An Analysis on the Economic Effects of Greenbelt: Focused on the Case of Korea

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Ⅰ. Introduction

Maybe no other policy issues have aroused such close arguments for and

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against than greenbelt around the world. As yet, disputes over the gains and losses of greenbelt have not been finished both practically and theoretically.

At present a hot dispute is in process pivoting around the greenbelt that surrounds the cities and towns of the nine county San Francisco Bay Area between organizations such as The Greenbelt Alliance, Bank of America, California Resources agency and a group of developers.[1] Both groups compete by presenting the negative impacts of unchecked growth and that of a greenbelt respectively.

And there is a more heated controversy over the necessity of greenbelt in Korea. Even during the election campaign for members of Korea National Assembly in April 1996, the problem of the greenbelt has been one of the major political issues. The pros and cons of professionals and scholars on the greenbelt appear in newspapers up to the present.

The destiny of greenbelt has also changed with different results among many countries that have already established it. England, which originated the greenbelt area, is said to have been faithful to the original ideas of greenbelt on the whole, although there have been some throes and changes. But greenbelt policy in Japan was actually collapsed, yielding under tremendous pressure to development.[2]

Is the greenbelt a gain or loss in terms of economic criteria? Can't we evaluate the value of greenbelt definitely? The basic purpose of this paper is to answer these questions. Examining the economic logic underlying the establishment of greenbelt will be done, and analyzing the economic impact and efficiency of greenbelt will be attempted in this paper, especially for the case of Korea.

In the following section I briefly present the concepts of greenbelt because there are many similar concepts, and because I need to clarify the

1) http://www. greenbelt.org/gba/beyond.html

2) Japan had once established a kind of greenbelt that restricts development firmly in suburban areas of the capital region in 1956, but abolished it in 1965. Instead Japan has introduced a lukewarm measure to promote a planned urbanization from 1968.

object to be analyzed in this paper. And then I will clarify the underlying rationale of greenbelt in the 3th section, and analyze its economic impact and efficiency in the 4th section respectively.

In final section I will revisit the spot of vigorous disputes on greenbelt in Korea with the results of analysis in mind, and think why the controversy has not been ceased. And I definitely draw a evaluation to greenbelt, and present some of policy implications of these findings, which may help to solve the problem of greenbelt in Korea, as well as to apply to the other countries and communities that are considering to provide greenbelt to their suburban areas.

Ⅱ. The concept of greenbelt

The concept of greenbelt differs a little bit among countries. In fact various words such as country belt, agricultural belt, rural belt, green girdle and green wedge have been used as a similar meaning.[3] The terminology of 'greenbelt' was initiated by Raymond Unwin as a synonym to country belt, town belt or agricultural belt.[4]

But if we traces historically, the ideas(refer to Figure 1) that argue to preserve cities with circular belt can be found from long ago. F. J. Osborn develops strains of the green belt concept from the Old Testament through Plato, Aristotle, Roman city planning, Thomas More's ***Utopia*** and Robert Owen, but credits Ebenezer Howard's ***Garden Cities of Tomorrow*** for uniting the complementary purposes of limiting urban spread by preserved open space.[5]

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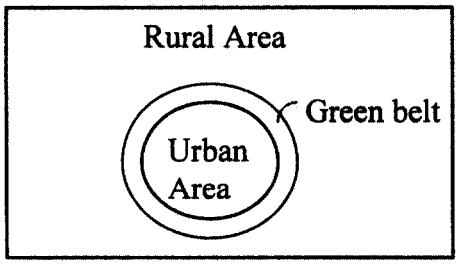
3) Richard Munton, ***London's Greenbelt: Containment in Practice***, London, 1983, p.1.

4) Kim TaeBok, ***A Study on the Management of Greenbelt in Korea***, GunHwaSa, Seoul, 1993, p.10.

5) Larry D. Singell et al, "The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space", ***Land Economics***, May 1978, p.207.

