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Tax incidence and price discrimination: An application of theories to gambling markets

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ABSTRACT

This paper examines whether a casino tax is good for local welfare in a tourism economy. We find that what is important for efficiency is not the tax rate itself but the tax incidence on tourists. Casino tourism in Macao engages in price discrimination via market segmentation. We prove that, compared with the mass market, the VIP market will grow faster with a greater price rise if a tax hike on the VIP market is not large, but will grow less rapidly with a smaller price increase if the tax hike is very large. An empirical study is carried out using data from Macao, which is typical of segmenting markets for discriminatory pricing. We show that our theory is largely consistent with observed evidence. This paper also provides some policy recommendations useful for Macao. We propose that its casino tax should be kept low at its current rate in the mass market but be raised substantially in the VIP market if its economic growth is to be made less unbalanced and more sustainable.

1. Introduction

Casino gambling has become an increasingly important industry in many tourism jurisdictions. For example, the U.S. commercial casinos grew 3.49% annually on average between 2002 and 2012, generating US$37.34 billion in gross revenue in 2012 and contributing US$8.60 billion in direct taxes to state and local governments (AGA, 2003, 2013). As a tiny city in South China, Macao enjoyed dramatic growth in real GDP at the average yearly rate of 14.24% between 2002 and 2012 after its casinos were opened to mainland Chinese customers. In the same period, its gross casino revenue (GCR) grew exponentially at the average annual rate of 29.93% to US$38.02 billion in 2012, with its casino taxes accounting for 87.6% of its fiscal revenue and 32.56% of its GDP in 2012 (DSEC, 2013a, 2013b). Macao overtook Las Vegas in 2006 as the world's largest casino resort in terms of GCR, which was six times as large as that of Las Vegas in 2012 (UNLV, 2013) and even surpassed the total revenue of all U.S. casinos combined.

However, serious economic problems have arisen in Macao from its fast gaming expansion. Its gaming-biased development is perceived as unsustainable for at least two reasons. First, the ratio of GCR to GDP rose from 39.40% in 2002 to 87.34% in 2012, a typical pattern of unbalanced growth relying on casino gaming without diversification (causing the Dutch disease). Second, the contribution of VIP gambling to GCR increased from 62.68% in 2005 to 69.33% in 2012, a risky shift in the sectoral structure of

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casino gaming. Macao's opaque VIP operations, associated with the pathological gambling of Chinese officials, have served for years as the chief source of local wealth, which is inherently vulnerable to external shocks such as Beijing's heightened measures for corruption crackdown. Therefore, it is important to explore what public policies are available to resolve or alleviate these economic problems, a widespread concern raised in Macao. We are concerned with whether casino taxation can be effective for problem solving.

There are three major motivations for this study. First, the economic literature on casino business is very limited, and much of this small literature is largely institutional in nature (Benar & Jenkins, 2008, p.63). While lawmakers who attempt to extract maximal casino taxes to cover fiscal shortfalls are blamed for killing the goose that lays golden eggs (Christiansen, 2005), there is not yet any substantial economic analysis of this issue (Anderson, 2005, p.322). Little is known about how casino taxation affects efficiency and equity in a tourist resort, and our paper will fill this gap in the literature.

Second, casino tourism is equivalent to "exporting" gambling products, local taxes, and social costs to visitors. Casino complexes incur large fixed costs but can acquire geographic market power. Gambling services are neither transferable nor resalable. These business features enable a casino resort to extract maximal wealth from tourist spending in segmented markets through tax incidence and price discrimination. To the best of our knowledge, there has been no study that investigates the economic implications of the special nature of casino business. Our paper is devoted to such study through the use of equilibrium models.

Third, there is a constant struggle between casinos and governments for economic rents created from commercial gambling. While the effects of casino taxes on such income sharing are intensively debated in the gaming literature, no enough attention is paid to the potential role of casino taxation in remedying the Dutch disease that prevails in tourist resorts. Our paper explores the plausibility of tax policy as an effective measure to deal with Macao's Dutch disease, i.e., the vulnerability of VIP business and the unsustainability of lopsided growth.

This paper attempts to make the following contributions to the literature. First, tax incidence is usually analyzed with partial equilibrium models in the gaming literature (Anderson, 2005), and price discrimination is also examined in such models. Yet the conclusions from these models may not be valid since economy-wide feedback effects are assumed away. The analysis of tax incidence is conducted in the economics literature that uses general equilibrium models following Harberger (1962), but the general results are often complex and ambiguous. Special cases are then used to provide intuition by making ad hoc assumptions (Fullerton & Heutel, 2005). Our study employs both partial and general equilibrium models to clarify the economic effects of casino taxation and market segmentation without imposing ad hoc restrictions.

Second, the clarifying analysis of tax incidence is provided in this study by comparing the partial and general equilibrium results. While the optimal tax rate of some type can be derived from partial equilibrium analysis as in Suits (1979), our general equilibrium analysis shows that whether a casino tax is economically efficient depends on how much of it can be passed on to tourists; the tax rate itself is of no significance. This new result is of practical importance for casino resorts, in that what a tax policy should seek for efficiency is not an optimal tax rate but large tax incidence on tourists through effective marketing as done in Macao.

Third, interactions of tax incidence with price discrimination are so complicated that a general rather than a partial equilibrium model should be invoked to derive reliable results. A tax may not necessarily be passed on to customers via the increased price they pay as predicted by partial equilibrium models. The tax burden is shared among casinos' customers, operators, and employees. Such pervasive tax incidence cannot be captured by a partial equilibrium model. Thus, general equilibrium analysis is required, as done in this paper, to incorporate not only demand and supply elasticities but also substitution elasticities and factor intensities based on certain industrial characteristics. Using the fact that the VIP sector is relatively capital intensive with inelastic consumer demand while the mass market is labor intensive with elastic demand, we can derive more definitive results than the existing literature. These results may be directly useful for policy making.

Fourth, our empirical study on Macao provides both evidence for the validity of theories developed in this paper and an indication for their applicability to policy recommendation. Our theories suggest that Macao's tax on VIP services is too lenient so that this problematic sector has grown too fast. Consequently, local growth becomes increasingly vulnerable to external shocks, and income inequality is also inevitably on the rise. Empirical evidence found from Macao supports our theoretical assertions. As such, the derived policy implication is that Macao should substantially raise its tax rate on the VIP sector while finding effective ways to boost growth in the mass market. The current lopsided growth should be altered via casino tax reform, and the economy must seek more balanced and sustainable development. Tax policy can also be used in Macao to stop inequality from worsening by permitting the working class to benefit proportionately from rapid economic growth.

The rest of the paper proceeds as follows. Section 2 derives an optimal tax rate from a partial equilibrium model. Section 3 provides a general equilibrium analysis for the economy-wide efficiency of casino taxation. Section 4 uses another general equilibrium model to discuss the impacts of casino taxes on discriminatory pricing in the segmented market for gambling. Section 5 presents an empirical study to show the consistency of our theories with evidence observed from Macao. Section 6 concludes the paper and is followed by a technical appendix.

2. Tax incidence and local welfare associated with casino gaming

Many holiday resorts actively recruit gaming firms to operate casinos as a tourism attraction for economic growth (Benar & Jenkins, 2008), so their gambling markets under free entry are somewhat competitive (though not perfectly). We start with an export-oriented internally-competitive market; tourism is just the exportation of local products to visitors. Since customers of a tourist resort are mainly non-residents, its economic welfare should exclude the consumer surplus and include only the local surplus that is defined as the sum of producer surplus and tax revenue.