Siting of Locally Unwasted Facilities: Challenges and Issues

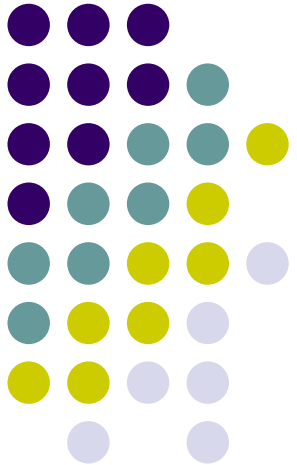
12-14 Dec 2007

The Chinese University of Hong Kong

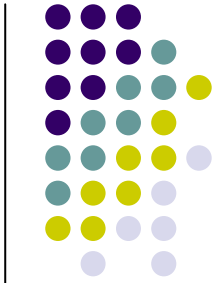
Are Casino NIMBYs?

Euston Quah
Division of Economics
Nanyang Technological University

Raymond Toh Yude
Ministry of Transport
Government of Singapore



Some Facts

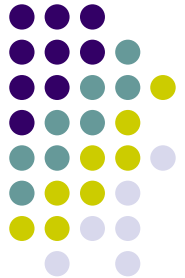


- In March 2004, Singapore Government debated on the legalization of casino gambling.
- 18 April 2005, the decision was to develop 2 integrated resorts in view of the benefits to the economy.
- Singaporeans are not averse to gambling:
  - Many legal avenues to gamble – lottery, horse and sports betting (eg soccer matches), playing slot machines in club houses.
  - Overseas regional casinos , e.g. Genting Highlands (Malaysia), Macau, and Melbourne or on cruise ships that sails in international straits.
  - Ronald Tan (2004) estimated that in 2003 $5 billion was wagered on legal gambling activities, $2 billion was wagered in underground betting and gambling, and a further $1.8 billion to $2 billion was spent in casinos outside Singapore.
  - Gambling represents 5.5% of Singapore's GDP

Why IR?

- Benefits of IR:
  - World class resort with many different facilities that cater for different groups of users
    - retail and dining
    - entertainment shows
    - hotels facilities
    - conventional facilities
    - casino
  - The IR seeks to enhance “Singapore’s reputation as a premium ‘must-visit’ destination for leisure and business visitors”
  - Supports the tourism industry which contributes to 10% of Singapore’s GDP and 7% of the workforce

Social Costs

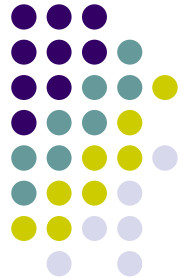


- Actual social costs of casino gambling is unclear
  - Vina and Bernstein (2002) observe that many economies had developed casinos to stimulate their deteriorating economies, in other words, bankruptcy was rampant *before* the introduction of casino.
  - Very small proportion of individuals with pathological or extreme gambling tendencies possess a higher bankruptcy rate than the national average.
- However, the development of a NIMBY syndrome is usually not based on the *actual cost* imposed on the society but on the *perceived risks and costs* to society (Portney, 1991)
  - NIMBYistic attitude arises from an asymmetric information coupled with a general distrust of the government in their decision making process.

NIMBY Syndrome

- There are two main characteristics of a NIMBY (Quah and Tan, 2002).
  - First is the involvement of the government in the development process.
  - Second is that the facility has much negative environmental externalities.
- NIMBY facilities pose harm to the environment where they are sited, such as creating water, air and noise pollution, destroying the aesthetics of the community, or even causing life-threatening hazards.
  - There is asymmetrical distribution of costs and benefits in that harm to the environment is usually only borne by the community that hosts such facilities whereas the benefit is reaped by the whole society, thus resulting is a NIMBYistic attitude.

Casinos as NIMBYs



- Casinos and NIMBYs share certain similarities:
  - Though it may not be environmentally hazardous, the asymmetrical distribution of perceived costs and benefits results in NIMBYistic attitudes.
  - Singapore as host and the global community as recipient of benefits, Singapore will have to bear the social costs.
  - Furthermore, Frey *et al.* (1996) argue that the concept of NIMBY can be applied to issues that affect the local community and involve wider moral consideration. In this case, the public feel that casinos are morally wrong goods that should not be allowed to develop.

Survey and Methodology

- A survey was administered to 513 Singapore citizens or Permanent Residents above 21 years of age.
  - Ethnicity was not a major concern in this study as religion plays a more significant role because of the moralist/religious argument against the casino.
  - Two separate surveys were administered to control the possible psychological effect in using different terminologies and to test whether there will be a transformation of good effect
    - Survey 1: asked about the development of a *casino* and the legalization of *casino gambling*,
    - Survey 2: asked about the development of an *integrated resort-casino* (IR) and the legalization of *casino gaming.*
- Probit Modeling to determine the significant factors in the individual decision making framework.