Figure 1. The concept of greenbelt

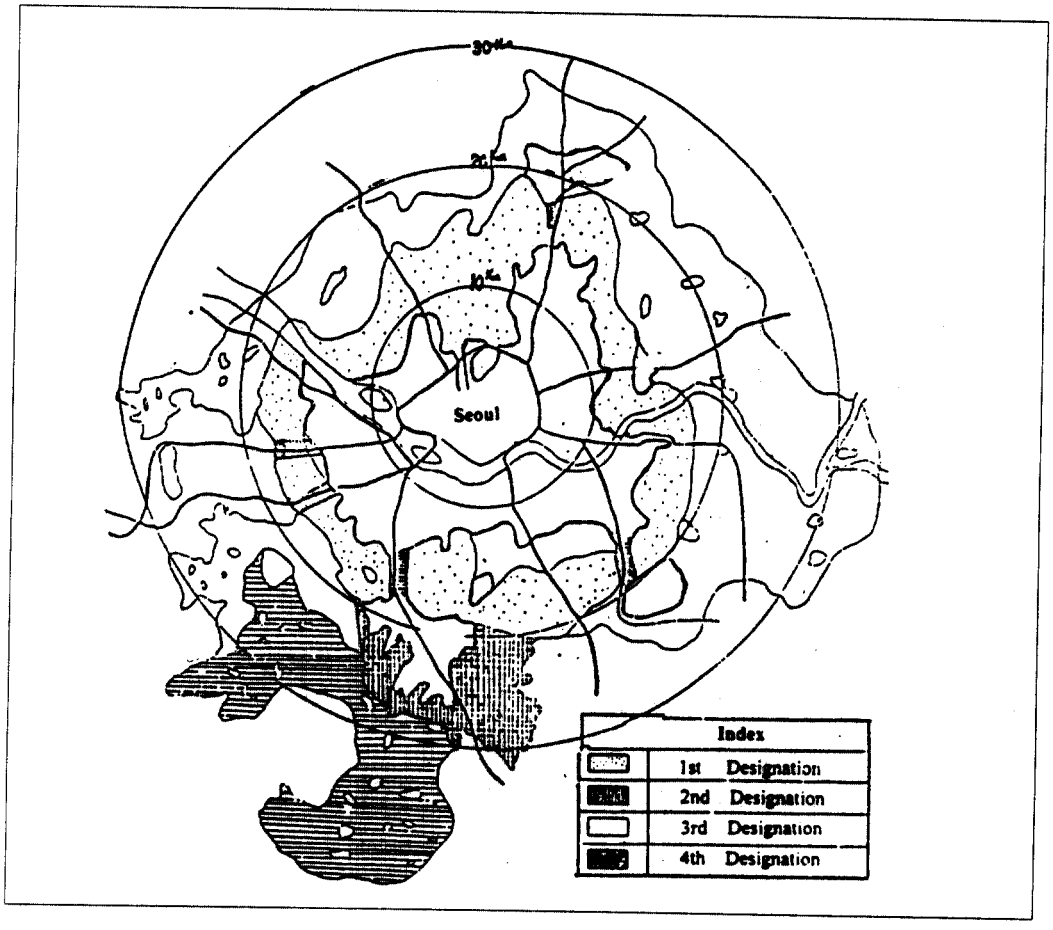


According to the Department of Environment of England which institutionalized greenbelt for the first time, it defines a greenbelt as ***an area of Urban land, near to and sometimes surrounding a town, which is kept open by permanent and severe restriction on building.***[6]

In Korea, greenbelt is an example of growth controls designed to contain the growth of urban areas. It was designated in major cities in Korea between 1971 and 1977, to serve the functions of preventing irregular physical expansion of cities, protecting the environment and securing national defense. Land use conversions and construction activities inside green belt except rebuilding or altering the existing structures are firmly prohibited.

6) Department of Environment, ***The Greenbelts,*** London, Her Majesty's Stationary Office, 1988, p.8.

Figure 2. Greenbelt of Metropolitan Areas in Korea



Implicit in the concept of green belts are two complementary purposes: the preservation of land in a natural, garden-like, or agrarian state, and the shaping and limitation of urban spread.[7]

In some countries like Korea, greenbelt has more importance in the latter purpose through strong regulation of development, in contrast the founding of such towns as Greenbelt, Maryland: Greendale, Wisconsin: and Greenhills, Ohio in the U.S. are more tied with the former purpose.

But in the last decade the greenbelt concept has moved further into the

7) Larry D. Singell et al, ibid, p.207.

method of checking urban sprawl through strong regulation to development, particularly at the suburban areas of large cities, where many communities have become acutely aware of the twin phenomena of sprawl and decimated stock of open space.[8]

At any rate, in the light of the concept of greenbelt, it has two major functions. One is to keep open space which has some natural resources worth preserving as undeveloped lands.(From now on, I will call this kind of lands as "green lands" in this paper) As this function, the word "green" seems apparent in the greenbelt concept. In contrast, the other is to check urban spread. As this function, the word of "belt" is emphasized in the concept, as if the belt makes a bowl in which all the physical growth should be contained fully.

