. 1997; Grinols and Mustard 2001; Grinols 2004), because a transfer is a cost to *someone*. This is an important issue because how transfers are treated will have perhaps the largest impact on the magnitude of social cost estimates.

Some researchers base their argument that “transfers are costs” on an extremely vague concept coined “abused dollars” by Politzer, Morrow, and Leavey (1985, p. 133):

[the] amount [of money] obtained legally and/or illegally by the pathological gambler which otherwise would have been used by the pathological gambler, his family, or his victims for other essential purposes. These abused dollars include earned income put at risk in gambling, borrowed, and/or illegally obtained dollars spent on basic needs and/or provided to the family which otherwise would have been “covered” by that fraction of earned income which was used for gambling, and borrowed and/or illegally obtained dollars for the partial payment of gambling related debts.

Researchers who cite “abused dollars” are typically staunch anti-gambling advocates (e.g., Grinols 2004; Grinols and Mustard 2001; Kindt 2001). Kindt (2001, p. 31) suggests that the abused dollar cost concept “was given the actual or implied imprimatur of the *Journal [of Gambling Behavior]*.” However, the editor of the *Journal* at the time, Henry Lesieur, has indicated that he regrets publishing the article and that it has been “justifiably criticized” (Lesieur 2003).⁴⁰

On the surface “abused dollars” might appear to be a reasonable way to measure the negative effects of gambling since it seems to measure the waste or damage associated with gambling. Upon closer examination the concept is too vague to be useful. For example, measuring the amount of

⁴⁰ Lesieur writes that he regrets publishing the article because he believes that many of the costs of problem gambling are not measurable.

dollars spent gambling that “could have been used for other essential purposes” does not provide much information. First, what is an “essential purpose”? The concept loses its meaning once we consider gambler income levels. Is an “essential purpose” for a millionaire the same as for a person with average income? Furthermore, a generous interpretation of “abused dollars” would imply that the sum of all money bet (i.e., handle) represents abused dollars. This is likely to be significantly higher than the actual amount lost by a casino gambler.⁴¹ The concept also treats borrowed money as abused dollars. Many later authors attempt to make a similar measurement but call it by another name (e.g., “bailout cost” or “social cost”).⁴² In any case, the “abused dollars” concept is far too vague to serve as a useful classification mechanism in social cost estimates.

The issue of wealth transfers, say from bad debts and bankruptcies, is important. Most non-economists are not satisfied with the “transfer of wealth” argument. But treating transfers as social costs has its own problems explained by Walker (2003, pp. 165–166). In any case, measuring transfers is relatively simple, once it is determined how they should be handled in cost-benefit studies.

6.5.2 Bad debts

Researchers typically classify “bad debts,” money borrowed but not paid back, as a social cost of pathological gambling if the borrowed funds are used to finance gambling activities. Thompson et al. (1997) estimate that a pathological gambler will have \$1,487 in bad debts annually.

Certainly bad debts are costly to the creditors but the result of these bad debts is simply to transfer wealth from creditors to debtors. Since transfers are not considered social costs, the inclusion of bad debts in the estimate of social costs is inappropriate.⁴³

Bad debts are simply wealth transfers that cannot be considered a social cost because they do not reduce social wealth, but the cost of resources used in the collection of bad debts can be characterized as a social cost. To the extent that bad debts accumulated by gamblers exceed those that would

⁴¹ Walker (2004) gives the example that a gambler bets an average of \$1,000 in order to lose \$100 at slot machines with a 90% pay-out.

⁴² Grinols and Mustard (2001) resurrect the “abused dollars” concept, but define it differently than Politzer et al. (1985).

⁴³ The argument that defaults on bad debts will lead to higher prices (interest rates, for example) and that this is a social cost is the result of misunderstanding the distinction between pecuniary and technological externalities. Any externalities that merely alter relative prices are pecuniary, not technological.

occur in efficient capital markets, social wealth is reduced when resources that would have been used to produce goods and services are instead used in efforts to collect or avoid paying bad debts. Previous researchers have not identified this as a potential social cost of pathological gambling behavior.

6.5.3 Bailout costs

Frequently pathological gamblers find themselves in dire financial situations. When they turn to family members or friends for financial help, it is often labeled “bailout costs.” Numerous researchers provide estimates of this type of “cost.”⁴⁴ Transfers of wealth, whether voluntary or not, cannot be considered social costs since the overall wealth does not decline and an inefficiency is not created.⁴⁵ The NRC (1999, p. 163) notes, “One of the biggest stumbling blocks in economic impact analysis is determining which effects are real and which are merely transfers.” The PPF model helps to shed light on whether an effect is real or pecuniary.

If one considers bailouts as social costs, then perhaps *every* exchange of money should be one. The argument quickly runs into problems. If I give someone 50¢ to buy a soft drink, should it represent a social cost analogous to a bailout cost? Call this a social cost of thirst, or an “abused 50¢” due to thirst. When the university pays me my monthly salary, is that a social cost analogous to any other government expenditure? Call this a social cost of education. These examples show that the whole concept of social cost quickly loses its meaning when it is defined to be so general. This is one reason why the definition of social cost is critical.

⁴⁴ See “Casinos in Florida” (1995), Goodman (1995b), Kindt (1994), Politzer et al. (1985), and Thompson et al. (1997).

⁴⁵ Consider a schoolboy who loses his money pitching pennies at recess. Rather than see him go without food, his mother may deliver a stiff lecture and replacement lunch money. The mother would certainly be displeased with his behavior but her “gift” is a voluntary transfer of wealth that does not constitute a decrease in social wealth and is not a social cost. Similarly, if her adult son is a pathological gambler and loses his own income gambling, she may choose to provide funds for his food and shelter. The wealth transfer would not constitute a social cost because her gift is purely a transfer and there is no loss in wealth for the community.

6.5.4 Government welfare expenditures

Some researchers have been confused about how government spending relates to social costs. In economics, a social cost is a decrease in the wealth of society. However, Thompson et al. (1997) attribute social costs of \$334 to welfare expenditures. From the previous discussion, it should be clear that mere wealth transfers, from taxing Sam to pay Joe, do not represent social costs because the level of wealth remains constant.⁴⁶

What about non-transfer government spending? Do these constitute social costs? This question was raised, for example, by one of Walker and Barnett's reviewers (1999, p. 187, note 10): "[The authors] even deny that thefts are costs to society. They deny that the costs of welfare are social costs. If not, they would not have to be included in the state budgets, so how can they not be social costs?"

Even when particular government-paid costs of gambling are agreed to be "social costs" their measurement may be tricky. Most researchers count government expenditures relating to the treatment of problem gambling as social costs (Walker and Barnett 1999; Collins and Lapsley 2003; Eadington 2003; Single 2003). The magnitude of these social costs in a country depends critically on the level of treatment-related expenditures by government. This makes the comparison of social costs across countries difficult. If one country increases its expenditures on problem gambling treatment the social costs of gambling in that country increase, according to most studies, even if the number of problem gamblers or the severity of their problematic behavior decreases. A country whose government spends nothing to deal with problem gambling may have a significantly lower social cost, *ceteris paribus*.⁴⁷

Social cost studies that simply use government spending as measure of social costs are problematic. Yet, there is no obviously better way to handle these costs. One could argue that government spending should be handled in a fundamentally different way since they may be tied more directly to politics than to the level of problem gambling. Even so, the level of government spending can provide useful information to researchers interested in studying the cost-effectiveness of different treatment options.

This is a critical point. Simply because the government spends money on something does *not* necessarily imply that the expenditure represents a

⁴⁶ A related legitimate social cost would be any excess burden incurred raising the tax revenue used for transfers.

⁴⁷ Alternatively, suppose one country compensates pathological gamblers 150% of their treatment costs. Then the social costs of gambling in this country would be over-estimated.

social cost or a decrease in social wealth, though it *may*. Members of society must give money to government in taxes, and so in a sense it is a cost to society members. However, the benefits also go to society members. For example, education, research, police, and unemployment benefits would all be social costs if government expenditures are sufficient to qualify as social costs. These things are fundamentally different from the social costs associated with pathological gambling. We seek to minimize the social costs of gambling, but we do not seek to minimize education, research, police protection, or many other forms of government spending. If government spending implied social costs, the social cost problem would be easily solved by eliminating government spending! This point hopefully illustrates why social cost must be something other than mere expenditures by a person, or negative consequences to an individual.

Browning (1999) discusses government expenditures as externalities. His discussion is in the context of smoking and the related health care costs that are borne by government. He calls these “fiscal externalities.” They are not technological externalities because spending by government result in taxes on citizens and taxes rates are not arguments in utility functions (Browning 1999, p. 7). In discussing cigarette smoking and medical care subsidies, Browning (pp. 12–13) explains,

If the fiscal externality in the cigarette market is associated with excessive cigarette smoking and there is a welfare cost, it is simply a reflection of the welfare cost produced by the medical care subsidy. There is no “new” inefficiency produced by the fiscal externality. Fiscal externalities, therefore, do not necessarily imply any inefficiency. If there is inefficiency associated with the fiscal externality, it reflects the distorting effect of the policy (here, the medical care subsidy) that creates the fiscal externality. Fiscal externalities themselves do not cause any new inefficiency in resource allocation.

This is an important perspective that must be considered and addressed by gambling researchers, especially as researchers call for more government support of pathological gambling treatment and prevention expenditures.

6.5.5 Modeling transfers

We can illustrate the analysis of transfers in bad debts, bailouts, or government expenditures by using people’s wealth on the axes of a PPF model

as in Figure 6.3.⁴⁸ The PPF represents the possible distributions of wealth of \$100.⁴⁹ As before, all points on the PPF are efficient though both members of society might not consider them all equitable or “fair.” Bailout costs, bad debts and government welfare costs are all transfers of wealth, from concerned family members, the bank, and taxpayers to the pathological gambler in question. In each case the person losing money is likely to be unhappy with the transaction but it is also a net benefit to the recipient whether or not he suffers from pathological behavior.⁵⁰

Assume we are initially at point *m* in Fig. 6.3. Now suppose Joe is a pathological gambler and that he (i) receives a \$20 “bailout” from his father Sam, (ii) defaults on a \$20 loan from Sam the banker, (iii) receives a \$20 check from the government financed by Sam’s taxes, or (iv) steals \$20 from Sam’s wallet. Each case can be represented by movement from point *m* to *n*. None of the cases is a decrease in social wealth. Rather, they are transfers from Sam to Joe.

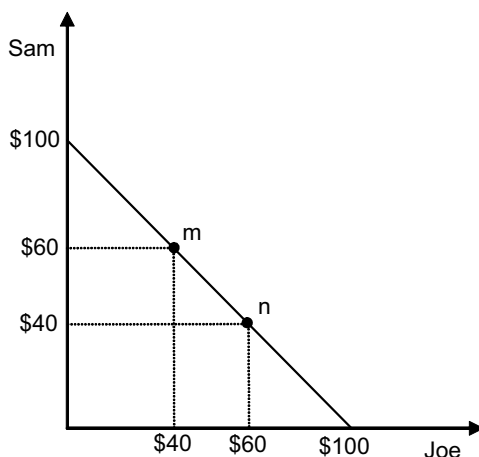


Fig. 6.3. Wealth transfer

⁴⁸ Alternatively, one could simply point out that, if tax revenues, political contributions, etc., are not social costs, then certainly abused dollars, bad debts, and bailout costs cannot be.

⁴⁹ The straight line PPF indicates that the “good,” i.e., money, is perfectly shiftable between individuals. In production cases, PPFs are bowed, as explained in the appendix.

⁵⁰ This discussion ignores a potential social cost associated with administering wealth transfers. With government transfer payments, for example, there is often a cost to collecting (and avoiding) the taxes. These are social costs of taxation.

An important caveat must be reiterated. There might be social costs associated with the above transfers that are unrelated to the size of the transfer. An example is the psychic cost of having to provide a bailout to a relative. A bailout, one might argue, is made under duress. A person might face a prison term if owed money is not paid to a lender. Consider a case where individual g is a pathological gambler who will receive either a bailout or a prison sentence, and individual b is the concerned family member who has the choice of bailing out g or letting him go to prison. Let the individuals' utility functions be $U_g = U(C, G, P, U_b, B, Z)$ and $U_b = U(C, U_g, B, Z)$, where C represents consumption, G is gambling, P is prison time, B is a bailout, and Z is other arguments affecting utility. We might legitimately expect the following partial derivatives: $\delta U_g / \delta G > 0$, and $\delta U_g / \delta P$, $\delta U_g / \delta B$, $\delta U_b / \delta B < 0$. Both the prison term and bailout have a negative psychic effect on both individuals. If the prison sentence has a greater total negative effect than the bailout, then b will bailout g . This *is* a choice.

Giving a birthday gift, on the other hand, is usually a choice not made under duress. We might expect both giving and receiving a birthday gift to increase utility though it need not. The recipient might feel that now he owes the giver. The giver might feel that he was somehow compelled or obligated to give in the first place. Such a transfer might have either positive or negative psychic connotations. The same is true of any wealth transfer.

It should be noted that the redistribution of wealth caused by gambling is often very important in policy deliberations. The suffering of the families of pathological gamblers is cause for serious concern, but it is important to recognize that neither the gambler's losses nor the transfers of wealth that they prompt are social costs. More importantly, using the amount of wealth transferred as a result of pathological gambling as a measure of social costs, and the addition of these amounts to "real" social costs is adding apples and oranges. The resulting sum is meaningless.

6.5.6 Industry cannibalization

"Industry cannibalization" is the term used by many researchers to describe the negative effects gambling establishments have on neighboring businesses. When casinos open in a particular town, sales at nearby restaurants and other entertainment firms may fall. This consequence of casino introduction is considered by many to be a social cost. Adherents to this view argue that any positive economic effects of casinos are offset by losses to other industries, so net economic growth is unlikely. Refer to

Sect. 3.2 for a complete discussion of this issue. Generally, we can view “cannibalization” as a normal activity within market economies.

6.5.7 Money outflow

Somewhat less common than the other alleged social costs is the argument that monetary outflows represent social costs. Political arguments and common sense seem to dictate that the introduction of gambling into a region or state can be economically beneficial only if the introduction brings about a net inflow of money. The complementary argument is that money outflow from a region reduces the wealth in the region. As with “industry cannibalization” this issue was discussed in Chap. 3 in the context of economic development. The concern of money outflow can be discounted because consumers do not pay for something unless they expect the value of what they receive to be higher than the price they pay.

6.5.8 Productivity losses

Most researchers allege that pathological gamblers create social losses because their gambling affects their jobs. They may become less productive on the job, miss work, or become unemployed as a result of their gambling problem. Thompson et al. (1997) estimate costs of lost work hours, unemployment compensation, and lost productivity from unemployment at \$2,941 (see Table 6.3). Grinols and Mustard (2001), Grinols (2004), and Single, Collins, Easton, Harwood, Lapsley, Kopp, and Wilson (2003, Sect. 4.4) also count productivity losses as social costs.

Other authors have argued that such costs are internalized because the costs fall upon one of the parties of the labor contract (Walker and Barnett 1999; Eadington 2003; Walker 2003). If a worker’s productivity falls or if he fails to show up to work, either the employer or employee is the residual claimant to the loss, the “stolen wages” to which Thompson et al. (1999) refer. There is no “social” aspect to this. If the employer chooses, he may reduce the wages paid to the worker in the proportion of missed hours. Alternatively, he may fire the worker and replace her with someone else who offers a higher marginal product. If the employer chooses not to take action against the worker, the employer incurs the cost of the worker shirking. In either case, there is no externality to outside parties. McCormick (1998, p. 8) provides a useful explanation:

Imagine a person spends considerable time playing video poker, so much so that this person loses his or her job and has to seek a lower paying, less de-

manding position. Emphatically, the lost wages are not an uncompensated social cost. The individual directly bears these costs and still plays the games, then the individual feels all the consequences of his or her actions. In this case, there can be no welfare improvement from limiting this person's access to video poker games. This is true even if other people were depending on the gambler to supply them with income. While indeed it might be sad and a deep personal tragedy, it was a decision made by the individual and one for which, in classical economics, there is no gain from government intervention.

6.5.9 Theft

From the discussion above, theft is a transfer of wealth, and therefore does not qualify as a social cost.

6.6 Conclusion

Although there are bound to be new claims of negative effects as social costs, most of these effects appear to be easy to classify given a definition of social cost. Using the economics definition described in Sect. 6.2 we can concisely explain why many of the alleged social costs are “bad effects” that may be associated with pathological gambling but not true social costs or reductions in societal wealth. Table 6.4 summarizes this information.

Items (4) and (12) in Table 6.4 require additional comments. Suicide can be considered an act of rational choice (Crouch 1979, p. 182). Even so, if a pathological disorder drives a person to commit suicide, his survivors may suffer psychic costs that can be considered negative technological externalities depending on utility functions. Nonetheless, these costs are arguably internalized.⁵¹ The last item in Table 6.4, divorce, is interesting. Most researchers simply assume that marriage is good and divorce is bad. There is no consideration given to the circumstances surrounding the divorce. Indeed, in most cases the individuals seeking divorce expect to be better off as a result, so it would appear that divorce is “good” for them.⁵² Still, one could argue that the marriage might not have turned bad in the absence of problem gambling.

⁵¹ Psychic costs could result from any natural-cause death too; should we therefore classify death as a social cost of life?

⁵² Prior to marriage the prospect of divorce is not a positive. But once married, if divorce occurs it must be in an attempt to improve the relationship.

Table 6.4. Alleged “social costs” of gambling

Alleged social cost	Economic perspective
(1) income lost from missed work	Costs borne by gambler (“internalized”)
(2) decreased productivity on the job	
(3) depression and physical illness related to stress	
(4) increased suicide attempts	
(5) bailout costs	Transfers or pecuniary externalities
(6) unrecovered loans to pathological gamblers	
(7) unpaid debts and bankruptcies	
(8) higher insurance premiums resulting from pathological gambler-caused fraud	
(9) corruption of public officials	
(10) strain on public services	
(11) industry cannibalization	
(12) divorces caused by gambling	Value judgment

Using the economics paradigm for defining social costs, it is likely that the typical social cost estimate grossly overestimates the true social costs of pathological gambling. For example, the Thompson et al. (1997) estimate of social costs (per pathological gambler per year) must be reduced from \$9,469 to \$2,974 (Walker and Barnett 1999). However, even if researchers were to accept the economics perspective on social cost, there are remaining complications in performing social cost estimates. Some of these issues are addressed in the next chapter.

Even after defining “social costs,” we are still left with the question, “Why does this matter?” Experience has shown that in the absence of an explicit definition of social cost researchers use *ad hoc* methodologies in estimating costs. Many such estimates have been arbitrary and meaningless. Although a welfare economics methodology is not the only one, it has precedence and provides a framework by which existing and forthcoming cost-benefit analyses may be compared. This perspective may give researchers a different, valuable perspective on the varieties of negative consequences from pathological gambling.

7 Miscellaneous social cost issues

7.1 Introduction

In the previous chapter, I explain a mainstream economics definition of “social cost” and how it could be applied in cost-benefit analyses of gambling. Throughout the chapter, potential pitfalls of cost-benefit analyses are indicated by way of specific examples from previous studies. Cost-benefit analyses have garnered a significant amount of attention from media, industry, government, and researchers. Yet, aside from the fundamental problem of defining social cost performing such studies in any meaningful and useful way is surprisingly difficult to do. In this chapter, we examine some other complications related to cost-benefit analysis. This discussion can be valuable for researchers performing analyses as well as consumers of such research.