Variables Used

- Personal characteristics:
  - Gender, age, income level, education level, and religion;
  - Whether one cares about the development of a casino/IR;
  - Whether one has children or plan to have one;
  - Whether one gambles and the frequency of participation in legalized gambling.
- Personal perception of the impact of a casino/IR in Singapore:
  - Whether the casino will lead to more social problems;
  - Whether there is a risk of Singaporeans developing a gambling addiction;
  - If the casino will bring economic growth through tourism and increased employment.
- Mitigation effects:
  - Acceptable level of public participation in the policy making process;
  - Effectiveness of the safeguards proposed;
  - Importance of siting location.

Money or Goods?

- Conflict Resolution Framework:
  - In a willingness-to-accept framework, we want to test if the respondents are willing to be accept a compensation package in monetary terms or in the form of public goods in return for their support.
    - The compensation in monetary terms is in the form of a tax rebate, calculated as a percentage of their current tax.
    - The provision of public goods are of two types:
      1. more social workers who are able to mitigate the risk of social problems and pathological gambling; and
      2. pure public goods such as the provision of education, giving of more money to the development of the arts in Singapore, and donations to charitable organizations.

Statistics in Religion

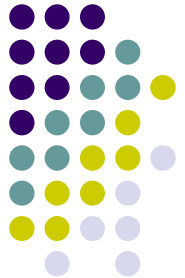


Table 1: RELIGIOUS AFFILIATION IN THE SAMPLE POPULATION

Religion	Sample Population		Proportion of Population* (%)
	Number of Respondents	Proportion (%)	
Buddhism and Taoism	184	35.9	44.2
Christianity (including Catholicism)	126	24.6	18.7
Islam	57	11.1	14.0
Hinduism	34	6.6	4.8
No religion	112	21.8	18.3
Total	**513**	**100**	**100**

* The population proportion figures are calculated based on the breakdown given by the Singapore Department of Statistics (2001). It has been adjusted to account only for those who above 21 years of age.

Econometric Model Used

- Latent Variable Model
  - $y_i^* = \boldsymbol{x}_i' \boldsymbol{\beta} + u_i$
    - where y_i^* is the individual's perceived net benefit of the project after undergoing a mental calculation of the costs and benefits.
    - The matrix x_i contains the personal characteristics and the independent variables which determine the costs and benefits and the mitigating factors of the project while β is a matrix of estimates that describes the marginal effect of each causal factor.
- Probit Model
  - $\Pr(y_i = 1 | \boldsymbol{x}_i, \boldsymbol{\beta}) = \Phi(\boldsymbol{x}_i' \boldsymbol{\beta}) = \int_{-\infty}^{\boldsymbol{x}_i' \boldsymbol{\beta}} \left[(2\pi)^{-1/2} e^{-v^2/2} \right] dv$
    - Assumption of normality is imposed for the error term in the latent variable model for each individual (*ui*) , i.e., it is independent of all the independent variables.

Model Results

Independent Variables	IR Probit Model (*casino* = 0)	Casino Probit Model (*casino* = 1)	Pooled Probit Model (pooled data)
casino	–	–	–0.00686 (0.1486)
gender	0.0861 (0.2070)	0.131 (0.2270)	0.0571 (0.1479)
educ	0.127 (0.1386)	0.0599 (0.1497)	0.133 (0.1006)
income	–0.370 * (0.1976)	0.216 (0.2005)	–0.126 (0.1313)
age	0.0491 (0.1076)	–0.0703 (0.1315)	0.0473 (0.08061)
gamble	0.397 *** (0.08943)	0.302 *** (0.08403)	0.297 *** (0.05559)
children	0.239 (0.2468)	–0.397 (0.2603)	–0.0398 (0.1747)
budtao	0.245 (0.2783)	–0.621 ** (0.3045)	–0.238 (0.2022)
christianity	–0.136 (0.3198)	–0.908 *** (0.3346)	–0.584 *** (0.2186)
islam	–0.814 (0.5231)	–0.989 ** (0.4247)	–0.959 *** (0.3174)
hinduism	–0.192 (0.4737)	0.467 (0.5179)	–0.299 (0.3904)
care	–0.190 (0.2212)	–0.506 * (0.2679)	–0.267 (0.1635)
addiction	–0.324 ** (0.1483)	–0.709 *** (0.1659)	–0.446 *** (0.1046)
social_prob	–0.383 ** (0.1625)	–0.455 ** (0.1888)	–0.415 *** (0.1169)
growth	1.116 *** (0.3457)	0.910 *** (0.2855)	0.893 *** (0.2074)
public_part	0.376 (0.2296)	0.562 ** (0.2583)	0.404 ** (0.1671)
safeguards	0.652 ** (0.2233)	0.602 ** (0.2338)	0.666 *** (0.1569)
site	0.248 * (0.1275)	0.135 (0.1349)	0.168 * (0.08751)
constant	–0.0424 (0.8024)	2.474 *** (0.8069)	1.037 * (0.5683)
Number of observations	260	253	513
Percent correctly predicted	83.08	86.17	82.46
Log likelihood	–98.265	–76.337	–187.299
McFadden R–squared	0.451	0.558	0.468

Dependent Variable:
support

Standard errors are given in parentheses.
* Test statistic is significant at 10%.
** Test statistic is significant at 5%.
*** Test statistic is significant at 1%.