In this context, this paper examines both the major functions of the greenbelt in terms of economic efficiency respectively. It is because greenbelt may not always be efficient in both functions. If greenbelt 'for example' is proved efficient only for the aim of preserving green lands, while it is demonstrated inefficient as the method of checking urban growth, and then we had better seek out another method without persisting the 'belt'.

Ⅲ. The underlying rationale of greenbelt

1. 'Green' belt as public goods

It is well known that one of the characteristics of land is that land is multi-purpose. But if we divide the purposes of land into two large categories, one is lands as private goods, the other is lands as public goods.

8) Larry D. Singell et al, ibid, p.207.

Public goods are goods which are enjoyed in common.[9]

The former are such lands as housing land, commercial land, industrial land and agricultural land, which can produce social benefits by combining labor or capital inputs. In contrast, the latter are such lands as forests, rivers and ecological lands, which can also produce a certain social benefit even as a natural condition.

The social benefits that are produced from lands as public goods are very extensive. For example these lands give their surrounding areas and people natural environment that afford clean air and water, natural spaces for rest, recreations and field studiess. Thus the sum of these benefits from lands as public goods would be the value of the lands.

As lands have these two different functions in substance, so it is very ideal to keep the optimal proportion of lands as private goods and lands as public goods to all nations of which the total lands are inevitably limited.

Many economists who have faith in the free market mechanism might argue that those problems be easily solved by leaving them in charge of market, because the market will decide the proper proportion as a natural consequence.

But the problem is if all the land uses are left entirely to the decision of market function, the market might allocate immoderately little lands as public goods, thus bringing about exorbitant social losses. One of the reasons is because most of the benefits from lands as private goods are calculated in terms of money in the market, and returned to a certain individual. Thus the demand for lands as private goods possesses purchasing power, and it can be embodied in the market. While the benefits from lands as public goods are not calculated in terms of money in the market mostly, and restored to many and unspecified persons. So most of the demand for lands for public goods does not possess purchasing power, and it can not be materialized in the market.[10]

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9) Eban S. Goodstein, ***Economics And Environment,*** Prentice Hall, NJ, 1995, p.38.

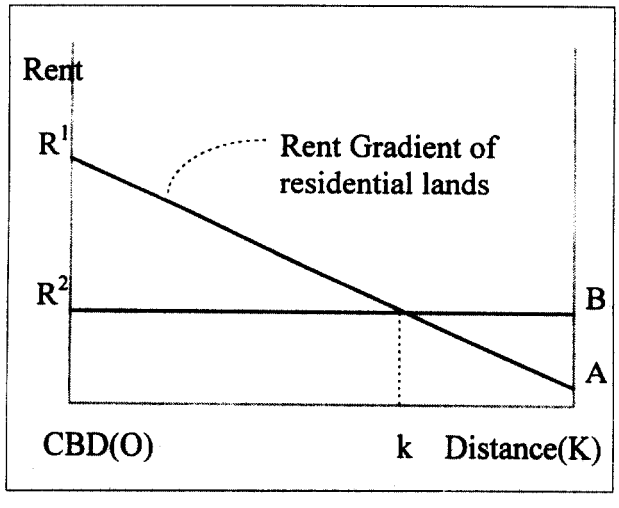
10) Lee Jung Jean, "Improvement of environmental preservation in Seoul", ***The Journal of Environmental studies,*** Vol. 27, Seoul National University, 1990.

The other reason is even if the lands as public goods are supplied in the market, the true demand for public goods will not be satisfied in pure market economies due to the transactions costs or free-riding. Let's suppose that a clean natural forest is surrrounding a neighbor A. So the people in the neighbor enjoy some benefits from the forest, such as clean air, rests and recreations. Now suppose that the forest is on sale in the free market under the condition that it should be kept as the natural conditions. In this case people are not willingly to pay it because they can enjoy benefits as before without buying it. Thus the value of lands as public goods, that is green lands, is apt to underestimated in the free market.