There are several possible explanations of the low quality and rather confused nature of social cost research. First and perhaps foremost, this is a new area of research. As a result, one should not expect complete agreement among researchers. Second, contributors to the literature have a surprisingly wide array of academic backgrounds in economics, law, medicine, political science, psychology/psychiatry, public administration, sociology, and even architecture. We would expect different researchers to approach the social cost issue in different ways. This variety is important because gambling research is by its nature interdisciplinary. But problems can develop when people step outside their areas of expertise.¹ Aside from this, with so many different backgrounds, agreement on any particular issue is unlikely.

Finally, a possible indicator or perhaps source of confusion in the literature is the type of redundant jargon one finds in the social cost literature. The terminology just to describe “costs” is surprisingly vast including private and social, internal and external, direct and indirect, harms and costs,

¹ This issue is addressed further in Chap. 8.

intangible and tangible, external costs and externalities, and pecuniary and technological externalities. Do we really need so many different terms to describe the negative effects of pathological gambling?² In addition to confusion surrounding costs, the psychology literature has a similar problem in its definition of problematic gambling behavior. The terms used to describe such behavior include disordered gambling, problem gambling, pathological gambling, probable pathological gambling, and compulsive gambling. While these terms all refer to problematic gambling behavior, there are different levels of the affliction. This disagreement on the nomenclature, coupled with different levels of problem gambling, makes the estimation of social costs even more difficult.

All of the above issues will abate as the research matures. The remainder of this chapter examines some longer term, more substantive concerns related to social cost research. Section 7.2 discusses some of the problems in attributing costs to gambling behavior. In Sect. 7.3, I discuss several potential social costs of gambling that have not been identified or measured in previous research. Aside from the economics perspective on social costs, there are several other viable perspectives that have been offered by well-respected researchers. These increasingly popular perspectives are described briefly in Sect. 7.4. Whatever methodology researchers view as legitimate and/or workable, in Sect. 7.5 I argue that we should adopt a single “universal” methodology for social cost of gambling studies. Section 7.6 concludes the chapter.

7.2 Problems estimating social cost values

Despite numerous attempts to estimate the social costs from casino gambling in different countries, there are serious problems in this line of research that have not been adequately addressed. In some cases, these problems are so serious as to completely invalidate the results of many social cost studies. Four of these issues are briefly addressed here, and related issues are covered in Chap. 8. Although there may not be immediate solutions to these problems, researchers should at least recognize these hurdles in their studies so policymakers and voters can be better informed.

² Part of the explanation for this, of course, is that few authors define “cost.”

7.2.1 Counterfactual scenario

When considering the costs (or benefits) associated with gambling and gambling behavior, it is important to consider the counterfactual scenario. That is, we must be mindful of what otherwise would have happened.³ In the social costs case, we must consider the magnitude of such costs if casinos were not legal. Gamblers can travel to casinos outside their city, state, region, or country. Illegal and internet gambling may be available. In any case, legalizing casinos in the home area may not significantly affect the social costs that accrue to that region.

Even if we accept this argument, measuring the social costs in the counterfactual may be difficult. One way to do this would be to identify similar regions that do not have casino gambling. Of course, such a comparison must be done carefully to control for as many societal factors as possible.

7.2.2 Comorbidity

Even after reconsidering existing social cost estimates, it is important to consider the matter of the net or marginal contribution of pathological gambling to socially undesirable behavior. Investigators usually observe that pathological gamblers have legal problems, often require public assistance in the form of various kinds of welfare payments, and may require more medical services than other individuals.⁴

These observations are easily verified but prove little. As most authors would acknowledge, simply observing that gambling is correlated with such problems does not imply that gambling causes them. If gambling were not an option, a person who is predisposed to a pathological disorder may manifest his disorder in other destructive ways. More importantly, if pathological gambling is simply a symptom of some more basic disorder, it is the more basic disorder rather than gambling itself that is the underlying cause of the adverse consequences and social costs of the pathological gambling. Most researchers (e.g., Grinols 2004, Grinols and Mustard 2001, and Thompson et al. 1997) simply attribute all of the costs to gambling. A mechanism is needed to allocate the harm among coexisting disorders, yet most authors ignore this issue.

In comorbidity cases pathological gambling may make little or no marginal contribution to the legal problems, bankruptcy, need for public assis-

³ See Collins and Lapsley (2003), Eadington (2003), Grinols (2004), and Walker (2007b).

⁴ For example, see Grinols (2004), Grinols and Omorov (1996), and Thompson et al. (1997).

tance, or the high medical care costs that often characterize pathological gamblers. Since social cost calculations should include only the marginal contribution that pathological gambling makes to destructive behavior, a determination of whether such behavior is caused by, rather than simply correlated with, pathological gambling is crucial to correctly estimating the social cost of gambling.

In large part, this issue revolves around whether pathological gambling is a primary or secondary disorder. Shaffer et al. (1997) have addressed this issue. They note that the *DSM-IV* (APA 1994) indicates that “a person meeting all of the criteria for pathological gambling is *not* considered a pathological gambler if he or she also meets the criteria for a Manic Episode, and the Manic Episode is responsible for excessive gambling” (Shaffer et al. 1997, p. 72). The authors explain that pathological gambling may be independent of other afflictions or it may be only a reflection of other problems (p. 73).⁵ Obviously, if the conditions for pathological gambling are a subset of another affliction or of a combination of other afflictions, then we cannot legitimately attribute all the social costs of pathological gambling to the gambling per se.

The study by Petry, Stinson, and Grant (2005) indicates the extent to which pathological gamblers exhibit other behavioral problems. They estimate 73.2% of U.S. pathological gamblers have an alcohol use disorder. The lifetime prevalence rate for drug use disorders among pathological gamblers is 38.1% and for nicotine dependence it is 48.9%. Other comorbid conditions include mood disorders (49.6%), anxiety disorders (41.3%), and obsessive-compulsive personality disorder (28.5%) (Petry et al. 2005, p. 569).⁶

Given many pathological gamblers exhibit other disorders, it is difficult if not impossible to accurately estimate the social costs attributable specifically to pathological gambling. As an example, consider a pathological gambler who is also a drug addict and engages in behavior resulting in social costs of \$5,000. What proportion of the cost should be attributed to the gambling disorder and to drug use? Although it is critical to deal with this issue *no* social cost study has taken account for comorbid disorders. In-

⁵ Briggs, Goodin, and Nelson (1996) report results suggesting alcoholism and pathological gambling are independent addictions. However, as Shaffer et al. (1997, pp. 72–73) note, “the Briggs et al. study employed a unique subject sample that likely represents the tails of two special self-selected distributions; they also employ a small sample size. Taken collectively, these factors encourage us to view their results as tentative and their conclusions as uncertain.”

⁶ Thompson et al. (1997, pp. 87–88) provide some anecdotal evidence from a survey of Gamblers Anonymous members.

stead, researchers have simply attributed all the costs to pathological gambling. This results in overestimates of the social costs of pathological gambling.

The counterfactual scenario further complicates this issue. Again consider a drug addicted pathological gambler. If the person was not a pathological gambler, his behavior from drug use might result in social costs higher or lower than in the case with both disorders. It is theoretically possible that with comorbid disorders a particular disorder might actually decrease social costs compared to the counterfactual. This issue has not been considered in the literature.

The important implication to be drawn from these studies of multiple disorders is that observing a correlation between social problems or socially costly behavior and pathological gambling is not adequate to attribute the social problems to gambling. Both pathological gambling and the probability that one will run afoul of the law may be symptoms of a more basic (“primary”) disorder. While this point is obvious to most observers, it is typically (and inappropriately) ignored in estimating the social cost of gambling. Studies which fail to address the causality and marginal contribution issues are likely to overstate the actual social costs of gambling. Social cost estimates for gambling that do not address these issues should be viewed with skepticism.

7.2.3 Pathological gambling and “rational addiction”

While the treatment of addictions and studies of their prevalence have primarily received attention by psychologists and sociologists, economists have investigated the rationality of choice over a wide range of human behavior, including that influenced by addictions. Nobel Prize winning economist Gary Becker is largely responsible for the development of economic theory in this area. The framework of the rational addiction model is explained most succinctly in Becker, Grossman, and Murphy (1994, p. 85). The model considers

the interaction of past and current consumption in a model with utility-maximizing consumers. The main feature of these models is that past consumption of some goods influences their current consumption by affecting the marginal utility of current and future consumption. Greater past consumption of harmfully addictive goods such as cigarettes stimulates current consumption by increasing the marginal utility of current consumption more than the present value of the marginal harm from future consumption. Therefore, past consumption is reinforcing for addictive goods.

Empirical tests confirm that the models have substantial predictive power.⁷

A central implication of this literature is that prior to becoming addicted to gambling, the decision of whether or not to gamble is a rational choice. This simply means the person weighs the expected costs and benefits of an action before acting. The implication here is that even pathological gambling is a condition that results from rational behavior. Consider that there is a risk element in many decisions that we face daily. When deciding to drive a car, a person may consider that there is a slight risk of death from unforeseen accidents. Likewise, the choice of whether to play casino games includes a slight risk of developing an addiction. But risking addiction is not inconsistent with rationality. The initial choice of whether or not to consume a potentially addictive good is generally a rational decision, as Orphanides and Zervos (1995, p. 741) explain:

Addiction results from a time-consistent expected utility maximizing plan. Addiction is voluntary, yet it is not intentional. It is the unintended occasional outcome of experimenting with an addictive good known to provide certain instant pleasure and only probabilistic future harm. Despite the rationality of their decisions, addicts regret their past consumption decisions and are not “happy.” Had they correctly assessed their addictive potential, addicts would have acted differently. Had they known, they would never have chosen to become addicted.

This work alleviates criticisms of earlier rational addiction models that had not accounted for unknown probabilities of developing an addiction.

Becker (1992, p. 121) anticipated the need for such a model:

Nothing in the analysis of forward-looking utility-maximizing behavior presumes that people know for sure whether they will become habituated or addicted to a substance or activity, although that is sometimes claimed by the critics of this approach. An individual may have considerable uncertainty about whether she would become an alcoholic if she begins to drink regularly. A troubled teenager who begins to experiment with drugs may expect, but not be certain, that his life will begin to straighten out, perhaps because of a good job or marriage, before he becomes addicted. Since these and other choices are made under considerable uncertainty, some persons become addicted simply because events turn out to be less favorable than was reasonable to anticipate – the good job never rescued the drug user. Persons who become addicted be-

⁷ For a comprehensive discussion of the rational addiction model, see Becker (1996), a collection of his previous papers: Becker (1992), Becker and Murphy (1988), and Stigler and Becker (1977). Empirical tests of the model can be found in Chaloupka (1991) and Becker et al. (1991, 1994). Mobilia (1992) applies the model to gambling behavior.

cause of bad luck may regret their addictions, but that is no more a sign of irrational behavior than is any regret voiced by big losers at a race track that they bet so heavily.

Landsburg (1993, pp. 100–101) supports this view, arguing that medical costs resulting from illegal drug use cannot be considered a social cost. He argues that “an increase in consumer surplus is already net of health costs and lost income. Any such losses would have been reflected in people’s willingness to pay for drugs so would have been implicitly accounted for in the original [cost-benefit] calculation.” The same argument applies to gambling.

To reiterate, whether or not a person has pathological or compulsive tendencies prior to placing a bet at a casino, the decision to gamble *is* rational prior to developing an addiction. If a person becomes an addict his quality of life may fall in a variety of ways. However, the development of an addiction does not imply that the initial decision to gamble was irrational even if the person regrets the original decision. Since the adverse consequences experienced by a person as a result of his own rational actions cannot be considered a social cost, the reduced quality of life experienced by a gambler who becomes addicted cannot be considered to be a social cost. In the words of Orphanides and Zervos (1995, p. 752), “when forward-looking expected utility maximizing individuals possess the correct information regarding the distribution of [addictive tendencies], a ban or any other restriction on consumption is never Pareto optimal.” Further, to argue that the original decision to gamble was irrational is an example of the “bad-outcome-implies-bad-decision” fallacy discussed by Frank (1988, pp. 72–75.)

This perspective on addictive behaviors, especially as it relates to pathological gamblers, is very controversial in the gambling literature. If the argument is valid, it will have a significant impact on how social cost estimates are estimated because it implies that the costs of pathological gambling are actually private in nature. Even if government social services are devoted to helping problem gamblers, it could be argued that these are costs of the policies themselves (Browning 1999; Walker 2007b).

7.2.4 Surveys on gambling losses

Diagnostic/screening instruments like *DSM-IV* and *SOGS* typically ask how the person financed his/her gambling and the maximum amount lost gambling in a single day. Blaszczynski, Ladouceur, Goulet, and Savard (2006, p. 124) explain that clinicians rely on estimates of gambling losses

to identify at-risk gamblers. In addition, such measures can be used to measure the reduction in gambling activity post treatment. Examples of financial questions from the *DSM-IV* and SOGS are shown in Table 7.1.

Table 7.1. Financial questions from *DSM-IV* and SOGS screening instruments

Screening instrument	Instrument item
DSM-IV	8. "...has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling."
DSM-IV	10. "...relies on others to provide money to relieve a desperate financial situation caused by gambling."
SOGS	2. "What is the largest amount of money you have ever gambled with on any one day?" Possible responses include: I've never gambled; \$1 or less; more than \$1 but less than \$10; more than \$10 but less than \$100; more than \$100 but less than \$1,000; more than \$1,000 but less than \$10,000; more than \$10,000.
SOGS	14. "Have you ever borrowed from someone and not paid them back as a result of your gambling?"
SOGS	16a-k. "If you borrowed money to gamble or to pay gambling debts, who or where did you borrow from?" Possible responses include: household money; your spouse; other relatives or in-laws; banks, loan companies, or credit unions; credit cards; loan sharks; you cashed in stocks, bonds, or other securities; you sold personal or family property; you borrowed on your checking account (passed bad checks); you have (had) a credit line with a bookie; you have (had) a credit line with a casino.

Sources: *DSM-IV* (1994, p. 618) and Lesieur and Blume (1987, p. 1187)

Surveys including questions about sources of money and gambling losses have been used to make social cost estimates. Examples include Thompson et al. (1997), Thompson and Schwer (2005), and papers used by Grinols (2004) in deriving his social cost of gambling estimate.^{8,9} This

⁸ An additional problem with these studies is that they estimate "abused dollars," "bad debts," and "bailouts" and call these social costs.

⁹ The survey questions are typically omitted from published papers so it is difficult to know exactly what questions survey respondents were asked.

practice is problematic for several reasons. First, it is unclear whether respondents understand how to calculate gambling losses. Blaszczynski et al. (2006, p. 127) explain “without specific instructions regarding how gambling expenditures are to be calculated, participants use different strategies.” The obvious problem with this is

different strategies used lead to variations in the expenditures reported and, therefore, cast doubt on the validity of the data and raise questions that there may be potential serious biases regarding gambling expenditures currently reported in the gambling literature. (Blaszczynski et al. 2006, p. 128)

A second problem is asking survey respondents to accurately identify the source of their gambling money. Keep in mind that such surveys ask problem gamblers who admit to having or who are diagnosed with spending control problems to classify various sources of income used for specific types of expenditures. *Budgets are fungible*. It is difficult or impossible for an individual to unequivocally specify the source of money lost gambling from paycheck, credit card, borrowing from friends or family. People have several sources of income or money and also many types of expenditure. Even financially responsible individuals may not typically link specific sources of income to specific expenditures.

Third, any particular person’s financial problems may be due to gambling but that is not easy to determine unequivocally.¹⁰ Several examples can illustrate. Suppose a problem gambler buys a car beyond what his budget would allow even if he did not have a serious gambling problem. It is quite possible that in answering or using the *DSM-IV* or SOGS criteria, the person will attribute his financial woes to gambling. But who can determine the extent to which the financial woes are due to gambling or a preference for expensive cars? Perhaps the person exhibits financial irresponsibility in many aspects of his life. The screening devices do not distinguish between gambling and other potential causes of financial problems. As a final example, how do the screening devices handle a situation in which a person secures a loan and *then* decides to gamble the money away? The person does not borrow to gamble, but gambles after he has borrowed. In either case the person might have a gambling problem, but these are different situations. How likely is it that the person or the clinician will correctly answer the financial-related questions in these situations?

¹⁰ Obviously there will be cases where gambling is a clear problem. But it is doubtful that irresponsible gamblers are otherwise financially responsible.

Finally, extrapolating from the experience of the most serious problem gamblers to the general population as is often done is inappropriate (Walker and Barnett 1999). Thompson et al. (1997), Thompson and Schwer (2005) and Grinols (2004) base their estimates in part on survey responses by Gamblers Anonymous members. These are arguably the most serious cases and are not representative of the general population of pathological gamblers.

The point here is that financial woes and problem gambling may be correlated, but that does not indicate a causal relationship that is implied in the diagnostic instruments or in social cost studies that rely on surveys of problem gamblers. This is a critical issue that has not yet been adequately addressed in the literature.

7.3 Unidentified and unmeasured social costs

Even with best efforts at estimating the social costs of gambling and despite apparent anti-gambling biases, there are still several social costs of gambling that have not been identified elsewhere in the literature. Perhaps these have been ignored because they deal more with the political process related to casino regulation than the costs attributable to problem gambling. Even so, these costs are no less serious simply because they involve politicians rather than casino patrons. Since gambling is typically illegal or regulated by government, there are potentially very high social costs associated with the regulation of casino gambling. Two specific issues are addressed below.

7.3.1 Restriction effects

A significant social cost can occur as a result of government restriction of casino gambling. The fact that gambling is not universally available means that the government prevents mutually beneficial voluntary transactions from occurring. Like it or not, even though gamblers face negative expected values from their activity, it must be the case that they expect to benefit with increased utility if they decide to place bets. When individuals are prevented from making what they see as mutually beneficial, voluntary transactions, they are harmed. Producers are also harmed by a restriction of their potential transactions because their profits are lower than they otherwise would have been without the restrictions.

Wright (1995, p. 99) explains the benefits of moving away from a total ban on casino gambling. It removes economic distortions, including “dead-

weight losses, enforcement costs, and incentives to lobby and bribe.” Eadington (1996, p. 6) is another of the researchers who has identified the benefits to consumers of gambling legalization and implicitly the cost to consumers of restrictions on legalized gambling.

The welfare lost to society as a result of casino gambling being artificially restricted below its market equilibrium level can be illustrated in the PPF–IC framework developed earlier. In Fig. 7.1, suppose the number and size of casinos in a jurisdiction are restricted from the market equilibrium of q_e to level q_2 . As a result, the mix of goods changes from point a to b and welfare decreases from that represented on IC_1 to that associated with IC_2 .