Model Tests

- Are there 2 different models?
  - We did a Chow Test
    - **H0**: There are no structural differences across the two groups of respondents;
    - **H1**: There are structural differences across the two groups.
  - The Chow statistic calculated is 1.833 and the corresponding *p*–value is 1.75%.
  - At 5% level of significance, there is statistical evidence to reject the null hypothesis – there are structural differences in the two groups
  - In other words, the casino proposal undergoes a psychological transformation simply by changing the name to an integrated resort-casino and the gambling industry into gaming industry.

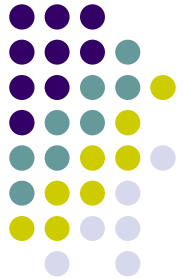
IR Model vs Casino Model

- Religious Variables (including the intercept – non-religious):
  - In the IR Model, none of the religious variables returns with a statistically significant estimate
  - In the Casino Model, only *hinduism* is insignificant.
  - Negative sign in the estimates for *christianity* and *islam* in both models
  - Religious factors will play a more important role in influencing the level of support especially for the Casino Model
  - A Christian is more likely to displace his religious objection to the project if the project is an IR; Muslims may oppose the project on religious grounds even when the debate has shifted from IR to Casino.
- *gamble* (frequency of participation in gambling)
  - The only other personal characteristic that is statistically significant. Expected result as those who like to gamble are more likely to support the presence of a casino.

IR Model vs Casino Model (cont.)

- Social costs and benefits
  - *addiction*, *social_prob*, and *growth*
  - *social_prob,* and *growth* have similar effect on the level of support for both models
  - Fear of a risk of addiction to gambling is *strongly negative* for the Casino model – an estimated 28% drop in the marginal probability on support – compared to a 13% fall in probability of support for the IR Model.
- Mitigation Policies
  - *safeguards* – the effectiveness of the safeguards proposed by the government will lead to higher support for the project by 25% (both models)
  - *public_part* – only important for Casino Model
  - *site* – significant for the IR Model as Sentosa Island is more desirable/suitable for the development of an IR.

Conflict Resolution



- Conflicts arise due to the NIMBY syndrome can cause significant delay in the siting process and incur high opportunity cost.
- NIMBY facilities are usually necessary for the development of the state, for example a waste treatment plant, an incinerator, or a power plant. Without them, the economic and social development of the state could come to a standstill.
- Therefore, it is important to develop conflict resolution strategies and other compromises which can minimize the damage and maximize the acceptance with least amount of delay in building the proposed NIMBY facility (O'Hare *et al.*, 1983).

Conflict Resolution (cont.)

- Decide-announce-defend (DAD) procedure causes the most amount of opposition to the siting of a NIMBY.
  - Sometimes the people may develop mistrust for the government or the local authorities
  - Authoritarian procedures or Top-Down approach may cause the public to feel that they are treated unfairly.
- A siting strategy that includes citizen participation is advocated because it ensures that the process will be fair and democratic (McAvoy, 1999)
  - Allows the other strategies to work more efficiently, such as designing mitigation policies to deal with the perceived risk, benefits and costs and the designing of compensation packages.
  - Public participation is a necessary condition to conflict resolution

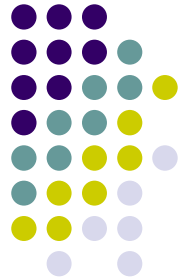
Conflict Resolution (cont.)

- Mitigation policies
  - Quah and Tan (2002) argue that public participation can be a form of mitigation policy that governments can adopt and it reduces the amount of asymmetric information leading to natural reductions in perceived risk.
  - Mitigation is more effective than compensation
    - It seeks to address the real problems posed by the facility
    - Attempts to clarify and change the unfavorable risk perceptions which may be held by the members of the local community.
- Public Relations
  - Announce-discuss-decide (ADD)
    - Factoring inputs of the public into the decision making process
    - Design of genuine mitigation policies
    - Decision to scrap the NIMBY facility without a loss of political credibility
  - Maintaining good public relations is a vital element in the resolution of conflicts.

Conflict Resolution (cont.)

