The 2005 World Sustainable Building Conference, Tokyo, 27-29 September 2005 (SB05Tokyo)

INTRODUCTION OF PARKING LOT TAX AIMED AT EFFICIENT LAND USE

Masayuki KOCHIZAWA Mr.Eng.[1]

[1] Graduate School of Engineering, Tohoku University, 06 Aramaki-aza-Aoba, Aoba-ku, Sendai, Miyagi 980-8579, Japan

Keywords: parking lot, taxation, land use

Summary

With falling land prices in the center of the big cities in Japan, it became impossible to count upon obtaining capital gains from land, and then most of vacant lots are converted into the self-service parking lots as the means of thrift, what are known as “coin-parking” lots. This paper regards it as a problem that the coin-parking lots remain the same function for a long time and such situation checks the efficient land use in the center of cities. In addition, this paper has suggestion a new taxation system on the land of the coin-parking lots, and it verifies that the taxation works well to get to the efficient land use. That taxation is called the "parking lot tax".

If the 2.9% parking lot tax is introduced to the land of existing coin-parking lots, it will be difficult to obtain large profit from coin-parking lots management. Therefore, this research arrives at a result that the introduction of the parking lot tax is able to prevent the owners of land from keeping the land to obtain large capital gain, and it becomes method for the efficient land use.

1. INTRODUCTION

In the center of the big cities in Japan, most of vacant lots are converted into the self-service parking lots as the means of thrift, what are known as “coin-parking” lots. The land prices soared at the boom around later 1980’s to early 1990’s, or the “bubble-economy", and the land and buildings in the center of the cities became the object of profitable speculation. But it was not long before the land price fell, so it became impossible to count upon obtaining capital gains from land, and then such passive land use has increased. This paper regards it as a problem that the coin-parking lots remain the same function for a long time and such situation checks the efficient land use in the center of cities. In addition, with comparing them with the land taxation of Japan, this paper has suggestion a new taxation system on the land of the coin-parking lots, and it verifies that the taxation works well to get to the efficient land use. That taxation is called the "parking lot tax".

This study takes up the result at “West of Sendai Station and Ichiban-cho Area” (total area 79 hectares) as a case study. This area is designated by the Government as “Development Policy for Priority Urban Redevelopment Areas”. Sendai City is a regional hub city of one million people. However, the vacancy factor of the office building in the center of the city keeps increasing from being in the sphere of the day trip to Tokyo. Moreover, large shops in suburbs grow up, and the shopping streets in the center of the city begin to decline.

2. DEFINITION OF COIN-PARKING LOTS

Coin-parking lots are often used as temporary land use, because it is easy to manage them by uninhabited with car gates and locking boards. A lot of electronic equipment distributors and estate agents developed this equipment in around 1988. It is thought that coin-parking lots for about 250,000 cars have been set up till the present time. However, these land use are not able to control easily because coin-parking lots increase rapidly regardless of narrow.

In this paper, the coin-parking lots are defined as follows: conversionable at once, using only ground level, and charging for every hour. If these conditions exist, the ones with staffs are included. However, the ones with the store etc. are excluded because of difficulty in conversion.