We can also see that the level of casino gambling expenditures would not normally remain above level q_e . If the current mix of consumption was at point c , society would be better off shifting expenditures away from casino gambling toward other goods and services. As a result the society would move to a higher IC.¹¹

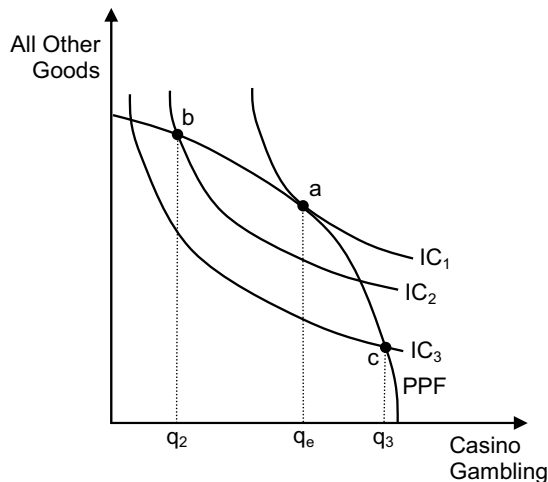


Fig. 7.1. Welfare loss from restricting casino gambling

¹¹ At point c the level of casino output has a marginal cost of production that exceeds the marginal benefit of consumption. In this case, the market is over-saturated, and we may expect some casinos to go out of business until spending at casinos falls to point a .

Alternatively, we can show the harm caused by artificial restrictions on markets by considering the CS and PS lost as a result of the restrictions on casinos.¹² For each transaction or bet that does not occur as a result of government restrictions, the CS and PS lost represents the social cost of the government restriction. Figure 7.2 illustrates CS and PS and an artificial restriction on quantity in the casino market. As before, CS and PS are indicated by the shaded areas. CS is labeled $a+b+c$ and PS is labeled $d+e+f$. If government restricts the quantity of casino gambling from q_e to q_2 , then the CS and PS areas become smaller. Specifically, CS falls by $b+c$ and PS falls by $d+f$. The social cost from the lost transactions is the difference between the social surplus at q_e and q_2 or area $c+f$. This is called a “deadweight loss” by economists. It represents a loss to one or more parties that is not offset by gains to some other party.

In the case of the casino industry and in the context of Fig. 7.2, areas $b+d$ will likely go to the casino industry. Since the quantity of casinos is typically restricted, the firms in the industry can expect economic profits or a rate of profit above the average level. Because the supply of casinos is restricted, there is less competition in the market than would occur otherwise. As a result, casinos can charge above market prices. These higher

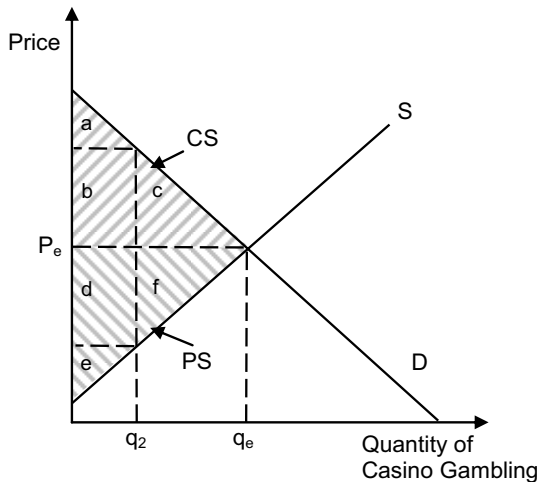


Fig. 7.2. Deadweight loss from a quantity restriction

¹² The Australian Productivity Commission report (APC 1999, Appendix C) provides a detailed discussion of the CS derived from gambling.

prices may be manifest in higher hotel rates, more expensive restaurants, or even worse odds/payouts in casino games. These profits are represented by areas $b+d$, the difference between what consumers pay and the sellers' cost of production. The point is that there will be a transfer of CS to producers in the amount b , so that total PS will be $b+d+e$ when a government restriction is imposed.¹³

Although the restriction on casinos causes a welfare loss to society in PS and CS lost, casino suppliers may actually prefer the limitation on the number of casinos to a free market. They receive a transfer from consumers (b). If $b > f$ then the casinos actually benefit from the restriction.¹⁴ Governments may prefer the regulated quantity as well since they have the power to tax. They may charge the casinos fees and taxes, reducing the benefits to casinos. Obviously if taxes and permit fees are too high (greater than $b-f$ in Fig. 7.2) the casinos would prefer a free market to regulation.

One possible reason that gambling researchers have ignored the cost of restricting gambling is that authors rarely acknowledge the benefits of gambling to consumers. Consumer transactions are ignored. The basic point here is that the competitive market absent of artificial government limitations would bring about the social welfare maximizing level of casino gambling capacity. To some extent, this topic speaks to the counterfactual scenario issue. In the absence of *casino bans*, consumers and producers may be better off. We must consider the social costs of banning products that consumers would like to consume. When these are considered they will balance, to some extent, the marginal social costs associated with casino legalization.

7.3.2 Lobbying

Another significant cost related to casino gambling and legalized gambling in general has to do with the legalization process itself. There is an incentive for wasteful lobbying in two related cases. First, lobbying will occur by both casino advocates and opponents over the legalization of casinos in new jurisdictions. Second, lobbying can be expected by prospective casino operators vying for permits where casinos are legal.

The mere facts that there is a government ban on gambling and that government policy can be influenced create incentives to engage in so-

¹³ The discussion here is limited because what happens with the lost surplus depends on the specifics of the market.

¹⁴ One way of thinking about this is that area f represents profit lost from consumers who now do not gamble; area b represents the higher prices that can be charged to remaining customers.

cially wasteful behavior. Specifically, the effort by opponents and proponents of legalized gambling to influence government policy constitutes a social cost because resources would have been used to produce goods and services. This social cost is the result of “rent seeking behavior” and is expected given the legal framework within which gambling is controlled. Tollison (1982) describes rent seeking behavior and provides a useful example illustrating why it is the *institutional framework* in which gambling is legalized that is the source of this social cost:

Consider a simple example in which the king wishes to grant a monopoly right in the production of playing cards. In this case artificial scarcity is created by the state, and as a consequence, monopoly rents are present to be captured by monopolists who seek the king’s favor. Normally, these rents are thought of as transfers from playing card consumers to the card monopolist. Yet in the example, this can only be the case if the aspiring monopolists employ no real resources to compete for the monopoly rents. To the extent that real resources are spent to capture monopoly rents in such ways as lobbying, these expenditures create no value from a social point of view. *It is this activity of wasting resources in competing for artificially contrived transfers that is called rent seeking. If an incipient monopolist hires a lawyer to lobby the king for the monopoly right, the opportunity cost of this lawyer (e.g., the contracts that he does not write while engaged in lobbying) is a social cost of the monopolization process.* (Tollison 1982, pp. 577–578; italics added)

Johnson (1991, p. 336) stresses the government role in rent seeking behavior:

The most serious rent seeking is caused by government, because only government has the power to create and enforce monopoly powers and to create and finance a system of special privileges without the possibility of competition eroding the values of these monopoly powers or special privileges.

Since the casino industry is typically not perfectly competitive due to government restrictions, a particular casino may expect a level of profits above the normal level.¹⁵ Based on Tullock’s discussion (1967, p. 231) the maximum rent seeking expenditures by a prospective casino owner would be the subjective risk-adjusted net present value of the future stream of profits for that casino.¹⁶ The total rent seeking expenditures of all potential gaming industry firms could be very large.

¹⁵ This “normal level” of profit, as well as the difference between economic and accounting profit is explained in any intermediate microeconomics text.

¹⁶ The prospective gaming firm adjusts its willingness to lobby based on its perception of the likelihood of legalization or securing an operation permit.

The opponents of casinos may also use resources in attempts to prevent legalization. Opponents may include other gambling or entertainment industries, restaurants, hotels, and other firms even in other jurisdictions. Firms that fear being “cannibalized” by casinos would be willing to sacrifice up to the risk-adjusted present value of their expected losses from having nearby casinos in an effort to prevent legalization.¹⁷ As with the gambling proponents, the sum of these expenditures could be quite sizable.

The rent seeking lobbying for a particular legislative proposal is a sunk cost that cannot be retrieved. We would expect a sizable amount of rent seeking expenditures each time a legalization proposal is considered.

The social costs caused simply as the result of the gambling legalization process could be large. Tullock (1967, p. 230) explains,

Transfers themselves cost society nothing, but for the people engaging in them they are just like any other activity, and this means that large amounts of resources may be invested in attempting to make or prevent transfers. These largely offsetting commitments of resources are totally wasted from the standpoint of society as a whole.

Both Tullock (1967, p. 228) and Krueger (1974, p. 291) suggest that measurement of these social costs would be complicated. Tullock explains, “the potential returns are large, and it would be quite surprising if the investment was not also sizable.”

It is critical to understand that any money paid directly to politicians in lobbying efforts is simply a transfer.¹⁸ The social cost of lobbying comes from the hired lobbyists and lawyers whose efforts are aimed at promoting or fighting gambling legislation. These activities are socially costly because these individuals could be working in some productive capacity, not just in attempting to secure the government’s favor.¹⁹

It is useful to consider the level of political contributions by the gaming industry shown in Table 7.2. Although the contributions themselves are transfers and do not represent social costs, it is likely that there is a positive relationship between the level of contributions and the social costs associated with lobbying.

¹⁷ As in the case of the proponents, this ignores the expenditures by parties whose gains or losses are not measured in terms of expected profit changes. An example of such an opponent might be a religious organization.

¹⁸ See Mueller (1989, p. 231) or Johnson (1991, pp. 336, 338) for an explanation of this.

¹⁹ The same argument applies to theft, bad debts, government welfare payments, and other transfers.

Table 7.2. Casino/gambling industry political contributions in the U.S.

Election cycle	Industry rank	Total contributions (millions)
2006 ^a	30	\$9.7
2004	35	\$11.3
2002	26	\$15.0
2000	36	\$12.6
1998	38	\$6.6
1996	39	\$7.1
1994	50	\$3.0
1992	69	\$1.6
1990	75	\$0.5
Total	38	\$65.3

^a The 2006 cycle figure is estimated.

Source: Center for Responsible Politics.

Even after casinos are legalized, local governments may regulate the number, size, types, location, and ownership of potential gambling establishments. This regulation creates an incentive for the potential owners to compete for the limited number of permits. The rent seeking at this stage could potentially exceed that described above since many more firms may be interested in competing for gambling permits once gambling has been legalized. This situation is analogous to Krueger's (1974, p. 301) case of import permits in which "an import prohibition might be preferable to a non-prohibitive quota if there is competition for licenses under the quota." Applied to the restriction on the availability of casino gambling, a complete (non-negotiable) ban on gambling may be preferable to the current process of campaigns and votes on legalization and subsequent competition for casino permits.²⁰

Another socially wasteful behavior related to the legalization process is the effort of government bureaucrats and others attempting to be on the receiving side of the contributions and lobbying by the parties discussed above. Krueger (1974, p. 293) explains this behavior by bureaucrats:

Successful competitors for government jobs might experience large windfall gains even at their official salaries. However, if the possibility of those gains

²⁰ This depends on the specific legal framework being considered. Krueger finds that the more inelastic demand for the product, the greater the deadweight loss from rent seeking.

induces others to expend time, energy, and resources in seeking entry into government services, the activity is competitive for present purposes.

This cost would be difficult to estimate but it could be significant, especially considering how generous the gaming industry is in its contributions to politicians.

7.3.3 Summary of political costs

Although previous studies typically focus on the social costs related to pathological gambling, the costs associated with government restrictions, legalization, regulation, and lobbying are potentially larger than the social costs associated with pathological gambling. Perhaps the focus has been on pathological gambling because the afflicted individuals and their loved ones suffer. On the other hand, costs in the political process seem to be much less “personal” or obvious. Still, researchers wishing to give a complete picture of the economic effects of casino gambling must not ignore the potentially significant social costs due to political processes.

7.4 Other perspectives on social costs

The methodology discussed in the previous chapter is economically rational, but there are other legitimate perspectives on the social costs of gambling. Several conferences have been dedicated to sorting out these social cost issues. They include the 1st International Symposium on the Economic and Social Impact of Gambling (Whistler, September 2000) and the 5th Annual Alberta Conference on Gambling Research (Banff, April 2006).²¹ At both conferences, researchers from a variety of disciplines and perspectives met to discuss the appropriate way to identify and measure the socioeconomic effects of gambling. Little progress seems to have been made, in terms of agreeing on the appropriate methodology. As Wynne and Shaffer (2003, p. 120) explain,

While the ultimate goal of the Whistler Symposium was to derive “best practice guidelines” for conducting future gambling socioeconomic impact studies, participants rapidly realized this was an overly ambitious expectation that would not be achieved. Moreover, the Symposium experience showed that there was

²¹ Papers from both conferences are published. The Whistler papers are in the *Journal of Gambling Studies* (2003, vol. 19). Papers from Banff are forthcoming in Williams et al. (2007).

little consensus on (a) the most salient philosophical perspective, or conceptual framework, that should underpin research into the social and economic impacts of gambling; (b) definitions of private costs versus social costs attributable to gambling; (c) what costs and benefits should be counted in socioeconomic impact analyses; and (d) the best methods for measuring gambling benefits and costs.

The three major perspectives represented at Whistler and Banff were cost-of-illness (COI; Single 2003), economic (Collins and Lapsley 2003; Eadington 2003; Walker 2003), and public health (Korn, Gibbins, and Azmier 2003). Each of these approaches is (briefly) described below.

7.4.1 Cost of illness (COI) approach

One popular mechanism for estimating the costs of problem gambling is based on COI studies that have previously been applied to alcohol and drug abuse. Single (2003) describes these generally while Single et al. (2003, p. vi) provide a detailed explanation of the approach:

The impact of substance abuse on the material welfare of a society is estimated by examining the social costs of treatment, prevention, research, law enforcement, and lost productivity plus some measure of the quality of life years lost, relative to a counterfactual scenario in which there is no substance abuse.

As Harwood, Fountain, and Fountain (1999, p. 631) explain,

Underlying...COI [studies] is the premise that an illness or social problem imposes "costs" when resources are redirected as a result of that illness or problem from purposes to which they otherwise would have been devoted, including goods and services and productive time.

There are other methodologies that are commonly associated with the COI approach. These include the "willingness to pay" and "demographic" approaches (Harwood et al. 1999).

The COI approach to problem gambling is useful because it has its foundation in alcohol and drug studies. The application to problem gambling does not require a reinvention of the wheel. In addition, this approach has much in common with the economic perspective. The issue of opportunity cost or the counterfactual scenario is important in both but they differ in how they treat worker productivity and some types of expenditures.

Like the other approaches described below, COI studies are not without criticism (e.g., Reuter 1999; Kleiman 1999). As the name suggests, COI studies are focused on costs, not benefits.

7.4.2 Economic approach

This book focuses on the economic perspective on gambling. The approach discussed in Chap. 6 (Eadington 2003, Collins and Lapsley 2003, Walker 2003, and Walker and Barnett 1999) shares much with COI studies. Many of the same “costs” appear in both but there are differences in how they view what should be included as a cost and how costs should be measured. Several examples of disagreement are highlighted below. The economic approach is more general than the COI approach because it provides a framework for also classifying and measuring benefits.

The economic perspective is concerned with the overall level of aggregate wealth in society. If an action decreases overall wealth, it is a social cost. “Wealth” refers to well being, not simply material wealth. This approach has been criticized by McGowan (1999) and Thompson et al. (1999) among others. Researchers such as Hayward and Colman (2004, p. 4) have argued that the economic approach ignores certain negative effects of problem gambling. Many of the criticisms are unfounded because they are based on an assumption that “economic” implies “money measurement.” This is more a description of accounting than economics.

7.4.3 Public health perspective

The public health perspective is perhaps the most general of the three approaches. It is based on the Ottawa Charter (1986) and focuses on prevention, treatment, harm reduction, and quality of life. In terms of gambling, it focuses on how gambling can affect individuals, families, and communities (Korn and Shaffer 1999, p. 306).

The public health approach does not primarily focus on how to measure costs and benefits but they are an important component of the public health perspective. There are quality-of-life components that defy measurement and it is important for these to be considered along with components that are easier to quantify. In this sense, the public health framework helps to show how the other approaches fit into the big picture.

While there are areas of agreement among the different perspectives, there are also some significant differences. Each approach has its merits and limitations, and each would imply a different approach to measuring the costs and benefits from gambling.

7.4.4 Revisiting the definition of “social cost”

What constitutes “private” and “social” cost of gambling is debated, even among economists. Walker and Barnett (1999) were the first to explicitly address the issue. The economic perspective has been criticized because it fails to count as costs many of the negative effects that researchers and practitioners believe are critical (Hayward and Colman 2004; Thompson et al. 1999). At the other extreme, Thompson et al. (1997) and Grinols (2004) count as a social cost almost anything negative that can be remotely linked to gambling. The differences in opinion on these issues are illustrated by Thompson et al. (1999) and Walker (2003).

The economics definition of social costs is based on the idea that these costs reduce the overall level of wealth, overall well-being, not just material wealth (Walker and Barnett 1999). In this sense, the economics definition fits in the context of a public health perspective but is distinct from the COI approach. The COI approach is adapted from the substance abuse literature and focuses on costs insofar as they impact gross domestic product (GDP, the monetary value of all goods and services produced in an economy during a year). Economists are skeptical about the use of GDP as a measure of well being because it does not account for things like the quality of goods, the value of leisure time, environmental quality, or other factors that may affect happiness.

Obviously, what should be counted as costs of gambling, and how to measure them, are issues that will continue to be debated for the foreseeable future. There are several distinct approaches to this issue and a reconciliation of the different methodologies is not likely to occur soon.

Some researchers (e.g., APC 1999; Collins and Lapsley 2003; Single 2003; Single et al. 2003) have based their definition of social costs on that posited by Atkinson and Meade (1974) and Markandya and Pearce (1989). According to these researchers, for a cost to be “private” the actor must have *full knowledge* about the potential costs of consuming the good. For smoking, this implies that if the consumer is not “fully informed” about the harm from smoking, he underestimates the harms and chooses to smoke too much. The result, according to these authors, is a social cost, *even if the cost is borne by the smoker himself*.

The Markandya and Pearce (1989) social cost definition ignores the fact that consumers are never fully informed about any of their decisions. For example, when I decide to get into my car and drive to work, I am not fully informed about the chances of being in an accident or my probability of surviving a particular accident. Furthermore, consumers are probably as likely to overestimate as they are to underestimate the dangers from smok-

ing or gambling.²² Following the logic of Markandya and Pearce, if a consumer *overestimates* the costs of smoking, he will smoke too *little*. The result is less smoking than is socially optimal. Yet, this possibility is not acknowledged by Markandya and Pearce (1989) or researchers who cite them. The view that unknown or unexpected costs are necessarily social is fraught with potential problems. A careful analysis of the Markandya and Pearce social cost definition should be undertaken since the use of this methodology likely results in a significant overestimate of the social costs of gambling, at least from the economic perspective.

7.4.5 The Australian Productivity Commission report

The most thorough examination of the costs and benefits of legalized gambling was published in 1999. The Australian Productivity Commission report (APC) is very detailed and gives a meticulous explanation of the economic perspective on social costs and benefits including a discussion of the benefits of legalized gambling (Chap. 5), consumer surplus and its measurement (Appendix C), and the measurement of costs (Chap. 9 and Appendix J).