- Monetary Compensation
  - Monetary compensation can be most effective and decisive only when the harm inflicted by a NIMBY facility is the loss of property values. For intangibles that the residents might be attached to, such as the aesthetics of the environment, monetary compensation is less effective (Quah and Tan, 2002).
  - Other than the difficulties in valuing the intangibles, there is also a problem of loss aversion (Kahneman *et al*., 1991). Empirically, losses are valued more than gains
  - Not effective for other moral reasons. O'Hare *et al.* (1983) found that compensation in cash is often viewed as a bribe
    - Frey (1997) suggests two key reasons why monetary compensation fails – a bribe effect and a crowd out effect.

Conflict Resolution (cont.)



- Compensation with Public Goods
  - Goodwill measures such as providing better street lighting, building more recreational facilities, can be important to the local residents as it helps to maintain a strong and positive presence within the host community (Kunreuther and Easterling, 1996)
  - Mansfield *et al.* (2002) argue that public goods may be perceived as a fairer method of compensation and not thought of as bribes as they benefit the society and not the individual.
  - Two types of goods-in-kind:
    - Public good that might directly mitigate the specific detriments caused by the public harm,
    - Good that has no association with the harms but will benefit the public in general.

Survey Indicators

- Three different types of compensation are offered:
  - Monetary compensation through a tax reduction;
  - Increase the number of social workers to deal with the social problems of problem gambling; and
  - Increase its public spending on public projects (e.g. education, development of the arts, giving to charitable organizations) using the tax proceeds from the casino.
- We are interested in the switching effect of any given compensation options
  - Mean Equality test on the rate of support. The following hypotheses are set up for each type of compensation:
    - **H0**: There is no change in the level of support with the offer of compensation
    - **H1**: There is a change in rate of support with the type of compensation

Survey Indicators: Results

Type of compensation	Monetary Compensation (Income Tax Rebate)		In-Kind Compensation (Social Workers)		In-Kind Compensation (Public Projects)	
	IR Model	Casino Model	IR Model	Casino Model	IR Model	Casino Model
support[#] = 1 and *compensation*[+] = 1	97 (37.3%)	89 (35.2%)	88 (33.8%)	82 (32.4%)	108 (41.5%)	101 (39.9%)
support = 1 and *compensation* = 0	21 (8.1%)	19 (7.5%)	30 (11.5%)	26 (10.3%)	10 (3.8%)	7 (2.8%)
support = 0 and *compensation* = 1	27 (10.4%)	25 (9.9%)	18 (6.9%)	11 (4.3%)	31 (11.9%)	29 (11.5%)
support = 0 and *compensation* = 0	115 (44.2%)	120 (47.4%)	124 (47.7%)	134 (53.0%)	111 (42.7%)	116 (45.8%)
support = 1 (%)	45.4	42.7	45.4	42.7	45.4	42.7
compensation = 1 (%)	47.7	45.1	40.8	36.8	53.5	51.4
Net change (%)	**2.3**	**2.4**	**–4.6** *	**–5.9** **	**8.1** ***	**8.7** ***
Mean Equality test (*p*–value, %)	38.7	36.6	8.21	1.27	0.09	0.02

Notes: Percentages of respondents in each category are given in parentheses. The sum of the figures may not add up correctly due to rounding errors.

[#] *support* = 1 if the respondent supports the project without any compensation given, 0 otherwise.

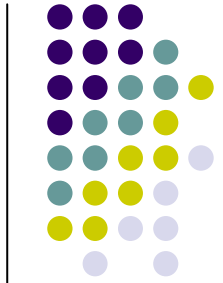
[+] *compensation* = 1 if the respondent supports the project when the compensation is given, 0 otherwise.

[*] Test statistic is significant at 10%.

[**] Test statistic is significant at 5%.

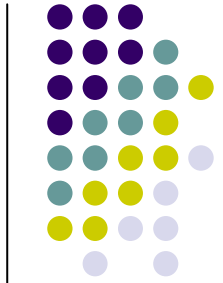
[***] Test statistic is significant at 1%.

Survey Indicators: Summary Findings



- Monetary compensation
  - Yields a positive change in the level of support that is not statistically significant.
  - Not a useful tool in conflict resolution.
- Provision of social workers
  - Net drop in the support that is statistically significant for both models
  - Respondents had withdrawn their support for the project suspecting that the project might bring about more social problems – not worth taking the risk.
- Provision of other public goods
  - Largest positive yield, statistically significant at 1%.
  - Most effective and the preferred method of compensation under the willing to accept framework (consistent with the results discussed in Mansfield *et al.* (2002).)

Conclusion



- Siting a casino is analogous to siting a NIMBY.
  - There is no doubt about the potential benefits to the economy and the world at large, but the host community has to bear the harms related to gambling
- Many factors may be affect one's response, but the interesting behavioural factor is in the terminology used. This has implications of public policy making and policy communication.
- In the area of conflict resolution, compensation with public goods is more effective as a means to increase support but the type of public goods to be provided that would be most effective would require further examination.