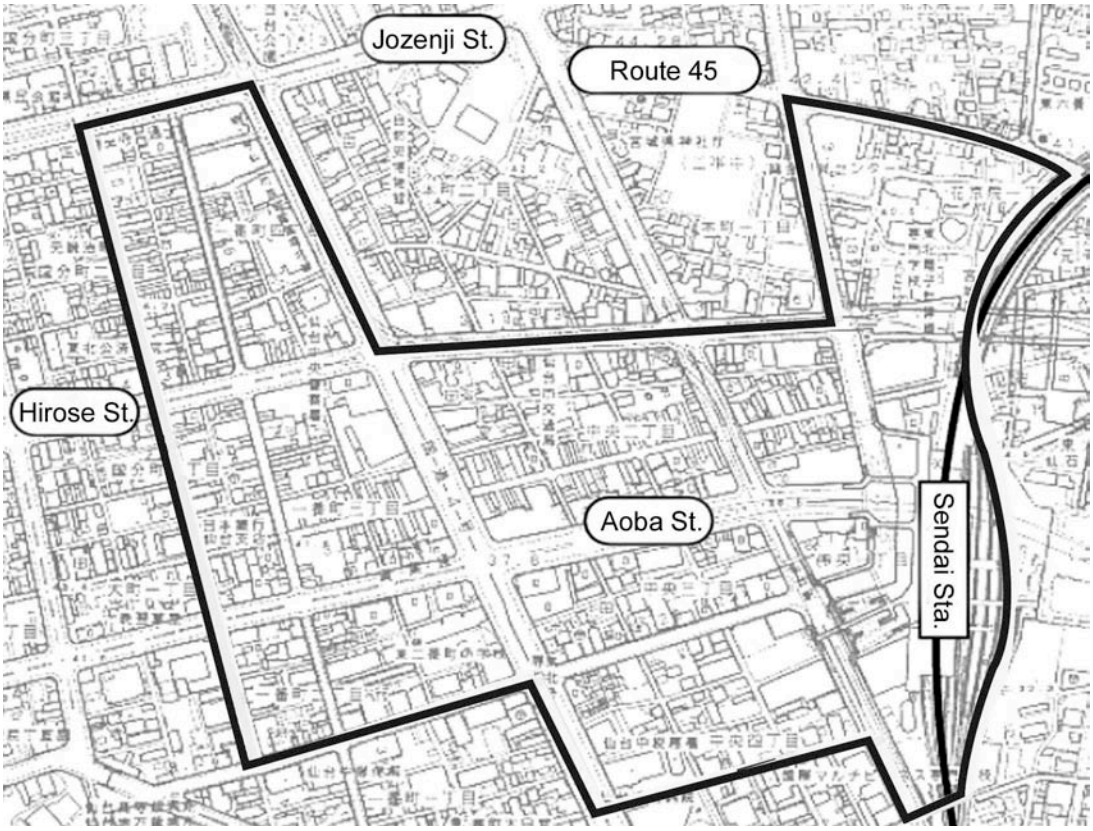

Figure 1 Map of West of Sendai Station and Ichiban-cho Area

3. FIELD SURVEY

First, I surveyed about coin-parking lots at "West of Sendai Station and Ichiban-cho Area" (See Figure 1) before suggestion of parking lot tax. Table 1 shows these data. The conversion from another usage to coin-parking lots are increasing rapidly. Similarly, opposite cases are, too. Among 37 coin-parking lots that were in this area, newly three coin-parking lots have run, while two of that converted to apartment houses during half a year from February, 2004.

Table 2 shows the processes of five patterns that converted to the coin-parking lots. The Government says that the aim of development at "West of Sendai Station and Ichiban-cho Area" is to accumulate commerce and business and to form green tracts of land. However, the area has multipronged characters even if one purpose is set since the market mechanism works.

Table 1 Data of 37 Coin-Parking Lots at West of Sendai Station and Ichiban-cho Area

Use Zoning	Commercial Zone
Floor Area Ratio	From 400% to 800%
Number of Accommodation	1,134
Presumed Average Price of Land	870,000 yen a square meter
Presumed Total Price of Land	24 billion yen
Total Area of Land	2.8 hectares
Average Area per a Car	24.3 square meters
Utilization Rate	66.3%
Parking Time per 100 yen (Daytime)	From 15 to 20 minutes
Parking Time per 100 yen (Nighttime)	From 15 to 60 minutes

Table 2 Patterns of Last Usage of Land Before Coin-Parking Lots

	Total Number	Usage Before	Area	Feature of Location
Pattern 1	2	Houses	Narrow	Coexistence Quarter of Residence and Commerce
Pattern 2	7	Monthly Parking Lots	Wide	
Pattern 3	12	Commercial Buildings	Narrow or Wide	Dense Commercial Quarter
Pattern 4	8	Parking Lots with Staffs	Wide	
Pattern 5	8	With Staffs Same as Now	Narrow or Wide	

4. ROLE OF PARKING LOT TAX

Big land not used is restricted by the law in Japan, but the law doesn't correspond to coin-parking lots because coin-parking lots are small enough and used for business. It is difficult to obstruct passive land use in present laws, and another inducement plan is needed to reach effective land use. On the other hand, it can be said that the inducement plan reacting to this market mechanism is necessary to control the difference in the area.