The APC represents perhaps the best work that has been done in cost-benefit analysis of legalized gambling. I have little disagreement with their work, for example, on the benefits of gambling (APC, Chap. 5). Unfortunately, on the cost side the APC makes some of the same errors as other researchers. The APC takes the liberty of making numerous “judgment calls” in developing their methodology. While they consistently present explanations for these decisions, one can question their validity.

What is needed in the literature, especially on the cost side, is a more objective criterion for judging social costs. This criterion will better facilitate comparability across time and regions. The economic definition of social cost provides a criterion. However, one could argue that the Pareto criterion and economic efficiency are arbitrary standards for such analysis (Yeager 1978).

²² One could argue that to the extent gamblers are uninformed about the odds of the games they play, they are more likely to overestimate their chances of winning. The majority of lottery players arguably overestimate the chances of winning. After all, 1 in 100 million is hardly distinguishable from zero, yet lottery players relish imagining what they will do with their winnings if theirs is the lucky ticket. In the case of smoking, if there has been a significant amount of talk about relatively harmless second-hand smoke, people may be more likely to overestimate the dangers from smoking.

Table 7.3. The Australian Productivity Commission report

APC position	Response from the economic perspective
<p>“Overall, the Commission considers that the costs to family members flowing from problem gambling are genuine social costs.” (Chap. 4)</p>	<p>The APC fails to accept the distinction between technological and pecuniary externalities. Thus, the APC counts a variety of simple transfers as true social costs. The externality issue is explained by Baumol and Oates (1988). For a discussion as it applies to problem gambling and family members, see ACIL (1999).</p>
<p>The APC dismisses Becker’s rational addiction model because “the Commission does not consider the rational addiction model as an appropriate framework for the analysis of problem gambling.” (Chap. 4)</p>	<p>No substantive explanation for rejecting the model is given, even though the model has been ably applied to gambling (Morbilia 1992).</p>
<p>“Costs incurred by governments in providing welfare or counseling services are clearly externalities.” (Chap. 4)</p>	<p>Although this perspective is consistent with some researchers’ opinions, the APC does not offer supporting evidence for its position. It clearly contradicts the economic perspective (see Sect. 6.5.4 of this book) and Browning’s (1999) concept of fiscal externalities.</p>
<p>“...[the] costs of poor workplace performance derive originally from problem gambling then, irrespective of how they are shared between employer and employee, they remain social costs.” (Chap. 4)</p>	<p>The APC simply asserts these are social costs, without justification. I previously argued that productivity losses are not social costs (Sect. 6.5.8).</p>
<p>The APC advocates the estimation of intangible costs, for fear of “the greater risk that zero values will be imputed for these costs – which would be less meaningful than the conservative estimates presented [by the APC].” (Chap. 9)</p>	<p>This is arguable, and the APC position is reasonable. However, if intangibles are left to individual researchers, estimates will be completely subjective.</p>

The APC repeatedly explains the “economic perspective” but often dismisses it without justification. Consider the examples presented in Table 7.3.

To reiterate, the APC report is no doubt the most thorough report to date but it does not provide objective criteria for classifying negative effects as social costs. It would appear that there is not a complete understanding of the externalities issue among the APC report authors. The distinction between technological and pecuniary externalities is a key difference between the economic and APC methodologies.

7.5 Adopting a single social cost methodology

Legalized casino gambling can create benefits for consumers and local economies. On the other hand, pathological or problem gamblers impose costs on society. If a particular cost is “social” according to one research perspective but “private” from another perspective, adherents to one view may see the other perspective as ignoring significant social costs of gambling.²³ Research would arguably improve significantly if we could adopt a standardized methodology for identifying and measuring the costs and benefits of gambling.

Economists use GDP to compare productivity and economic growth across countries and over time. Although it is not a perfect measure of well being, it does provide a mechanism for comparisons. Psychologists use the *DSM-IV* for criteria to diagnose various types of problematic behavior including pathological gambling. Having this standard is arguably better than relying on the subjective criteria of therapists. Similarly, a standardized methodology for quantifying the social costs and benefits of gambling would be beneficial even if the measure is not perfect.

Developing a standardized methodology would have at least three positive effects on research. A standardized methodology would allow researchers to more effectively contribute to the policy debate over gambling, because such studies would be viewed with more legitimacy. Second, it would enable comparisons of costs and benefits across regions and through time. Third, it would provide a foundation by which the cost-effectiveness of various pathological gambling treatment mechanisms could be tested.

²³ An example is the criticism by some psychologists that economists ignore wealth transfers when these may amount to serious consequences to those facing decreased wealth.

7.6 Conclusion

Social cost in the gambling literature is anything but clear and consistent. The major source of inconsistency is the lack of a basic definition of “social cost.” The work here, a restatement and extension of Walker and Barnett (1999) and Walker (2003), provides one potential social cost methodology. Unlike previous social cost studies, the methodology proposed here includes a clear mechanism by which one can determine whether a negative effect of gambling is a social cost.

Given the variety of social costs related to legalized gambling, with some easily measurable and others a mystery, perhaps we should adopt general rules for social cost estimates. Let us develop estimates for the costs (police, court, incarceration and therapy costs) that are susceptible to measurement. But for others such as psychic costs that cannot be reasonably measured, or for negative effects that are not social costs such as pecuniary externalities, let us identify them without providing spurious empirical estimates. Offering methodologically flawed cost estimates does not improve our understanding nor does it promote sound policy.

Gambling researchers have different academic backgrounds, political perspectives, and opinions as to how casino gambling should be regulated and how pathological gamblers should be diagnosed and treated. Despite the amount of debate researchers probably agree on the goal of minimizing the harms associated with problem gambling. But reaching this goal requires a much better understanding of gambling behavior and the economic and social effects of gambling. The ongoing debates are worthwhile and important.

Policymakers and the press are very interested in gambling research, especially related to the social costs and benefits of gambling as well as pathological gambling. Simple measures, like money values for social costs or benefits, or prevalence estimates for pathological gambling are easily misinterpreted. When researchers provide these data, readers of the data are not likely to be aware of the controversies involved in creating the data. In areas where research is still relatively primitive, perhaps *no* data would be better than flawed data. For researchers such estimates are important to replicate and debate. This is part of the process of scientific development. If policymakers wish to utilize whatever data are available, researchers should do a better job at highlighting the potential flaws or controversies in their research.

Let us not be so eager to provide simple answers until we can reach some consensus on the fundamental methodological issues. This will require input from researchers in a variety of fields as well as the willingness

and ability to resist the temptation to offer politicians and media reporters simple “sound byte” answers to complicated questions.

8 Problems in gambling research

8.1 Introduction

By now it should be clear that the social and economic costs and benefits of casino gambling is a controversial area of research. The previous chapter offers several possible explanations including the young research area, jargon-laden arguments, and crossing disciplines. Shaffer, Dickerson, Der-evensky, Winters, Karlins, and Bethune (2001, p. 1) comment:

Compared with the more mature scientific areas of inquiry, the study of gambling related phenomena is a relatively young field. Consequently, scientists and clinicians have countless opportunities to develop new areas of research and treatment approaches. Immature fields like gambling studies also provide the opportunities for quasi-scientists and even charlatans to influence the public, policy makers, and perhaps themselves to thinking that their “evidence” supports a particular treatment, causal relationship or public policy.

Aggravating the problems of research quality is the fact that gambling research is important. The casino industry is an important one in many local economies and in some national economies. Politicians want some type of evidence or support for their positions and decisions on casino policy. In the absence of quality research the “quasi-scientists and charlatans” mentioned by Shaffer et al. (2001) become regarded as prominent experts. Gambling research is a field ripe for “policy entrepreneurs” whose primary purpose is to affect policy and who offer “unambiguous diagnoses even when the evidence is uncertain” (Krugman 1996, p. 11).

A number of organizations use gambling research in their lobbying efforts for and against expanded casino gambling. Published research referred to in lobbying efforts is not necessarily biased. Organizations that would like expanded casino gambling will cite research that supports their view just as opponents cite studies that reflect that perspective.

One example is the U.S. casino industry's lobbying organization, the American Gaming Association (AGA).¹ The AGA website lists a variety of "third party resources" on the casino industry. Included is contact information for academic and industry experts on a variety of casino-related topics.² One would expect that the experts listed on the AGA site would tend to look favorably on the casino industry.

There are more examples of anti-casino groups. One is "Focus on Family," a non-profit Christian organization opposed to casino gambling. Their website lists researchers and links to their papers.³ Aside from several summary papers the site lists only papers from Grinols (2 papers), Kindt (27 papers), and Thompson (1 paper). Another example is "Casino Watch."⁴ This Missouri-based organization uses the social cost estimate by Grinols and Mustard (2001) to derive an estimate for the costs of casinos in Missouri. A page from the Casino Watch webpage is reproduced in Fig. 8.1. Such use of academic research is common in the political arguments over casinos. Politicians and voters like such data that are easy to interpret and spin. Most politicians and voters do not take the time or effort to read and judge the cost-benefit analyses.

There are a variety of interest groups that would like to affect policy on casino gambling. These groups include the casino industry, religious organizations, and other business groups. Reviewing how these different groups demonstrate support for their positions on casino gambling does not necessarily say anything about the quality of the academic literature. This chapter examines some of the problems with gambling research.

The remainder of the chapter is organized as follows. Section 8.2 addresses scopes of expertise in the literature. Various calls for improvements of quality in the literature are described in Sect. 8.3. Section 8.4 provides general examples of problems that appear to be persistent in the economics of gambling literature such as failing to cite relevant literature or competing analyses. Section 8.5 discusses specific errors in gambling research, such as classifying gambling as a wasteful activity, and errors in the research on casinos and crime.

¹ The AGA webpage is at <http://www.americangaming.org>.

² Several years ago I was included as one of the experts on the AGA website. The AGA requests consent for individuals to be listed on its webpage.

³ The Focus on Family website is <http://www.family.org>.

⁴ Casino Watch is at <http://www.casinowatch.org>.

Cost of Gambling in Missouri Fiscal Year 2002

"The welfare of the people shall be the supreme law"

Missouri State Motto

Amount gambled (lost) in Missouri casinos	\$1,212,125,485
Revenue (tax) to the state (20%)	\$242,425,097
Population of adults in Missouri	3,997,000
Pathological gambling prevalence rate	1.50%
Pathological gamblers in Missouri	59,955
Cost per pathological gambler per year*	\$13,586
Crime	
Business and Employment Costs	
Bankruptcy	
Suicide	
Illness	
Social Service Costs	
Government Direct Regulatory Costs	
Family Costs	
Abused Dollars	
Cost due to addiction (59,955 x \$13,586)	(\$814,548,630)
Summary	
Cost due to addiction	\$814,548,630
Revenue to State of Missouri (20%)	-242,425,097
Loss to society/taxpayers	(\$572,123,533)
Loss to gamblers	(\$1,212,125,485)

* Source: Business Profitability vs. Social Profitability: Evaluating The Social Contribution Of Industries With Externalities, The Case Of The Casino Industry, Earl L. Grinols, Dept. of Economics, University of Illinois, David B. Mustard, Dept. of Economics, University of Georgia, December 2000



*"The definition of insanity is doing the same thing
over and over again and expecting a different result".*

Albert Einstein

Fig. 8.1. Social cost estimate used in anti-gambling advertising
Source: http://www.casinowatch.org/costs/gambling_costs_mo.html

8.2 Recognizing scopes of expertise

Gambling research is by nature interdisciplinary and different authors approach the measurement of costs and benefits in different ways. Most economists are adherents to the concept of “consumer sovereignty.” This is the assumption that the individual consumer knows better than other people what will make the individual the best off. The result is a more free-market attitude towards gambling and other goods and services than gambling researchers in other disciplines.

Economists who take an advocacy position begin to see other potential roles for government, perhaps protecting consumers from the negative consequences of their choices.⁵ A sociologist may examine the same issues but with a predisposition for government control of markets. Psychologists may not spend much of their research effort on examining the appropriate role of government in a free society. Some aspects of disagreement in the literature are the natural result of differences in academic disciplines.

Few economists have written on issues surrounding casino gambling. In contrast, sociologists, psychologists, political scientists, lawyers, and even environmental planners and architects have published on economic aspects of casino gambling in a variety of outlets. Many of these non-economists have had significant influence on government policy with respect to legalized gambling (U.S. House 1995; NGISC 1999). The problem is that these individuals often give “economic” arguments regarding legalized casino gambling even though their formal training is in some other field. The result is that they often confuse the issues.

One example of this is the confusion over the distinction between technological and pecuniary externalities as discussed in Chap. 6. Most authors simply consider any third-party effect to be an externality, even if it is clearly a transfer of wealth. Examples of this confusion are common. They include work by Thompson et al. (1997; see Chap. 6 of this book) and Kindt (1994, 1995, 2001). These authors have never acknowledged that externalities might be complicated.

⁵ For example, in the U.S. there has recently been debate over whether individuals should be allowed to control their own Social Security retirement funds. Opponents of private retirement savings accounts argue that individuals may make poor investment decisions. This perspective is a clear example of government attempting to protect individuals from their own bad decisions or bad luck.

Thompson (1996, p. 2) provides another example when he describes his “bathtub” macroeconomic model of the effects of casinos on local economies.⁶ He writes,

A casino analyst does not need to know rocket science, or know how to demystify Stonehenge. The application of the formulas of casino economics [does] not require the wizardry of brain surgery. The application uses only elementary arithmetic: addition, subtraction, multiplication, division, decimals, and percentages.

If this is the case there should be more high school student contributors to the gambling literature. In his article “Why Does Johnny so Rarely Learn any Economics?” Paul Heyne attacks the common perception that market economies are “simple” and easily understood:

It is a complicated system with billions of moving parts, in which everything depends upon everything else. That is the fundamental difficulty. The difficulty would be less if people weren’t convinced that the system is basically quite simple... If it is so simple, you don’t need any special knowledge to understand it. “I may not know much about economics,” people often say, “but I do know...” And then there follows some bit of incoherent but confident nonsense. The invincibility of such arrogant ignorance manifests itself in the contempt that these people have for “ivory-tower economists” who espouse academic irrelevancies like comparative advantage, marginal cost, and elasticity of demand. (Heyne 2001, p. 1)

One factor that may contribute to the problem of working outside areas of expertise is the natural overlap between economics and politics. In the U.S. and other free countries, everyone is entitled to his own opinion on political issues. These opinions may be based on numerous considerations including the opinions of others, self-interest, empirical or other scientific evidence, and ignorance. Economic theory often has policy applications. Since any *political* position is conceptually defensible, many laymen believe their opinions on economic policy issues are as valid as everyone else’s.

To point out the inherent danger, Heyne explains that although few people understand the physics behind keeping a bicycle balanced, most people can learn how to ride one.⁷ Furthermore, he writes,

⁶ Thompson’s model focuses on the importance of monetary flows to and from a regional economy. The issue is discussed in Sect. 3.5. Although there are some elements of truth in Thompson’s model, it is far too simplistic and does not accurately portray the economic effects of casinos on local economies.

we can hold a totally erroneous theory about bicycle balancing without getting into any trouble, unless we try to design the bicycle in accordance with our faulty theory. That is when we will get into trouble. In the economy, we can enrich one another without knowing how we do it. And we can maintain completely fallacious views of how any economy works without creating any great difficulties for anyone. But if our practical success generates excessive confidence in our erroneous theory, and we try to use that theory to improve the operation of the system, we can do a great deal of damage. (Heyne 2001, p. 1)

We need authors from numerous academic disciplines involved in gambling research because it is truly an interdisciplinary subject. We should all be cognizant of when we step outside our areas of expertise. Some economic issues such as externalities are very complicated even though they may, at first blush, seem to be common sense. Likewise, diagnosing and estimating the prevalence of pathological gambling is not necessarily straightforward. These issues are best left to experts in that field to discuss.

8.3 Calls for objectivity and transparency in research

In 2001 the editors of the *Journal of Gambling Studies* pleaded for gambling researchers to be careful in their public statements (Shaffer et al. 2001). In a young science such as gambling research, it is necessary for researchers to exercise care in revealing their opinions. One complication is the fact that public statements often must be brief with technical details and caveats dropped from the discussion.

More specific questions about research quality and legitimacy, particularly on the economic and social effects of gambling, have been raised in comprehensive analyses as well as in more narrow critiques. Comprehensive analyses include APC (1999), NGISC (1999), and National Research Council (NRC 1999, Chap. 5) while more specific ones include Eadington (2004), Walker (2004) and Walker and Barnett (1999). The NRC (1999, p. 186) explains, “most [studies] have appeared as reports, chapters in books, or proceedings at conferences, and those few that have been subject to peer review have, for the most part, been descriptive pieces.” The result has been questionable if not counter-productive research:

⁷ Heyne attributes the example to Michael Polanyi. By the way, people balance bicycles not by leaning in the opposite direction of a fall, but rather, by “[turning] the handlebars in the direction they are tipping so as to generate a centrifugal force that will offset the gravitational force pulling them down and to do this in such a manner that, for any given angle of imbalance, the curvature will be inversely proportional to the square of the cyclist’s velocity.” (Heyne 2001, p. 1)

In most of the impact analyses...the methods used are so inadequate as to invalidate the conclusions. Researchers...have struggled with the absence of systematic data that could inform their analysis and consequently have substituted assumptions for their missing data. (NRC 1999, p. 185)

An obvious example of this is in the social cost literature, discussed in Chaps. 6 and 7. In many of these studies, researchers use *ad hoc* methodologies to identify and measure costs.⁸ As a result, the annual social cost estimates have ranged from a “conservative” \$9,000 to above \$50,000 per pathological gambler.⁹

8.4 General problems in the literature

Much of the early research on the effects of gambling through the mid-late 1990s involved empirical estimates based on questionable methodologies. The published studies often appear to be “advocacy” pieces rather than scientific inquiries (Shaffer et al. 2001). The work by Arthur Andersen (1996, 1997), Goodman (1994a, 1995b), Grinols (1994a, 1995a, 2004), Grinols and Mustard (2001, 2006), Grinols and Omorov (1996), Kindt (1994, 1995, 2001), and Thompson and Quinn (2000) fall into this category. This type of work exhibits several common characteristics raising questions about its validity. In particular, these authors appear to have adopted similar research strategies, the results of which tend to inflate the social cost estimates they produce. Four such problems are addressed here.

8.4.1 Conflict of interest allegations

The casino industry has hired consulting firms to write studies on the economic effects of gambling. This type of research could be classified as “rent seeking” according to the discussion in Chap. 7. But the casino industry is not unique in this regard, as many industries hire consultants and researchers to study their markets or products. Nevertheless, research sponsored by the casino industry raises questions of conflict of interest. For example, Kindt (2001) simply ignores any research funded by the gambling industry. Conflicts of interest *may* taint the validity of research, but not necessarily. Rather than simply pointing to a potential conflict, specific errors in analysis must be shown in order to discredit research.

⁸ See Walker and Barnett (1999) and Walker (2003) for a more detailed review of the literature on social costs.

⁹ These estimates are by Thompson et al. (1997) and Kindt (1995).

As an example, I have been hired by governments, casino organizations, and conference organizers to do research. In each case, I was asked to do the research because of my previously published research, particularly dealing with the social costs of gambling. The Nevada Resort Association hired me to refute a paper by Thompson and Schwer (an early version of their 2005 paper). The reason I was asked to write the response was because I had already published a peer-reviewed journal paper on the topic that addressed the specific issues raised in the Thompson and Schwer paper. Kindt would likely say that my work should be automatically discounted regardless of the quality, simply because the work was funded.

Certainly, there are examples where funded research has produced spurious results. Arthur Andersen (1996, 1997) falls into this category. Their reports discuss various positive economic effects from casinos without justifying their methodology. In addition, the reports completely ignore any possibility that casinos cause economic or social harms.¹⁰

To be clear, funded research *may* be tainted but not necessarily (Rubin 2004, p. 178). There are two obvious problems with the argument that funded research is necessarily dishonest. If funding nullifies research findings, then all government-supported research may be invalid including most university research. In the extreme case, only unpaid volunteer researchers should be trusted. Second, and more importantly, scientific findings are not simply *opinions*. Questionable findings can be either supported or refuted by other researchers who repeat experiments, empirical tests, and analyses.

8.4.2 Dismissing research without refutation

Kindt (2001) uses *ad hominem* attacks rather than refuting arguments with which he disagrees. He demonstrates what C.S. Lewis called “Bulverism” (Lewis 1970, pp. 271–277) when one forgets that “you must show *that* a man is wrong before you start explaining *why* he is wrong.” Lewis (p. 273) describes its imaginary inventor, Ezekiel Bulver:

...he heard his mother say to his father – who had been maintaining that two sides of a triangle were together greater than the third – “Oh you say that *because you are a man*.” At that moment, E. Bulver assures us, “there flashed across my opening mind the great truth that refutation is no necessary part of argument.”

¹⁰ Ignoring costs, by itself, is not academically dishonest if costs are not the subject of the study.

Lewis (1970, p. 274) explains,

I see Bulverism at work in every political argument. The capitalists must be bad economists because we know why they want capitalism, and equally the Communists must be bad economists because we know why they want Communism. Thus, the Bulverists on both sides. In reality, of course, either the doctrines of the capitalists are false, or the doctrines of the Communists, or both; but you can only find out the rights and wrongs by reasoning – never by being rude about your opponent’s psychology.

Following this suggestion, commentators who believe research has been corrupted by the casino industry should answer two questions: “The first is, Are *all* thoughts thus tainted at the source, or only some? The second is, “Does the taint invalidate the tainted thought – in the sense of making it untrue – or not?” (Lewis 1970, p. 272). Instead, many who lob “bias” allegations do not bother to refute researchers with whom they disagree, ignoring the work completely or simply dismissing it as dishonest.

In an entertaining controversial example, Kindt’s *Managerial and Decision Economics (MDE)* article (2001) drew criticism from a number of researchers. The paper was invited for and published in an issue of the journal guest edited by Grinols and Mustard (who published one of their own papers in the issue). One problem with Kindt’s paper is that he criticizes other researchers, dismissing their work without refuting it. Rather, Kindt simply alludes to conflicts of interest. For example, Kindt (2001, p. 31) refers to Eadington as “a well-known apologist for the casino industry” but makes no attempt to refute Eadington’s research. Kindt uses a similar strategy in criticizing Shaffer (p. 27) and suggests that the *Journal of Gambling Studies* is under the influence of the casino industry.

It is unknown whether Kindt’s paper underwent a standard peer review; the article does not read like an academic paper. Of Kindt’s 108 references, only 6% were peer-reviewed articles; most are newspaper articles. There are 264 endnotes and 107 footnotes to the appendix tables. Aside from this, the paper is filled with stories, unsubstantiated allegations against researcher motivations, and other unscholarly argument. This is not the type of work that usually appears in peer-reviewed journals. Kindt’s writing is often published in law reviews.

The editor-in-chief of *MDE*, Paul Rubin, was also surprised and disappointed that Kindt’s paper had been accepted by the guest editors for publication (Rubin 2004, p. 177). Rubin decided to publish comments on Kindt’s paper in 2004 and allowed Kindt to reply to the comments. However, after reviewing the replies, Rubin wrote to him:

Based on the responses I am receiving, I am afraid that I cannot publish your replies. In my original letter...I indicated that "The comments and replies should avoid any *ad hominem* attacks. Moreover, they should deal with the paper and comments as written." You have not met either of these requirements. For one example, you routinely refer to anyone who disagrees with you as an "apologist for the gambling industry." This is the essence of an *ad hominem* attack. Moreover, as near as I and the authors can tell, your replies are almost completely unrelated to the comments....You have merely taken this opportunity to continue your attack on the gambling industry, but you have not satisfied the requirements of my original letter. In my Introduction, I will indicate that you have written replies but that I did not find them suitable for publication.... I am sorry that things worked out this way. However, you seem unable to engage in normal academic discourse.... (Rubin 2003)

Another example can be found in Thompson et al. (1999) though it is not nearly as serious as Kindt. In defending their earlier paper from the criticisms by Walker and Barnett, Thompson et al. write,

We reject criticisms of our model which say that *social costs* may not include costs that are imposed upon non-gambling individuals or groups of individuals while not being imposed upon all the members of society (Walker and Barnett, 1997).^[11] Our critics have suggested that we cannot call a theft a social cost. WE DO CALL A THEFT A SOCIAL COST.... We don't say our critics are wrong. Not at all. They are simply pursuing a different definition of social costs than we are pursuing. It is a matter of apples and oranges. (Thompson et al. 1999, p. 3)

Walker and Barnett simply pursue a different measure of social cost. Fair enough. However, Thompson et al. could have explained why their social cost measure is superior or otherwise preferable to that used by Walker and Barnett, and they give no such argument.

8.4.3 Ignoring published work

In his comment on Kindt's *MDE* paper, Eadington (2004, p. 194) identifies what appears to be a consistent and rather effective strategy of several staunch anti-gambling advocates:

...Kindt selectively chooses facts, opinions, sources, claims, and slogans that are consistent with his views toward gambling. He ignores or omits any studies or findings that might suggest anything else to be the case....Kindt and others

¹¹ The 1997 paper is an early draft of Walker and Barnett (1999) that was presented at a conference.

of the same persuasion toward gambling are trying to establish an “alternative reality” of the economic and social consequences of gambling, by getting their questionably valid research published in a number of respected outlets, and then continue to cite one another’s articles until the “alternate reality” becomes accepted.

The reader interested in specific examples should see Eadington (2004). Authors who appear to use this strategy of only citing material with which they agree as a method of advancing their ideas include Kindt, Grinols and Mustard, and to a lesser extent, Thompson et al. In addition, these authors rarely, if ever, acknowledge that their ideas are controversial. The problem in using this strategy is that it keeps relevant information from readers. Such a strategy is contrary to the spirit of academics.

Oddly enough, Kindt claims to have the same concern as I do about ignoring research. He is critical of researchers who do not address “important precedents such as the research article by Politzer et al. (1985),” the Task force in Maryland (1990), “Casinos in Florida” (1995) and Goodman (1994a) (Kindt 2003, pp. 16, 42).

Kindt expresses dismay at how researchers have made only “cursory, if any, citation to the [Politzer et al.] report and related literature” (Kindt 2003, pp. 20–21). Kindt ignores researchers who *have* addressed these papers, including Walker (1998a, 2003) and Walker and Barnett (1999).¹² It would appear that Kindt ignores these studies because they are critical of the Politzer et al. (1985) methodology. Even Lesieur, whom Kindt regards as “one of the leading researchers in gambling issues” and “well-respected” (Kindt 2003, pp. 17, 40) indicated that “I have regretted my editing and allowing publication of the Politzer et al. [1985] article on the costs of pathological gambling. It has been justifiably criticized” (Lesieur 2003).

Grinols and Mustard (2001) also appear to provide an example of ignoring relevant work in economics. The theme of the *MDE* issue in which the paper was published is “industries with externalities: the case of casino gambling.” In their discussion of social costs, Grinols and Mustard mention externalities generally. For example,

...casinos may generate positive or negative externalities. Positive externalities add value to the economy not reaped by the agent creating them, while negative externalities remove value not paid by the causing agent, following the usual definition. (Grinols and Mustard 2001, p. 145)

¹² The discussion of the Politzer et al. (1985) study in this book is in Sect. 6.5.1.

They provide the example of crime prevention which suggests they understand the distinction between technological and pecuniary externalities. However, there are also some hints or clues that they do not completely understand externalities. They do not cite any of the externality literature, and they suggest that “standard Pigouvian corrective theory for an industry with externalities is that it should be taxed by an amount equal to the costs that it imposes on society” (p. 155).

The first “hint” above is not, in itself, a problem. There is no need to cite historical literature if the topic in question is common knowledge, straightforward, or uncontroversial. But externalities are not straightforward. Regarding the second point, corrective Pigouvian taxes would not apply to pecuniary externalities. Suppose a new grocery store opens in a small town, significantly pushing up the demand for labor. If the market is somewhat competitive, then other firms may have to increase the wages they pay in order to retain employees. The higher labor costs for the existing firms represent a pecuniary externality. These costs may also lead to higher prices for groceries and other products for consumers. The higher prices would also be pecuniary externalities. Pigouvian taxes are usually applied only to technological, not pecuniary, externalities.¹³

In short, Grinols and Mustard may be aware of the distinction between pecuniary and technological externalities, and how it applies to casino gambling and social costs, but their discussion does not reflect such awareness. One would expect them to either be aware of the distinction and recognize it in their papers, or to explain why it is either obsolete or irrelevant.

Thompson and Schwer (2005) provide another example of ignoring published work. They utilize the methodology used by Thompson et al. (1997, 1999) in developing a social cost estimate for casinos in southern Nevada. However, they do not mention that their methodology has been criticized in the literature.¹⁴ This is not to say that Thompson and Schwer should exhaustively search the literature for attacks on Thompson’s earlier work, but research papers should include a reasonable literature review.

¹³ See Baumol and Oates (1988, pp. 29–32). The externalities issue is actually quite complicated but Grinols (2004) and Grinols and Mustard (2001) treat it as if it is very simple and straightforward.

¹⁴ Critiques include Federal Reserve (2003), Walker (2003), and Walker and Barnett (1999).

8.4.4 Failure to analyze/criticize work cited

A close relative of these problems is when researchers use previously-published studies as the basis for their research, yet fail to analyze them or point out potential flaws. As in the previous cases, the problem is that this practice may hide areas of disagreement and debate from readers and perpetuate shortcomings in the literature.

Grinols (2004, p. 171) and Grinols and Mustard (2001, p. 154, Table 4) estimate the social costs of gambling by simply averaging cost estimates from previous, mostly non-refereed (and flawed) cost estimates. Nearly all of the studies they use have been questioned or discredited, directly or indirectly, in the literature. Yet, Grinols and Mustard do not acknowledge the published critiques of these papers or their methodologies, nor do they analyze the papers themselves.

To their credit, Grinols and Mustard do acknowledge that the social cost literature is “fraught with ‘inadequacy and confusion’” (2001, p. 143). But they imply that the studies they use are all legitimate: “We used many strategies to ensure that the final estimates of costs per pathological gambler were lower bounds” (pp. 152, 154). In reality, most of the studies used by Grinols and Mustard to develop their cost estimate are flawed.¹⁵

8.5 Specific examples of errors

In this section I discuss some specific examples of problems in the literature, including ignoring research, the misapplication of economic concepts, and errors in specifying econometric models. In each of these examples, the author seems to be strongly opposed to casino gambling.

I do not provide examples here of problems where the authors appear to be pro-casino. These cases seem less common and outside the industry, there seem to be few academic proponents of casinos. Most pro-casino studies are performed by accounting firms hired by the casino industry (e.g., Arthur Andersen 1996, 1997). The potential errors in those analyses are too many to begin discussing here.

¹⁵ The studies include Politzer et al. (1985), Thompson et al. (1997), and Thompson and Quinn (2000), which have all been addressed earlier in this book. These studies or their methodologies have been criticized by the Federal Reserve (2003), NRC (1999), Walker and Barnett (1999), and Walker (2003), among others.

8.5.1 Gambling as a wasteful activity

Some authors have argued that gambling is a waste of time, or worse a “directly unproductive profit-seeking” (DUP) activity. Clearly, gambling is a form of entertainment, like golf, tennis, snow skiing, or watching television and movies. Some gamblers may develop a gambling problem, and we should be concerned with that. But it is inappropriate to classify gambling by professionals, for example, as a wasteful activity.

Yet, the “gambling is a wasteful activity” argument has been made by Grinols (1994a, 2004), Grinols and Mustard (2000), Grinols and Omorov (1996), Kindt (1994), and Thompson and Schwer (2005). For example, Thompson and Schwer (2005, p. 64) demonstrate a questionable understanding of why people gamble:

Some economists will argue that there is no economic gain from gambling activity as it represents only a neutral exercise in exchanging money from one set of hands to another. Indeed, as no product is created to add wealth to society, the costs of the exchange (time and energy of players, dealers, and other casino employees) represent a net economic loss for society.

Oddly, the authors do not claim to hold this view but suggest that “some economists” do. But Thompson and Schwer do not criticize the statement. They could have pointed out, for example, that this is the same thing that happens when someone pays to attend a football game or to enter a movie theater. They could have explained that no one would voluntarily “redistribute” his income to someone else if there was not *some* benefit to giving up the money. This is true even in the case of donating money to a church or other charity. The fact that Thompson and Schwer (2005) present this view without questioning it suggests they are sympathetic to the argument. They attribute the “gambling is unproductive” perspective to Paul Samuelson (1976). Indeed, their paper is named after Samuelson’s words “beyond the limits of recreation.”

There are numerous other examples of this perspective in the literature, although they are all due to a small number of researchers who seem to consistently argue that casino gambling is unambiguously harmful. For example, Grinols and Omorov (1996, p. 50) write, “Economists have long known that for many gamblers and those who provide them gambling services, gambling is in a class of activities called [DUP activities].” Yet they provide no citations to support this “long known” view. Grinols and Omorov do quote Bhagwati, Brecher, and Srinivasan (1984) in an apparent but subtle attempt to attribute this view of gambling to those authors.

Bhagwati et al. (1984, p. 292) define DUP activities as

ways of making a profit (i.e., income) by undertaking activities which are directly unproductive; that is, they yield pecuniary returns but produce neither goods nor services that enter a conventional utility function directly nor intermediate inputs into such goods and services.

From this definition Grinols and Omorov (1996, p. 50) argue that “an individual who does not gamble for utility value, but to acquire money engages in income-reducing directly unproductive activity.”¹⁶ Grinols and Mustard (2000, p. 224) make the same argument and give an example of when an individual “quits his job to earn a living as a professional blackjack or poker player, gambling for money and not for enjoyment, [and] reduces national income by his lost production.”¹⁷

Although the professional gambler represents a very small proportion of all gamblers, it is informative to analyze these claims in detail because the conclusions can be more generally applied to the claims about non-professional pathological gamblers and their reduced work productivity.

The apparent source of the idea that professional gambling may be a DUP activity is an economics principles textbook. Many of the anti-gambling activists selectively quote from a 25-year-old edition of Samuelson’s famous *Economics*. The specific passage describes an economic case against gambling: it “creates no new money or goods,” and “when pursued beyond the limits of recreation...gambling subtracts from the national income” (Samuelson 1976, p. 425).¹⁸ In a nutshell, the argument is that some people quit their widget-production jobs to become professional gamblers. If they do not enjoy gambling, then from society’s perspective, they are producing nothing of value. The net cost of this to society is the value of the widgets not produced, and GDP is lower. Grinols and Kindt consistently use this DUP argument in their opposition to legalized casino gambling.

It is unclear why researchers who quote this passage do not report other relevant material. For example, in the paragraph immediately preceding that quoted by Kindt, Grinols, etc., Samuelson writes:

Why is gambling considered such a bad thing? Part of the reason, *perhaps the most important part*, lies in the field of morals, ethics, and religion; upon these

¹⁶ Marfels (1998, p. 416) provides a valid but brief attack on Grinols and Omorov’s interpretation of DUP activities.

¹⁷ Grinols (1997) gives the same example. He is probably the most persistent proponent of this view.

¹⁸ This passage has been cited or quoted by Grinols (1994a, p. 8; 1995a, p. 8), Grinols and Mustard (2000, p. 224), Grinols and Omorov (1996, p. 50), Kindt (1995, p. 567; 2001, p. 19), and Thompson and Schwer (2005, p. 64).

the economist as such is not qualified to pass final judgment. (1976, p. 425, emphasis added)

On the very next page, as a footnote to his discussion, Samuelson explains:

The astute reader will note...the case for prohibiting gambling must rest on extraneous ethical or religious grounds; or must be withdrawn; or must be based on the notion that society knows better than individuals what is truly good for them; or must be based on the notion that we are all imperfect beings who wish in the long run that we were not free to yield to short-run temptations. Some political economists feel that moderate gambling might be converted into socially useful channels. (1976, p. 426, note 7)

After reading the context of the popular quotation, one wonders why researchers resort to making a selective reference to an old principles textbook in an attempt to convince readers that gambling is “bad.” Perhaps it is an attempt to appeal to authority, as Samuelson is a Nobel Laureate.

Samuelson’s *Economics* is now in its 17th edition and has a co-author. The discussion on gambling (Samuelson and Nordhaus 2001, pp. 208–209) retains a negative flavor, arguing that the activity produces nothing tangible and is “irrational.” When I asked Nordhaus about the negative tone in *Economics* and suggested that consumers actually do get utility from gambling, he replied, “You make several valid points.” However, he argues there are fundamental differences between “cocaine and compulsive gambling and ice cream and tennis shoes” (Nordhaus 2002).

In any case, Samuelson is not the only famous economist to have written about gambling. For example, Gary Becker (1992 Nobel Laureate) published a *Business Week* magazine article titled, “Gambling’s Advocates are Right – But for the Wrong Reasons,” in which he writes,

I support this trend toward legalizing gambling, although my reasoning has little to do with revenues....It would enable the many people who wish to place a bet to do so without patronizing illegal establishments and facilities controlled by criminals. (Becker and Becker 1997, p. 45)

Why gambling is not a DUP activity

There are numerous problems with the idea that gambling may constitute a DUP activity. One is tempted to sympathize with Ignatin and Smith (1976, p. 75), who write, “it is difficult to understand why economists, who believe that gamblers must lose, do not infer that the act of gambling must, therefore, provide utility.” Microeconomic theory suggests that most gam-

blers probably receive some level of consumer surplus (CS) from the activity as discussed in Chap. 2.¹⁹

Grinols and Omorov (1996) and Grinols (1997) do admit that gambling provides utility for many gamblers but say “professional” gambling may constitute a DUP activity. This is a surprising claim, especially considering that televised professional poker tournaments have become wildly popular in recent years. Even if the players do not enjoy the games, apparently many television viewers do. It is difficult to understand how poker players, any more than professional athletes or Hollywood actresses, are engaging in DUP.

Even if we accept the argument that professional gamblers reduce GDP, the whole idea seems contrived as an application to gambling. People often make choices for which, under an alternative choice, national income might have been higher. Are all such choices “bad” because they decrease national income from some potential maximum? GDP is not the perfect measure of well being, after all.