Therefore, parking lot tax is introduced as one of the plans. There is a big difference from the existing system introduced in each country. This new taxation is a control plan of efficient land use, though existing system are special purpose tax intending to traffic infrastructure etc. and are used as plans of Transportation Demand Management.

5. SETTING OF TAX RATE

Taxation to coin-parking lots adopts the rate corresponding to the area of land. In this case, it can be applied to the present tax system in Japan by considering the operating profit of coin-parking lots to be capital gains of that land. Comparing with the present Japanese taxation for capital gains (See Note 1), the amount of the tax is determined by 30% of coin-parking lots sales, and it is converted from the following calculations into the tax rate.

Under the utilization rates of about 65% in Sendai, the profit of 59,000 yen a year from a square meter in coin-parking lots is expected. 17,600 yen that are 30% of the profit becomes the equivalent value of the parking lot tax. Though the presumed average price of land a square meter in this area is 870,000 yen and the amount of tax base is 70% of that, 17,000 yen corresponds to 2.9% of the amount of tax base. In this paper, I fix this rate as the rate of parking lot tax. This rate is heavier than property tax with the rate of 1.4%.

In Japan, land is thought to be big assets. The management of coin-parking lots is often selected as a means to keep without labor for the land owner who expects the rise of the price of land. Under the land prices falling steadily, if parking lot tax has effect of reducing the land value more than the former asset value, it can be considered the means to prevent "lock-in effect" ,or keeping the land to obtain large capital gain.

6. VERIFICATION OF PARKING LOT TAX

Under the downside of the price, I verify whether the sum of the future price of land and the total profit lose the present price of that by heavy parking lot tax and property tax imposing. When the taxation works well, the coin-parking lots are able to convert to others. The trial calculation objects are 37 coin-parking lots in the center in Sendai investigated in February, 2004.

Here, I define that *L(n)* is the price of the land after *n* year, *P* is the profit of a year, and *T* is the sum of taxes of a year. If *F(n)<0* at the following equation, then it appears that it cannot make amends for falling land prices by coin-parking lots management.

$$F(n) = L(n) + \sum^{n}(P - T) - L(0) \tag{1}$$

Let *r* be the falling rate of the land prices during a year.

$$L(n) = r^{n} L(0) \tag{2}$$

If *P* is constant in every year, it becomes the following.

$$\sum^{n} P = nP \tag{3}$$

Let *t* be rate of parking lot tax.

$$\sum^{n} T = (rL(0) + r^{2}L(0) + \cdots + + r^{n}L(n)) \times 0.7 \times (0.014 + t) = \frac{r(1 - r^{n})}{1 - r} L(n) \times 0.7 \times (0.014 + t) \tag{4}$$

Therefore, (1) is the following.

$$F(n) = r^n L(0) + nP - \frac{r(1-r^n)}{1-r} L(n) \times 0.7 \times (0.014 + t) - L(0) \quad (5)$$

Table 3 shows the number of coin-parking lots of 37 where the taxation works effectively, assuming *r=0, 0.01, 0.05 and 0.10*. In this paper, if the profit for five years is reduced by 50% by the taxation compared with the case without the tax system, it is thought that the system works effectively.

Since the land prices of many areas in Sendai are falling above 10% a year, it is that the taxation works effective in coin-parking lots regardless of the patterns of the last usage of the land. It is also the fact that many coin-parking lots without parking lot tax do not obtain enough profit to pay property tax.