In terms of the gambler himself, even if he does not “enjoy” gambling, we must assume that all things considered he decides how to best spend his time. Even though he may not enjoy it his gambling career including the expected return must be preferred to any alternative career path, no matter how much utility he might have received. If he is successful, his income and purchases rise, which would lead to increased utility. If, on the other hand, the professional gambler fails to earn an adequate living, we expect him to turn to some other method of earning a living.²⁰

Scitovsky (1986, p. 192) writes “the active participants’ satisfactions from engaging in sex, social and competitive sports, social games, gambling, etc., depend on the availability of equally active participants as partners; and that kind of interdependence...is symmetrical.” Further, he notes,

in social activities, like bridge, chess, tennis, football, or gambling, each active participant both needs partners and provides one. In other words, he creates both demand and supply, which complement each other and are mutually offsetting. That explains why most such activities do not go through the market, which, in these cases, only performs the ancillary services of providing the tools, the premises, the training, the bringing together of partners, and occasionally provides a standby professional partner when amateur partners are not available. (p. 192)

¹⁹ For a discussion specific to gambling, see ACIL (1999, pp. 60–61).

²⁰ Consider, as another example, an entrepreneur who starts his own business. If the business fails, of course, the investor is not likely to “enjoy” the experience. Is failed entrepreneurship therefore a DUP activity?

Thus, even in cases when the professional gambler does not enjoy his “career” others may benefit from his choice.

DUP and rent seeking

Aside from these problems, a review of the DUP literature from the early 1980s makes it clear that gambling cannot technically be considered a DUP activity. Bhagwati (1982, 1983) and Bhagwati et al. (1984) reveal that DUP is the general class of activities that includes “rent seeking.” Bhagwati (1983, p. 635) writes, “I call DUP activities the set of phenomena that Tollison et al. call rent seeking.”²¹ Rent seeking was explained Sect. 7.3.2. In the case of a government-created monopoly, rents are available to a potential monopolist, and interested parties compete to win government favor. This lobbying for the monopoly privilege is rent seeking or DUP. Gambling lacks the characteristics required to classify it as rent seeking, since there is no artificially contrived transfer by government.

Bhagwati (1982, pp. 989, 991) christens the term DUP and explains that while most DUP activities are related to attempts to influence government policies, they “can in principle be government free or exclusively private.”^[22] Thus, effort and resources may be (legally) expended in getting a share of the ‘going’ transfer by an economic agent, what may be described as ‘altruism seeking’.” Given that Bhagwati leaves the door open for the possibility of private DUP activities, does gambling by a professional qualify?

Consider an example that follows directly from Bhagwati’s discussion. Suppose a church has announced that it will contribute \$1,000 to local charities. The administrators of soup kitchens and shelters might spend time and other resources “lobbying” the church for contributions. This lobbying constitutes DUP. It is important that, as Bhagwati notes, there is a “going transfer.” Otherwise, suppose a soup kitchen privately convinces a church to donate some money it had not initially intended to. This case is simply a voluntary, private transaction. The contribution was not going to occur *ex ante*.

²¹ Tullock (1981, p. 391, note 2) explains, “Bhagwati is attempting to get the term ‘rent-seeking’ shifted to ‘directly unproductive profit seeking, DUP (pronounced dupe)’. I do not like rent-seeking as a term and would agree that this revision of the language would be an improvement, but I suspect that it is too late to make the change now.”

²² Bhagwati and Srinivasan (1982, p. 34) also make this point. Bhagwati (1982, p. 994) and Bhagwati and Srinivasan (1982) explain that in some cases DUP activities may be welfare enhancing.

Is a casino bet by a professional gambler a “going transfer up for grabs”? No. It is *not* the case that the casino will transfer a certain predetermined amount of wealth and the various gamblers compete for casino favor. Rather, a betting player agrees to the rules of the casino game. The gambler cannot lobby such that he wins while excluding other players from the same opportunity. Each player that walks into the casino has the potential to win, regardless of other player performance.²³

DUP activities are wasteful behavior that is geared at receiving a transfer that is, by nature, *rival*. If one firm receives government consent to become a monopolist, other firms are necessarily excluded from the privilege. If soup kitchen A receives the \$1,000 church donation, kitchen B does not. In contrast, my placing a bet at a casino and winning does not preclude other players from also playing, or even making the same bets. Put slightly more formally, in a standard rent seeking/DUP case where n individuals compete for a monopoly right, $n-1$ of the individuals will be unsuccessful. In contrast, if there are n professional gamblers trying to make a living, it is *not* the case that $n-1$ or n minus some number >1 must be unsuccessful. All n gamblers may earn a positive return. Of course, in the long run casinos have the advantage.

A bet in a casino is a voluntary private market transaction between casino and player. There exists no *rivalrous* “artificially contrived” public transfer, nor a “going” private transfer that is up for grabs, and gambling is not a DUP activity.

8.5.2 Casinos and crime

There have been several recent studies of how availability of casino gambling affects crime.²⁴ Some researchers have attempted to estimate the costs of crime without first establishing a valid link between gambling and crime (e.g., Thompson et al. 1997). The social costs from crime have been described by Walker and Barnett (1999) and with an opposing perspective by Grinols and Mustard (2001). The issue of crime has obvious importance to the COI, economic, and public health perspectives on gambling (Sect. 7.4).

²³ An exception to this would be playing poker at a casino, where players compete against each other rather than against the casino. In some games (e.g., black-jack) one player’s actions can affect other players’ performance. A final exception might be a case in which the casino is filled to capacity so that a given player is unable to place bets.

²⁴ See Albanese (1985), Curran and Scarpitti (1991), Stokowski (1996), Stitt, Giacopassi, and Nichols (2003), and Thalheimer and Ali (2004).

Grinols and Mustard (2006)

Grinols and Mustard (2006) estimate that casino related crime costs every adult in the U.S. \$75 per year. This is an important study, perhaps the most comprehensive study on casinos and crime. It was published in the highly regarded *Review of Economics and Statistics*. As a result, this paper has the potential to spark replication studies and to be particularly influential in policy debates.²⁵

Crime rate data and associated cost estimates must be interpreted very carefully. Albanese (1985, pp. 40–41) explains,

Crime statistics can be extremely misleading when they fail to account for: (1) changes in the population at risk, (2) changes in criminal opportunities, (3) changes in law enforcement resources and priorities, and (4) changes in crime elsewhere in the State.

The Grinols and Mustard paper fails to account for two of the factors mentioned by Albanese. They do not account for changes in the population at risk or for changes in law enforcement resources and priorities. As a result, their crime rate statistics and cost estimates are unreliable.

Grinols and Mustard report that crime in casino and non-casino U.S. counties *fell* during the sample period (2006, p. 3, Fig. 1). However, crime rates in non-casino counties fell significantly more than in casino counties. They interpret this result as evidence that casinos lead to more crime. But their conclusion should come with a major caveat. The crime rate includes the crimes committed by visitors to casino counties, but it *omits* the number of visitors from the population measure.²⁶ The crime rate numerator increases while the denominator remains constant after casinos open. They omit visitors from the population measure because county-level visitor data are not available. The result is almost certainly an overstatement of the crime rate in casino counties.²⁷

²⁵ For example, a recent state-sponsored study of casino gambling in Indiana (PolicyAnalytics 2006) relied almost entirely on the Grinols and Mustard (2006) paper for its discussion of crime.

²⁶ The only case in which this would be the correct crime rate measure is when all casino-attributable crime was committed against residents. Obviously some crimes occur on casino grounds and/or against county visitors.

²⁷ Grinols and Mustard (2006, p. 7, note 13) attempt to consider the issue indirectly. They analyze the crime rates in counties containing national parks and find that when population is adjusted by visitors, there is not an increase in the crime rate for park counties. Then they compare national parks to Las Vegas, for which visitor data are available. If Las Vegas and park visitors had identical propensities to commit crimes, Las Vegas would need to have 59 million visitors to account for

Giacopassi (1995, pp. 4–5) explains the same problem that was evident in a 1995 report from the Maryland Attorney General:

One of the basic flaws [...] is the failure to report rates of crime taking into account the population at risk. In the *Uniform Crime Reports*, the FBI states that “understanding a jurisdiction’s industrial/economic bases, its dependence on neighboring jurisdictions, its transportation system, its dependence on nonresidents (such as tourists and convention attendees)...all help in better gauging and interpreting the crime known to and reported by law enforcement.” (FBI 1993, p. iv) The FBI cautions against “comparing statistical data of individual reporting units...solely on the basis of their population...” (FBI 1993, p. v.)

Giacopassi (1995, p. 7) gives an example that shows why it is a problem to omit visitors from the crime rate calculation:

Extending this method of calculating crime rates to the logical extreme, it would be possible to have a casino and to have a vast amount of crime in a jurisdiction where there were no residents. This presents a dilemma: with no residents, there would be no denominator in the crime rate equation, so there could be no “official” crime rate. Clearly, calculating crime and crime rates without taking into account the population at risk can lead to wildly inappropriate conclusions.

Other studies have addressed the crime issue while taking into account the visiting population, though Grinols and Mustard fail to recognize these studies. Albanese (1985) examines crime in Atlantic City. Once visitors and changes in police resources are included, the correlation between casinos and crime is weak. Curran and Scarpitti (1991) also analyze Atlantic City crime pointing out that a significant amount of crime may be casino-based rather than outside in the community. Since the proportion of residents to visitors at casinos is likely to be lower than in the community overall, crime statistics in casino communities will tend to overstate the crimes committed against residents. Stokowski (1996) studies the effect of casinos on crime in three small Colorado mining towns. Her study utilizes traffic count as a conservative proxy for the number of visitors. Like Grinols and Mustard, she finds that crime/population rises after casinos open, but accounting for visitors the crime/vehicle count actually falls after casinos open (Stokowski 1996, p. 67, Table 3).

Grinols and Mustard do demonstrate that some crime is attributable to the presence of casinos. More important is what they *do not* show, that the

its number of larcenies in 1994. Las Vegas had 30 million visitors. This implies that casino visitors are more likely than park visitors to commit crimes.

crime rate increases or that the risk of crime to county residents increases accounting for the number of visitors.²⁸ They also fail to account for changes in law enforcement, and to distinguish between casino-based and community crimes. Considering these issues, the Grinols and Mustard crime rates are questionable.

Aside from the above issues, the cost per crime estimates utilized by Grinols and Mustard (Miller, Cohen, and Wiersema 1996, p. 24) deserve scrutiny. These cost per crime data include as their largest component an estimate for “quality of life” losses.²⁹ As a result, the total estimated cost per rape is \$87,000 even though the tangible cost estimate is \$5,100. The difference of \$81,900 is presumably the quality of life cost. Crime victims experience a decrease in the quality of life but monetary estimates of these losses are controversial.³⁰ Grinols and Mustard do not explain why they chose these measures of cost over others. The U.S. Department of Justice (Klaus 1994) has an estimate that the average loss per rape in 1992 was \$234, far below the estimate from the Miller et al. (1996) tangible cost estimate. This is not to suggest that one cost estimate is more appropriate than the other but Grinols and Mustard did not adequately justify their choice.³¹

Although Grinols and Mustard (2006) attempt a comprehensive analysis of casinos and crime, their crime rate measure and costs attributed to each crime are tenuous.

²⁸ Another potential problem is that Grinols and Mustard do not account for casino size or volume. This would be related to the number of visitors to the casino county. They simply account for the opening year of the casinos. Although they note that casino profits and gross revenue are not available for Indian casinos, there are available proxies for casino volume. One such measure that is available is casino square footage (Walker and Jackson 2007a). Accounting for casino size might give a better indication of the relationship between casinos and crime.

²⁹ Grinols and Mustard (2006, p. 14) indicate that they use the “cost per victimization figures...” This must be the higher “total cost per victimization” figure rather than “tangible costs per victimization” (Miller et al. 1996, p. 24).

³⁰ For a discussion, see “Uncertainty of the estimates and sensitivity analysis” (Miller et al. 1996, pp. 19–23).

³¹ Grinols and Mustard (2006, p. 14) compare their cost estimate to that by Thompson et al. (1996). Walker and Barnett (1999) analyze the Thompson et al. study in detail and find that it greatly overestimates the social costs of gambling.

Gazel, Rickman, and Thompson (2001)

Gazel, Rickman, and Thompson (2001) is another study on casinos and crime that appears to be flawed. The paper claims to be based on the Becker model of criminal activity that criminal behavior is a product of rational decisions. In reality, the paper has little to do with Becker's analysis presenting a panel data model to explain crime in Wisconsin counties.

The most serious problem in the paper is the econometrics, the results of which are spurious. When the authors find that the casino variable is insignificant in explaining crime, they drop all other explanatory variables from the model. It is simply inappropriate to arbitrarily drop "insignificant variables and variables with coefficients of the wrong signs" and "all control variables" from the model (Gazel et al. 2001, p. 69). Obviously the remaining "County" variable for the existence of casinos will take on increased significance if all other variables are omitted.³² In nearly every model, the casino variable is insignificant until the authors begin toying with the model, dropping variables, and rerunning with only the casino dummy. In effect, the authors are ignoring the *t*-test results for the casino variable and instead making the argument that the joint significance of all variables is representative of the significance of the casino variable. The authors make no attempt to justify the practice that should have been a red flag to referees and journal editors.

Regressing crime rates on a constant term and a group dummy indicating the presence of legalized gambling in the county is strictly equivalent to conducting a simple means difference test to assess whether crime rates differ significantly between counties that allow gambling and counties that do not. There is a vast statistical literature indicating that simply because means differ by some categorical variable, there is no implication that they differ *because* of that variable. In this case, just because crime rates are higher in gambling counties does not mean that they are higher *because* of gambling. Crime rates are known to be higher in more densely populated areas and casino gambling is known to have a very high threshold in the minimum number of consumers required for provision. One would expect to find casino gambling in more densely populated areas. We should not be surprised to find crime rates higher in areas with casino gambling but any causal inference is purely spurious.

Another shortcoming of the model is that the authors completely ignore the amount of police enforcement in the counties. Obviously the number of

³² The empirical model is a bit confusing because in the description of the model in the text uses different notation than the tables. It appears that "County" refers to the dummy variable for whether casinos are open in a particular county.

crimes that show up in official records will depend to some extent on the amount of police resources in the county. Fewer police will likely catch fewer criminals. Yet the authors do not mention this as an important variable to explain the amount of crime showing up in the statistics.

8.5.3 Grinols' *Gambling in America*³³

Grinols' recent book (2004) provides its readers with a comprehensive view of his perspective on gambling and illustrates some research problems (Sect. 8.4). In the first four chapters, Grinols discusses the history of gambling among other issues. In Chap. 5, he develops a formal cost-benefit model of gambling that appears to be adapted from Grinols and Mustard (2001). Items included on the benefits side of the ledger include net increase in profit measured across all businesses, net increase in taxes measured across taxpayers, consumer surplus, distance consumer surplus, capital gains to consumers induced by the activity, and gains from relaxation or elimination of non-price constraints on consumer choices (p. 97). Only "real resources consumed to deal with harmful externalities" appears on the cost side.³⁴

Grinols simply drops CS from the analysis, and explains

A reasonable first approximation is that the net effect of a casino on capital gains and consumer surplus considerations is small. If firm and household prices are invariant to the amount of gambling..., capital gains on endowments and consumer surplus drop out. (Grinols 2004, p. 107)

This treatment of CS seems unusual and inappropriate. Grinols argues that the only benefit from having new casinos is a "distance consumer surplus" since the gambler does not have to travel as far to a casino. Should the first casino in Mississippi, for example, be treated as a new product or "brand" of entertainment in that market? There is an entire literature on the effects of increased variety for consumers.³⁵ Certainly there are benefits to having Amazon.com other than the fact that consumers do not have to drive as far to shop. Increased product variety is beneficial but Grinols completely ignores it.

³³ This discussion is adapted from Walker (2007a).

³⁴ This statement is consistent with a proper understanding of technological externalities.

³⁵ For example see Lancaster (1990), Hausman (1998), Hausman and Leonard (2002), and Scherer (1979).

It is also unclear why Grinols thinks casinos do not create any significant traditional CS. Casinos are often coupled with other products, usually restaurants and hotels. To the extent these put downward pressure on prices in the local restaurant and hotel markets, CS would be created by a new casino. Even on the casino games themselves, there is price competition. For example, casinos will advertise that their slots pay out a greater percentage, or that craps players can bet “10X odds” rather than the standard 2X odds. Such competition could result in CS.

The chapter on social costs has very serious problems. Although Grinols addresses most of the standard social cost issues that have been examined in the literature (crime, employment and productivity losses, bankruptcy, suicide, social services costs, and regulatory costs) he completely ignores the remarkable level of controversy surrounding how to handle these issues. He goes on to summarize the findings of several cost-benefit studies that were performed during the 1990s, and estimates the annual cost to society per pathological gambler at \$10,330 (Grinols 2004, p. 171).³⁶ This estimate is seriously flawed because it is composed mostly of wealth transfers or costs to the individual gamblers. The studies have been criticized in the literature and their credibility has been questioned. Grinols ignores any such controversy and does not bother to analyze the studies himself, resulting in an inflated social cost estimate.

Finally, the social cost chapter includes a full *20 pages* of examples of newspaper clips and other examples of the personal and economic damage cause by casino gambling. Similar stories and statements are peppered throughout the book. Rarely does Grinols hint that there is a legitimate argument that casinos may create a net benefit through providing jobs, price competition, variety benefits to consumers, or economic development. Grinols ignores any literature that might suggest such benefits. Even though Grinols indicates that he has no moral objection to gambling (p. 11) the reader may suspect that he sees casino gambling as a “merit bad” as is discussed in Chap. 9.

Overall, Grinols underestimates the potential consumer benefits from casinos. His reliance on flawed studies to estimate social costs results in an overestimate of the social costs of gambling. Unfortunately, the reader who is not already familiar with the economics of gambling will be left with an incomplete picture. As discussed above, Grinols generally does not cite the relevant economics literature in justifying his methodology, nor does he make any reference to gambling research that does not agree with his conclusions. As a result, it is important for the reader interested in the economics of gambling to seek resources *not* cited by Grinols.

³⁶ This appears to be the same discussion as in Grinols and Mustard (2001).

8.6 Conclusion

This chapter offers a review of some of the more serious problems that plague the economics of casino research. In some cases, problems stem from apparent research strategies that have been adopted in order to derive high social cost estimates. In other cases, errors may be due to researchers going outside their expertise. The economics of gambling is still young and improving. At this stage readers must still be careful to evaluate the merits of the arguments they are reading.

Academic debate is a healthy and important catalyst for moving scientific understanding forward. I agree with the *Journal of Gambling Studies* editors (Shaffer et al. 2001). As the gambling literature continues to develop we must be careful to distinguish between our personal opinions and conclusions which are supported by quality empirical data or analysis.

9 Conclusion

9.1 Introduction

The worldwide expansion of the casino industry is controversial. Economic research on the industry has been less than enlightening. This is because it is a new area of research, there is no agreed-upon methodology to identify and evaluate benefits and costs, and researchers approach the industry from different academic disciplines.

Policymakers are interested in the economic effects of casinos, especially the potential for economic growth and increased tax revenues. Unfortunately, the literature has provided little help. My goal in this book has been to give the reader a mainstream economic perspective on casino gambling and its economic effects while highlighting some of the major areas of contention.

This final chapter reviews the issues discussed in the book and how gambling research has affected policy toward the industry. I also explain my perspective on how research *should* affect policy. The remainder of the chapter is organized as follows. Section 9.2 summarizes the economic topics discussed throughout the book. Section 9.3 is an introduction to some of the psychology and sociology topics relevant to the social costs of gambling and casino policy. In Sect. 9.4, I discuss the criteria on which casino policy is and should be based. I argue that more emphasis should be placed on the relationship among private property, freedom of choice, and the role of government in a free society. Section 9.5 concludes.

9.2 Summary of economic issues

The discussion in this book covers issues on the benefit and cost side of the casino gambling debate. In the first few chapters we discussed the economic benefits from legalized casinos. The introduction of a new good like casino gambling can have a number of possible economic benefits. The

later chapters examine the social cost of casino gambling. This is a complicated area in the literature because it is not well developed and different researchers have different perspectives on what constitutes a social cost. Because of the uncertainty on both the benefit and cost side of the equation, a reliable monetary estimate of the economic effects of casino gambling is not available.

9.2.1 Benefits

The potential economic benefits from casino gambling include economic growth, consumer benefits and increased tax revenues. The effects of casino gambling on economic growth were discussed in Chap. 2. Some of the common misconceptions about the growth effects of the casino industry were discussed in Chap. 3. The most common misperception is that the casino industry grows at the expense of other industries resulting in no overall positive effect.

A flourishing casino industry may have positive effects on the labor market. The casino industry is labor intensive and the expansion of the industry is likely to increase overall employment in the host economy even if some competing industries are harmed.

Peer-reviewed econometric evidence suggests that the casino industry has a positive effect on regional economic growth. Chapter 4 is an examination of the evidence based on U.S. casino data from 1991 to 1996. A preliminary examination of more recent evidence (1991–2005) indicates that the growth effect from casino gambling may not be long-term. The explanation for these mixed results is not straightforward and the issue warrants further investigation. To the extent casinos do stimulate economic growth, even in the short-term, local economies may use casino gambling as a revitalization tool and to attract new tourists.

Even if casino gambling did not have a positive effect on economic growth the industry's expansion would still benefit consumers who enjoy gambling. This is by far the most neglected benefit of the casino industry. Researchers and policymakers often ignore this issue focusing instead on tax or employment effects. Consumers benefit from the availability of casinos because they are able to enjoy a wider variety of entertainment options. Casinos are often accompanied by restaurants and hotels which lead to increased competition, lower prices, and increased consumer surplus.

Policymakers usually focus on the potential for increased tax revenues with casino legalization/expansion. Such revenues can be used to provide more services for citizens or to reduce existing budget deficits. Although the gains to government are offset by the taxpaying casinos, the general

public may prefer taxes on casino revenues to sales taxes or other less avoidable taxes.

The relationships between the different U.S. gambling industries were examined in Chap. 5 using data from 1985 to 2000. Although one might assume that the different forms of gambling would be substitutes for each other the empirical results are mixed. Some industries act as substitutes (casinos and lotteries) and others appear to be complementary (casinos and horse racing) at least in the U.S. The mixed results suggest that jurisdictions should be careful to analyze local conditions and interindustry relationships to determine how adding a new gambling industry could affect existing industries and overall tax revenues. The extent to which casinos affect tax revenue depends on the size of the industry, its effect on other industries, tax rates, and other factors.

Chapters 2–5 provide a foundation for future empirical research on the economic growth, employment, and tax effects of the casino industry. Now that the casino industry is well established in a variety of countries, data are available for more empirical studies.

9.2.2 Costs

The social and economic costs of casino gambling are even more controversial than the benefits. As Chaps. 6–8 have shown, there is an enormous amount of debate over almost every detail of social cost studies. Even if we eventually agree on a definition of “social costs” actually measuring their value presents a host of other problems.

Social cost research has been surprisingly influential with policymakers. Evidence of this can be seen in the U.S. House (1995) and the NGISC (1999). The influence of many of these studies has arguably been counterproductive in promoting understanding of the casino industry and its economic effects. The most common and fundamental problem is that most cost-benefit studies have not defined what exactly they are trying to measure. Exacerbating the problem is the fact that many authors make arbitrary assumptions in their analyses that have dramatic effects on their results.

We cannot simply try to estimate monetary values for any and all negative effects that are remotely connected to casino gambling. Pathological gamblers certainly engage in some anti-social and costly behavior but estimating the values of these costs is tricky. We must be sure that the costs decrease overall wealth in society. We must also take account of comorbidity and develop a mechanism of allocating costs among coexisting disorders.

Some of the social costs of gambling are connected to government programs and spending. These vary across country. In some cases such costs may be considered more a cost of a policy rather than a cost of pathological gambling disorders. These issues raised in Chaps. 6 and 7 are meant to raise awareness of the difficulties is properly estimating the social costs of gambling.

9.2.3 General problems

Aside from confusion over specific cost- or benefit-related issues there are some general problems in the research. These issues are discussed in Chap. 8. Authors have relied heavily on flawed studies and have ignored other relevant studies in the literature. We have discussed specific examples of these errors. My hope is that this discussion will incite readers of this book to read more of the casino gambling literature. It is a fascinating and controversial research topic.

9.3 Prevalence of pathological gambling

The psychology/sociology literature dealing with diagnosis, prevalence, and treatment of problem and pathological gambling is also controversial and interesting, especially as it relates to government policy.

The *DSM-IV* (1994) and SOGS (Lesieur and Blume 1987) are examples of pathological gambling screening instruments that outline criteria that may characterize pathological gambling behavior.¹ The diagnostic criteria from the *DSM-IV* are listed below. A person may be diagnosed as being a pathological gambler if described by five or more of the following conditions (*DSM-IV* 1994, p. 618):

The person...

1. is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)

¹ The discussion here is general and ignores many details. There are different levels of problematic gambling behaviors (problem or pathological gambling). In the discussion above, I simply lump these behaviors into “pathological gambling.” Readers interested in details of this issue should consult the diagnosis, prevalence estimation, and treatment literature.

2. needs to gamble with increasing amounts of money in order to achieve the desired excitement²
3. has repeated unsuccessful efforts to control, cut back, or stop gambling
4. is restless or irritable when attempting to cut down or stop gambling
5. gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
6. after losing money gambling, often returns another day to get even (chasing one's losses)
7. lies to family members, therapist, or others to conceal the extent of involvement with gambling
8. has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling
9. has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
10. relies on others to provide money to relieve a desperate financial situation caused by gambling³

It is not my purpose here to analyze the different criteria or the different classes of gambling problems. The important point is that researchers have developed prevalence estimates based on screening devices such as above. The APA estimates that between 1–3% of adults in the U.S. are afflicted.⁴

In most social cost studies, authors use prevalence estimates in order to estimate the social costs of gambling in a particular region. Studies that have done this include Grinols (2004), Grinols and Mustard (2001), Thompson et al. (1997), and Thompson and Schwer (2005).

To illustrate, Thompson and Schwer (2005) estimate the social costs of gambling in southern Nevada (Las Vegas) using prevalence and social cost data from other researchers. Table 9.1 shows some of the calculations from which they arrive at a maximum social cost of gambling estimate for southern Nevada. It should be noted that these figures are based on a number of arbitrary assumptions.

² This condition could be considered to be normal according to the law of decreasing marginal utility introduced in the appendix.

³ This criterion, along with item 8 was discussed in Table 7.1. It may be difficult, if not impossible, for a gambler to correctly/accurately attribute these to gambling alone.

⁴ This figure is admittedly old, but diagnosis and prevalence are issues beyond the scope of this book.

Table 9.1. Thompson and Schwer's social cost estimate

Diagnosis	Preval. est. (% pop.)	Preval. est. (# people)	Est. cost per gambler (per year)	Total est. cost (per year)
Pathological gambler	3.5%	38,571 adults	\$10,053	\$387.8 million
Problem gambler	2.9%	31,959 adults	\$4,926	\$157.4 million
			Total cost	\$545.2 million

Source: Thompson and Schwer (2005, pp. 84–85, Table 8)

Such cost estimates are often quoted by politicians and the media in their discussions over the costs and benefits of casino gambling. An earlier version of the Thompson and Schwer paper was widely publicized by the Las Vegas press and was the apparent catalyst for a discussion among politicians on raising casino taxes in Nevada. The PolicyAnalytics report (2006) was submitted to policymakers in Indiana for their consideration in altering their policies toward casino gambling.

9.4 Foundations of gambling policy

Government policy toward casino gambling appears to be based on cost-benefit analyses and expectations of casino tax revenues. Researchers, policymakers, voters, and the media implicitly accept that this is the appropriate information to consider in making such policy decisions. Why?

Politicians may be interested in making their society a better place and support policies that they believe will do this. Obviously, there are disagreements among reasonable people on how a particular government policy may affect overall welfare.

In the context of legalized casino gambling, cost-benefit analysis is perhaps the best tool available to inform policymakers and voters but these studies are often primitive in how they approach the issue. Many of the most important elements of a cost-benefit analysis of casino gambling defy measurement. *No* monetary estimate may be better than some of the estimates that have been published in terms of the quality of information these studies provide to policymakers. Improvements in the quality of research are sure to be slow coming, as researchers have yet to settle fundamentals.

But this is not due to a lack of trying as the conferences in Whistler (2000) and Banff (2006) demonstrate.

A primary concern of politicians is raising tax revenues to fund the programs they support. From the politician perspective, taxing casinos is a relatively painless way to raise revenue. The industry is usually “created” in a jurisdiction by relaxing legal prohibition of casino gambling. This means that the politicians can create unique tax rules for the industry. In addition, consumers are not required to pay the tax since it is avoidable by not gambling.

9.4.1 Are cost-benefit analyses useful?

With so many problems in performing cost-benefit analyses, one is inclined to wonder whether researchers should even attempt to do such studies of the casino industry. In a discussion of the literature on the cost of alcohol and drug abuse, Reuter (1999) and Kleiman (1999) suggest that research effort may be better spent estimating the impacts of *policy changes* rather than absolute levels of costs and benefits. The same argument might apply to casino gambling. But there is a demand for cost-benefit studies, as Reuter (1999, p. 638) explains:

No senior political figure can afford not to have a number to offer as an indicator of the seriousness of the problem with which her agency deals. The number should be current and have a scientific basis to be credible; that it may have basic conceptual flaws is probably not relevant because there is little organized interest in discrediting it.

As for the value of cost studies like that by Harwood et al. (1999), Reuter (1999, p. 638) writes, “[the study], although an enormously helpful compendium of a wide range of estimates of various components of something that might be called cost, is an unsatisfactory answer to a question of dubious importance.” The same could be said of the cost estimates published by Goodman, Grinols, Kindt, Thompson, and others.

It is easy to understand why cost-benefit analyses and tax revenue projections are influential in casino policy. There may be no better analytical tools on which to rely. But one could argue that these should not be the primary considerations for determining legality of casino gambling.

9.4.2 Property rights, freedom of choice, and government

An issue that has been almost completely ignored in the literature and in political discussions is the relationship between property rights, freedom of choice, and the role of government in a free society. Obviously, these issues will play different roles in different countries depending on the form of government.

In a free society where personal liberty is valued, individuals have the right to do as they please with their property and their money so long as their actions do not harm others. Government is created by citizens to protect these rights, and to protect individuals from harm caused by others. Exactly how do casino gambling, pathological gambling behaviors, and other related issues fit into this conception of rights and government?

Peter Collins' book *Gambling and the Public Interest* (2003) provides an excellent discussion of these fundamental issues. He explains that a commitment to individual freedom is the most compelling reason to think that gambling should be legal. He writes,

Freedom consists in the right to make bad choices as well as good ones, and a society that seeks to protect people from the consequences of bad choices in matters of lifestyle by taking away their freedom to choose at all violates their fundamental rights and assaults their dignity as persons. (p. 49)

Collins explains that he believes the arguments for casino legalization are stronger than those against it. He also believes that the casino market should be regulated by government (Collins 2003, p. 49).

Of course, individuals who have different political beliefs will reach different conclusions. Such is the nature of political issues. Whether or not one agrees with Collins, I believe that he commendably sums up public policy toward casinos and the duty of gambling researchers:

Whether gambling should be legal is a question for public policy and as such is a question the answer to which requires a combination of normative and empirical judgments. This means that the answer we give will depend in part on the political principles and social ideals to which we subscribe, as well as on what we think as a matter of fact will be the likely consequences of adopting one policy rather than another....Consequently if debate about these matters is to be honest and constructive, it is essential that people be candid and explicit about the moral judgments that underpin these principles. (Collins 2003, pp. 27, 29)

This view is consistent with the editors of the *Journal of Gambling Studies* (2001), in their “appeal for scientific maturity.” Researchers should strive to be transparent in explaining their perspectives on gambling.

My opinion as an economist, based on my research during the past decade, is that the overall economic and social effects of casino gambling are positive. My beliefs about property rights, freedom of choice, and the proper role of government in a free society also lead me to support the legalization of casino gambling. I believe that individuals have the right to decide for themselves how to spend their money as long as these decisions do not violate the rights of other people.

9.4.3 Externalities revisited

In light of Collins’ work on the ultimate basis for decisions on the legality and regulation of casino gambling, it is worthwhile to reconsider the importance of externalities in the debate.

In the gambling literature, the concept of “externality” has been applied very loosely by Grinols and Mustard, Kindt, and Thompson et al., among others. Many individuals view gambling regulation as a legitimate role for government because of the externalities involved.

I would argue that most researchers have ignored or misrepresented the perspective on externalities and that the magnitude of these problems as they relate to pathological gamblers is almost always overstated in the literature. But there is no doubt that pathological gambling behaviors can cause technological externalities. There are certainly some people whose gambling ruins their lives, the lives of family and friends, and even affects individuals they do not know. To many people, this potential loss justifies some level of government intervention.

9.5 Conclusion

It is apparent that many researchers, politicians, media members, and voters view gambling as a “sin good,” as demonstrated by Gross (1998, p. 217):

my sense is that gambling, just like alcohol, tobacco, drugs, and prostitution, is a “sin good” and should be addressed accordingly. The public debate raging regarding cigarette smoking is witness to the importance and complexity involved in such commodities.

This “sin good” argument against gambling is analogous to the argument for publicly funding the arts or “merit goods,”

commodities that ought be provided even if the members of society do not demand them. Government support of the fine arts is often justified on this basis. Operas and concerts should be provided publicly if individuals are unwilling to pay enough to meet their costs. (Rosen 2005, p. 49)

There are members of society who believe others should not be allowed to gamble because it is “bad” or immoral behavior – a merit bad. As Rosen explains, these types of goods are “just the opposite of ‘merit goods’ and are viewed as being bad per se. In both cases, the government is essentially imposing its preferences on those of the citizenry” (Rosen 1992, p. 494).

Perhaps some of what we see in the gambling literature is the result of authors viewing casino gambling as a merit bad. Some people are doubtful about the virtues of legalized casinos because of its historically illegal status.⁵ Most people however now apparently view casino gambling as a harmless form of entertainment.⁶

A first step toward improving casino research and policy is for authors to be honest about their views on these issues as they pertain to casino gambling. Even if all of the significant research questions could be answered, all the economic and social effects of casinos understood, and effective pathological gambling treatment developed, the fundamental questions raised by Collins (2003) would remain. These are the important questions: the relationship between property rights, freedom of choice, and the role of government in a free society.

Until researchers, politicians, the media, and voters begin to address these issues, research and government policy on casino gambling will keep moving on its current path, for better or worse.

Policy debates have moved away from the fundamental issues. Instead, we tend to base policies on cost-benefit analyses and expected tax revenues. As long as these are the criteria on which we base public decisions, researchers should strive to improve the quality of research as much as possible.

⁵ Grinols (2004) discusses the history of gambling bans in the U.S.

⁶ According to the AGA (2006, p. 34), over 50% of the U.S. public believes that gambling is “perfectly acceptable for anyone.” Another 29% believe that gambling is “acceptable for others, but not [me].”

Appendix Primer on microeconomics

This appendix provides an introduction to some of the economic tools used in this book. It is written for non-economists. There are three basic tools explained: the production possibilities frontier, the indifference curve, and producer and consumer surplus. An introduction to supply and demand is also provided. These tools are explained in the appendix using general examples and are applied to casino gambling throughout the book.

A.1 The production possibilities frontier

Economists use the production possibilities frontier (PPF) to model production by an individual, group of people, or economy. For simplicity, we begin by considering an economy in which only two goods are produced: beer and pizza.¹ The production possibilities frontier (Fig. A.1) illustrates the production choices faced. Using all available input resources efficiently, the PPF shows all of the possible maximum combinations of beer and pizza that can be produced. The shape of the PPF – concave to the origin – implies an increasing opportunity cost of production as the quantity of production rises. That is, the cost of producing pizza in terms of beer sacrificed increases as the economy produces more pizza.² The reason is that resources are not equally well-suited for production of the different goods. So as the production of a particular good or service increases, the additional inputs are less suited to the production of that good. The result is increasing marginal (or incremental) production costs.

The slope of the PPF represents the opportunity cost of production. The steeper the PPF, the higher the opportunity cost of pizza, since more beer must be sacrificed to incrementally increase pizza production. The flatter

¹ The simplification of a two-good economy is not a serious problem. We could instead use beer and “all other goods,” which would be a perfectly realistic, though a more general, example.

² This PPF shape corresponds to the standard positive-sloped supply curve, discussed below.

the PPF, the higher the opportunity cost of beer in terms of pizza. The slope of the PPF is called the marginal rate of transformation (MRT).

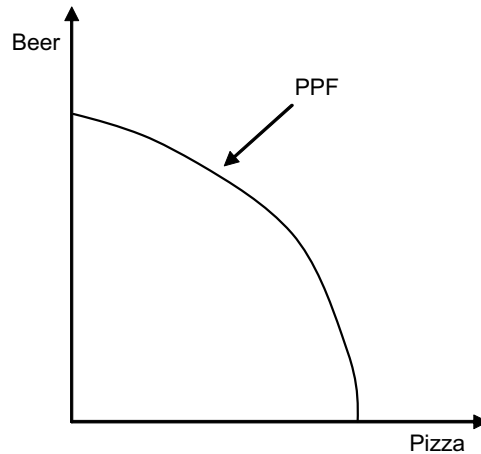


Fig. A.1. Production possibilities frontier

A technological advance in pizza production (if, for example, an automatic dough machine is introduced) would cause the PPF to rotate out along the pizza axis (Fig. A.2). Note that an increase in pizza technology may allow society to produce and consume more pizza *and* beer by moving from point *a* to point *b*.³

Without knowing something about the preferences of the individuals in society (discussed below) we cannot say that one point on the frontier is better than any other. For example, in Fig. A.3, we cannot say that point *b* is better than *c* or vice-versa. We do know, however, that each point on the frontier is, by definition, efficient. This type of efficiency is “technological,” referring to the situation in which output is maximized given inputs, technology, etc. Stated differently, technological efficiency occurs when a given level of output is produced with the least possible amount of resources. If production occurs on the PPF then input resources are not being wasted. Point *a*, on the other hand, exhibits waste, unemployment or inefficiency because with the level of technology and inputs, the economy

³ This is because pizza production has become more efficient. The same amount of pizza can now be produced in less time or with less labor or other input resources.

could produce more (say at point *b*). However, it is not possible to produce at point *d* or any other point outside the PPF because of input and/or technological limitations.