Table 3 Number of Coin-Parking Lots Where Parking Lot Tax Worked Effectively

				r = 0	r = 0.01	r = 0.05	r = 0.10
Pattern 1		$F(n)<0$ regardless t		0	0	1	2
	$F(n)_{t=0} \geq 0$	*Effective*	$F(5)_{t=0.029}<0$	0	0	0	0
			$0 \leq F(5)_{t=0.029} < F(5)_{t=0}/2$	1	1	1	0
		$F(5)_{t=0}/2 \leq F(5)_{t=0.029} < F(5)_{t=0}$		1	1	0	0
Pattern 2		$F(n)<0$ regardless t		0	0	0	3
	$F(n)_{t=0} \geq 0$	*Effective*	$F(5)_{t=0.029}<0$	0	0	2	0
			$0 \leq F(5)_{t=0.029} < F(5)_{t=0}/2$	0	1	1	1
		$F(5)_{t=0}/2 \leq F(5)_{t=0.029} < F(5)_{t=0}$		7	6	4	3
Pattern 3		$F(n)<0$ regardless t		2	3	5	5
	$F(n)_{t=0} \geq 0$	*Effective*	$F(5)_{t=0.029}<0$	1	1	0	1
			$0 \leq F(5)_{t=0.029} < F(5)_{t=0}/2$	2	1	0	2
		$F(5)_{t=0}/2 \leq F(5)_{t=0.029} < F(5)_{t=0}$		7	7	7	4
Pattern 4		$F(n)<0$ regardless t		0	0	3	6
	$F(n)_{t=0} \geq 0$	*Effective*	$F(5)_{t=0.029}<0$	0	0	1	0
			$0 \leq F(5)_{t=0.029} < F(5)_{t=0}/2$	2	3	1	0
		$F(5)_{t=0}/2 \leq F(5)_{t=0.029} < F(5)_{t=0}$		6	5	3	2
Pattern 5		$F(n)<0$ regardless t		1	2	2	5
	$F(n)_{t=0} \geq 0$	*Effective*	$F(5)_{t=0.029}<0$	1	0	1	2
			$0 \leq F(5)_{t=0.029} < F(5)_{t=0}/2$	0	1	2	1
		$F(5)_{t=0}/2 \leq F(5)_{t=0.029} < F(5)_{t=0}$		6	5	3	0
Total Number (Ratio to Gross Area)			$F(n)<0$ regardless t	3 (1.8%)	5 (2.8%)	11 (24.8%)	21 (65.2%)
			Effective	7 (16.9%)	8 (31.1%)	9 (34.2%)	7 (18.0%)

7. CONCLUSION

This is the result that the introduction of the parking lot tax is able to prevent the owners of land from “lock-in effect”, and it becomes method for the efficient land use.

It is not discussed enough to use efficiently small land in the urban policy of past Japan. Moreover, when some urban plans are settled on, economical value of land is hardly verified about the entire area though architectural index of the limit of floor area ratio etc. is instituted. The policy needs relation with the value of land and the taxation system since the owning land is an act of economic activities. The result of this paper will be the foothold to the policy.

Note

(1) The rate of the capital gain tax for individual owned in Japan have been reduced January 1, 2004. the rate is 20% in case of owning for 5 years or less, and that is 39% for five years or more.

References

Kochizawa, M. 2004. Guidance System for Efficient Land Use with Parking Lot Tax. Submitted to AIJ Journal of Technology and Design, 21.

Kochizawa, M., Nakajima, K., Sato, T. and Watanabe, M. 2004. A Study on the Introduction of Parking Tax System to shift into Dense Land-Use on the Outdoor Self Parking lots. Summaries of Technical Papers of Annual Meeting Architectural Institute of Japan, 2004, F-1, pp.125-126.

Kochizawa, M. 2004. Proposal Taxation for Improvement of Passive Land Use. Thesis Collection “Development and Control of Urban Architecture”, pp.391-394.