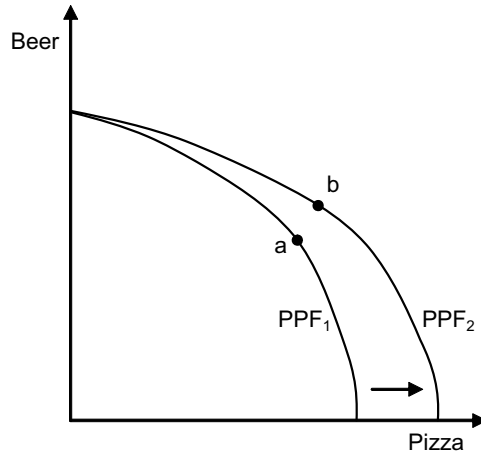


Fig. A.2. Technological advance in the pizza industry

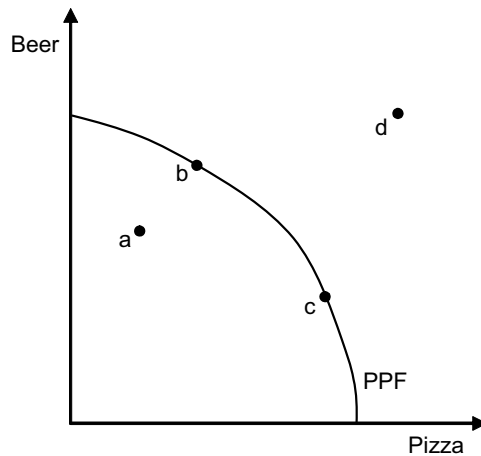


Fig. A.3. Efficient, inefficient, and unattainable production points

From the consumer perspective, we can compare the points on the frontier with many of the points off the frontier. For example, in Fig. A.3, d is preferred to a , b and c , since the former includes more of both goods than the other three points. But d is unattainable. We can also say that b is preferred to a . However, we cannot necessarily say c is preferred to b since it has more pizza but less beer.⁴

The ranking of various points can be summarized as in Fig. A.4. All points in quadrant I are preferred to point e and point e is preferred to all points in quadrant III . This is because each point in quadrant I either has more beer, more pizza, or more of both goods compared to point e . Similarly, bundle e contains either more pizza or beer, or more of both goods, compared to all the combinations in quadrant III .

We cannot legitimately rank the points in quadrants II or IV relative to point e . For example, all combinations represented in quadrant II have more beer than point e but less pizza. So unless we know something about preferences, we cannot compare points in II with point e . Similarly, combinations of goods represented in quadrant IV have more pizza but less beer than point e making a ranking of the points impossible without more information on preferences.

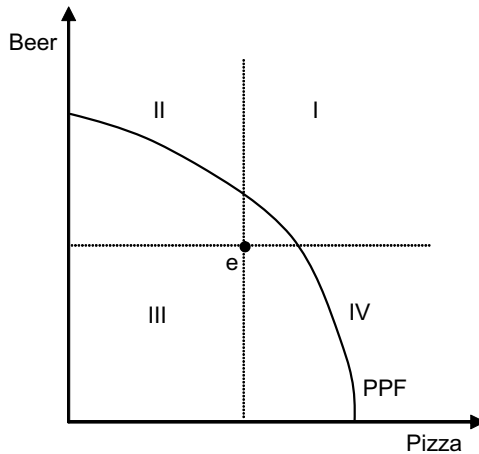


Fig. A.4. Ranking consumption points

⁴ “Allocative” efficiency refers to the situation in which the market is producing the optimal mix of goods considering preferences.

A.2 The indifference curve

An indifference curve (IC) for an individual or society is the collection of points that represent indifferent combinations of two goods. We can develop an IC using the information in Fig. A.4. Any point in quadrant *I* is preferred to *e* and *e* is preferred to any point in quadrant *III*. More is always better than less. If society is initially producing and consuming at point *e* then we would be better off given more pizza. For us to be indifferent between this new situation and the original one at *e*, we must give up some beer which would reduce well being. So the IC must have a negative slope.

The specific shape of the IC results from the law of decreasing marginal utility, the idea that each additional unit of consumption tends to provide less and less additional (marginal) benefit. With pizza and beer, the IC would appear as indicated in Fig. A.5.

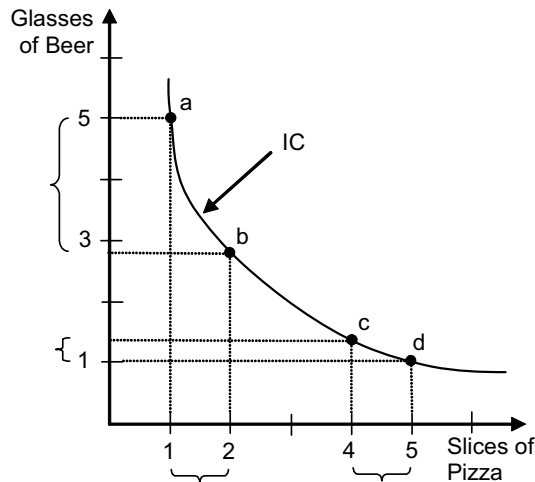


Fig. A.5. Indifference curve for beer and pizza

Four example points are shown. Since they all lie on the same IC, the consumer is indifferent among them. The law of decreasing marginal utility can be illustrated by considering how much beer the consumer would be willing to give up for another slice of pizza and remain as well off. Consider two cases: movement from point *a* to *b* and from point *c* to *d*; each move represents a one unit increase in the amount of pizza. Recall

that a person must remain as happy as before getting the additional slice of pizza in order to remain on a given IC. When a person has little pizza and a lot of beer, the marginal utility of beer is low and for pizza it is high. This suggests the willingness to give up a lot of beer for another slice of pizza. But if a person has more pizza, say at point c , his willingness to sacrifice additional beer for another slice of pizza is lower. The result is a convex shape for an IC between the two goods.⁵

Since the gambling issue is social in nature (i.e., whether or not to legalize it is not an individual decision), it will be useful to think of a “community indifference curve” rather than an individual IC.⁶

Now that the shape of the IC has been explained, there are several important characteristics to keep in mind. As Ferguson (1966) explains, every point in commodity space lies on one (and only one) IC, and there is an infinite number of ICs for any two goods. Furthermore, ICs cannot intersect. The proof is simple. In Fig. A.6, note that point a lies on both IC_1 and IC_2 . Ignore for a moment that this violates the condition that each point lies on a single IC. Then a must be indifferent to c , and a must be indifferent to b . This implies that b is indifferent to c . But b must be preferred to c since b has more beer and no less pizza than c , and more is always better. Hence, ICs cannot intersect.

One final point is that higher ICs indicate higher utility or satisfaction. In Fig. A.7, every point on IC_2 is preferred to every point on IC_1 and every point on IC_3 is preferred to all points on IC_1 and IC_2 . This is because a is preferred to b , and b is preferred to c , and all points on a particular IC are valued equally. So consumers prefer to be on higher, rather than lower, ICs.

Using ICs we can now rank all possible combinations of the goods represented in the graph. This will be a useful tool for demonstrating economic growth and the social costs of gambling. It is important to understand that this is the standard tool used in economics for the analysis of individual welfare related to consumption choices.

⁵ The slope of the IC is referred to as the marginal rate of substitution (MRS). The MRS of beer for pizza, i.e., the willingness to sacrifice beer for pizza, falls as one moves down and right along the IC. If one of the products on the axes is a “bad” then the slope of the IC will be positive. This is a special case that we need not deal with here.

⁶ For more detail on community indifference curves, see Henderson and Quandt (1980, pp. 310–319).

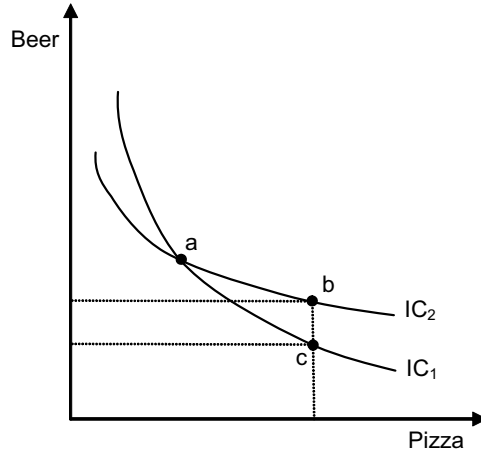


Fig. A.6. Proof that ICs cannot intersect

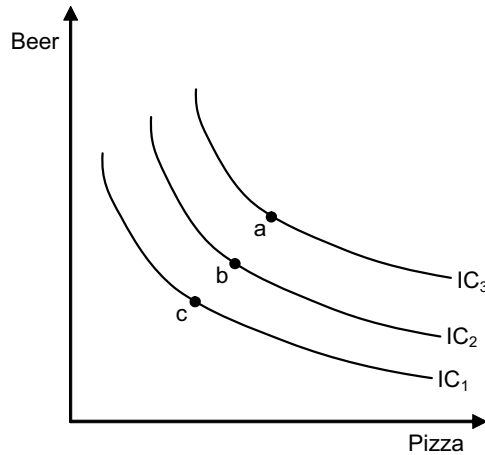


Fig. A.7. Indifference map

A.3 Allocative efficiency

Technological efficiency occurs when production takes place on the PPF so that no input resources are wasted or unemployed and production is

maximized given technology and input quantities. Once we consider preferences given by the IC, we can describe allocative efficiency.

It is important that what is produced is what people want to consume. Now that we have considered the supply side of the market (or costs represented by the PPF) and the demand side (or preferences represented by the IC) we can put the two sides of the market together and illustrate economic efficiency, technological and allocative.

In Fig. A.8 each point on the PPF is technologically efficient. However, only point *c* is allocatively efficient. That is, only at point *c* is the optimal *mix* of goods produced. From a social perspective, we want consumers to be on the highest possible IC. This is done by producing at the point on the PPF that allows us to be on the best possible IC, in this case IC_2 . That point represents the optimal combination of beer and pizza given preferences.⁷ Points *a* and *b* are inferior to point *c* because they are on a lower IC. Using ICs and PPFs together, we can rank different points on the PPF.

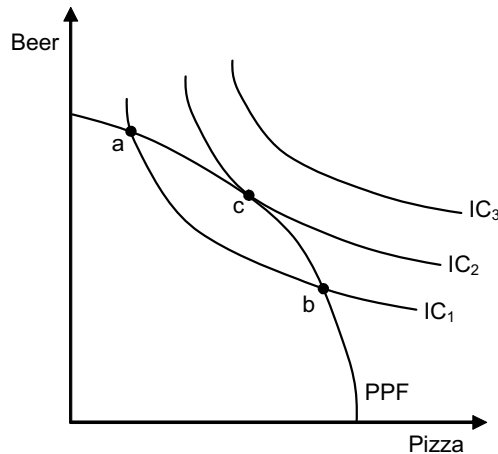


Fig. A.8. Technological and allocative efficiency

Consumer preferences will affect the production that takes place in society. If consumers have a relatively strong preference for pizza, the ICs would appear steep, indicating a willingness to sacrifice more beer for an additional unit of pizza. The resulting tangency between the IC and PPF would then be closer to the pizza axis (more pizza and less beer). On the other hand, a relatively strong preference for beer would be represented by

⁷ A complete treatment of consumer choice would require consideration of relative prices of the goods, preferences, and a budget constraint.

flat ICs and the resulting tangency with the PPF would be nearer to the beer axis with more beer and less pizza production and consumption.

A.4 Supply, demand, and markets

The previous sections of this appendix explain production based on opportunity cost and consumption based on preferences. These concepts are the basis for the supply and demand curves, the two major components of market models.⁸

The supply curve represents the marginal opportunity cost of production. Recall that the PPF has a concave shape that represents an increasing opportunity cost of production. That is, as production of one of the goods increases, its marginal opportunity cost (MC) rises in terms of the other good. If we graph the positive relationship between cost of production and quantity, the result is a supply curve as illustrated in Fig. A.9. A more simple explanation for the positive slope of the supply curve is that as price rises sellers wish to sell greater quantities. This is because the increase in price makes each sale more profitable.

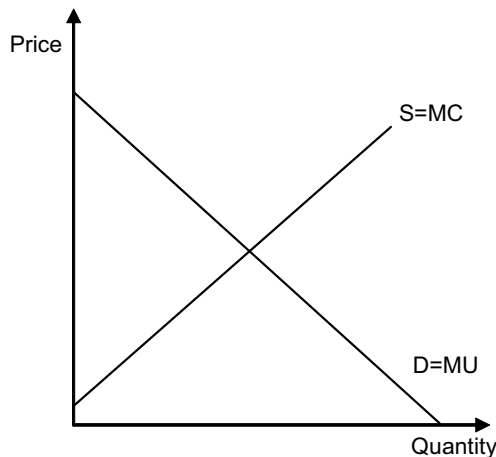


Fig. A.9. Supply and demand curves

⁸ The discussion of supply and demand here is very brief. For a complete treatment consult a principles of microeconomics text such as Mankiw (2007).

The demand curve represents the marginal utility (benefit) from consumption. Recall the law of decreasing marginal utility which says that each additional unit of consumption (of a good or service) yields less and less marginal utility (MU). If each additional unit of consumption provides less utility, then each additional unit will be valued less than the previous one. A rational person's willingness to pay for additional units would therefore be expected to decline. This negative relationship between quantity and willingness to pay is illustrated in the demand curve of Fig. A.9.

When the two sides of the market, supply and demand, are put together, the result is a market model (Fig. A.10). The equilibrium price (P_e) is the only price at which the quantity demanded is equal to the quantity supplied (called the equilibrium quantity q_e). If the current price in the market is *not* the equilibrium price, the self-interested motivations of buyers and sellers in the market push the price toward this equilibrium price.

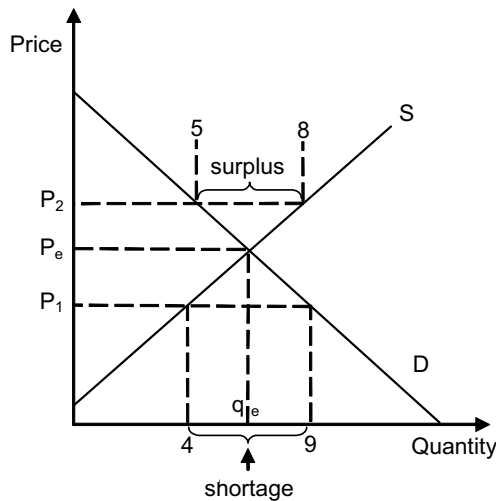


Fig. A.10. Prices and quantities in the market model

Consider a price such as P_1 in Fig. A.10. At a price below P_e the quantity demanded in the market exceeds the quantity supplied. This situation is called a shortage. In the example there is a shortage of five units. With a shortage, buyers and sellers in the market will bid the price up toward P_e and the shortage disappears. Alternatively, at P_2 or any price above P_e a surplus exists. That is, quantity supplied exceeds quantity demanded. In

Fig. A.10 there is a surplus of three units at P_2 . In this case, the buyers and sellers act in their self interest and bid the price down. Hence, when $P \neq P_e$, market forces push the price toward the equilibrium level. In this way, prices are determined in markets.⁹

The degree to which, and speed at which, prices adjust depend on the number of buyers and sellers in the market, the extent to which the products are homogeneous, and other market conditions. In any case, economists generally point to freely functioning markets as the most efficient mechanism for allocating scarce resources and producing what consumers want.¹⁰

A.5 Producer and consumer surplus

Economists gauge welfare or well being using producer surplus (PS) and consumer surplus (CS). Obviously, firms benefit from selling their products for prices in excess of their cost of production. This is typically referred to as “profit” conceptually similar to PS, simply the difference between the price they receive for producing and selling (the market price) and the minimum price they would be willing to accept (the cost of production, represented by the supply curve). So for all the transactions that occur in the market at the market equilibrium price, the PS is represented by the value of the triangle lying above the supply curve and below the horizontal line indicating the price. This is area $(d+e+f)$ in Fig. A.11.

Consumers benefit when they engage in market transactions. Indeed, in order to willingly make a purchase, the consumer must expect the benefits from consumption to exceed the market price they pay. The difference between what a consumer is willing to pay (the expected benefit from consumption, represented by the demand curve) and what must be paid (the market price) is the CS. In other words, CS represents the value of the product to the consumer in excess of its price. For all consumers who make purchases at the market price, total CS is represented by the value of the triangle lying below the demand curve and above the market price line. This is shown as area $(a+b+c)$ in Fig. A.11.

⁹ This is true in competitive markets. For a discussion of the assumptions underlying this model, see Mankiw (2007).

¹⁰ There are exceptions, however. They include externalities, public goods, and monopolies. These are typically considered to be cases in which government intervention can improve the efficiency of the free market. However, sometimes the government “solutions” to market failures are worse than the original problem (“State and Market” 1996).

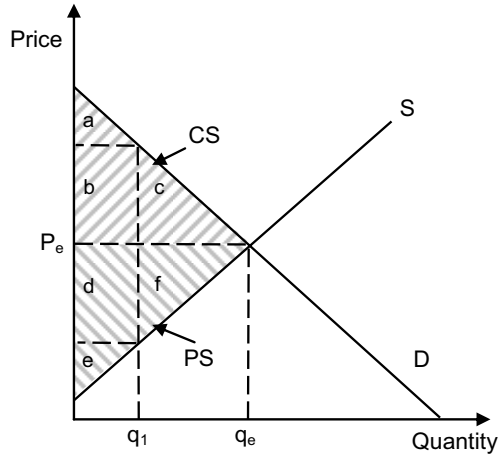


Fig. A.11. Producer and consumer surplus

The sum of the PS and CS areas is called the “social” or “total” surplus. It is a measure of the net benefits to consumers and producers who are engaging in transactions in the market. It is important to recognize that both parties – consumer and producer – benefit from these transactions. As a result, the maximization of market transactions tends to maximize welfare in society. (This assumes that transactions do not harm other parties not involved in the transactions. Such third party harms are called “externalities” and are discussed in Chap. 6.) So any restriction on the number of transactions leads to a reduction in the size of the social surplus. This is important in considering legal restrictions on gambling, for example. When the quantity of transactions, q_e in Fig. A.11, is artificially restricted to q_1 the amounts of CS and PS are reduced. The social surplus that remains at the restricted quantity of q_1 is $(a+e)$. The difference between initial levels (their sum) and the resulting sum represents the social cost of the quantity restriction.¹¹ Some of the benefits that would have occurred in a free market are now lost. (Social costs are discussed in detail in Chap. 6.)

¹¹ This statement is somewhat simplistic. There is no doubt that the social surplus and overall well being is lower than in an unrestricted market, but some of the benefits probably go to the sellers or the government from restricting quantity.

A.6 Summary

The PPF, IC, CS and PS are standard tools of economic analysis described in this appendix. We can analyze many of the economic and social costs and benefits of casino gambling using these tools. However, for more details on these and other important economic concepts, readers should consult an economics text such as Ferguson (1966) or Mankiw (2007).

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