In these context the effort to establish a greenbelt is one of expedients to secure lands as public goods, otherwise they are undersupplied. This underlying rationale of greenbelt can be approached graphically as follows:

First of all, let's suppose a certain urban area with only two kinds of land use for the simplicity: residential lands as private goods and green lands as public goods. Now I am going to start from the traditional land rent theory, that is William Alonso model. Figure 1 presents land rent gradients of those two kinds of lands.

Figure 3. Rent Gradients of residential lands and green lands



The Alonso model explains housing and location choice of households by the trade-off relationship between housing cost(rent) and commuting cost.

He argues that as households move farther from the center of employment(CBD), greater commuting costs must be counterbalanced by reduced expenditure on land.

Thus the rent gradient of residential land becomes R^1A in Figure 3, so that land rent is fully capitalized by commuting cost saving. And the assumptions that underlie in the model are also introduced in this analysis: The market is competitive, households try to maximize their utilities, and housing is characterized only by size(sq.ft) and location, say distance from CBD.

Meanwhile as the value of green lands are underestimated in the free market due to the characteristics as public goods such as free riding and a "demand distortion"[11] in the market. The value of such green lands are irrelevant to the distance from CBD, and they are not used for producing market value, thus the rent gradient of green lands is assumed to be low and horizontal line(maybe it is not exactly horizontal in reality) like R^2B in Figure 3.

Thus if the land use pattern of this urban area is left in charge of market mechanism, the lands amount of Ok should be allocated as the residential lands, and the lands amount of kK should be allocated as green lands among the total urban areas(OK) as the equilibrium land use pattern in Figure 3.

This is the main idea that those who stand against the artificial establishment of green belt argue. They explain that the market will decide the optimal land use pattern of itself.

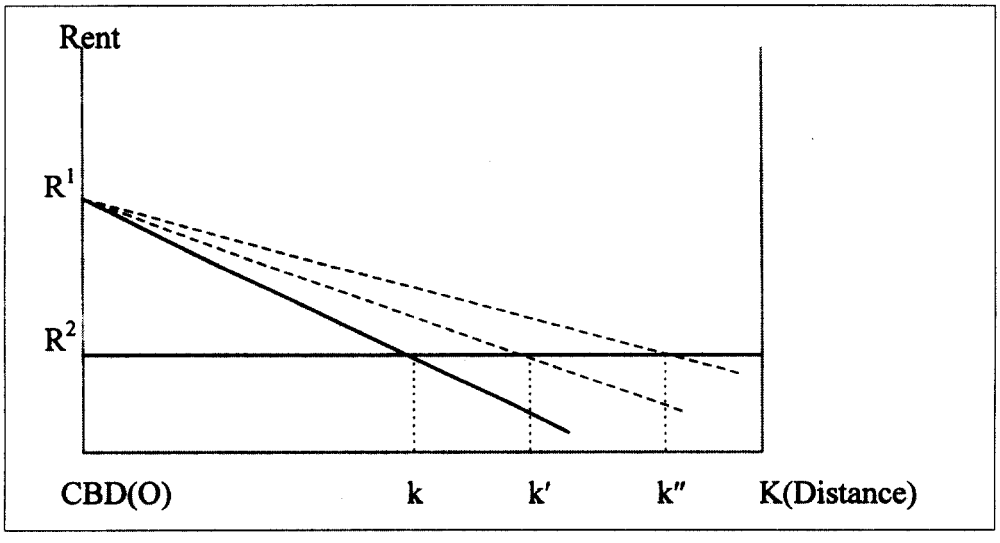
But the problem is if we follow this, the supply of green lands, as I already mentioned, will be reduced more and more, thus they will be undersupplied as compared with their real demand.

Figure 4 explains this clearly. Now I add one more assumption on this

11) I use this word to express that the true demand for the preservative lands are not sufficiently recognized in the free-market economies.

model: Real income increases as time lapses. This assumption is quite reasonable in the light of our experiences.

Figure 4. The effects of changes in income on rent gradient of residential lands



Changes in income and transportation(commuting) cost bring about changes in the equilibrium land use pattern of this urban area. According to this traditional model, the rent gradient of residential lands is[12] :

$$dR = - K/q \quad \cdots\cdots (1)$$

where R is the households' bid price for land, K is the commuting cost, and q is the consumption of land.

A change in income affects the right-hand side of Equation(1), because land consumption(q) rises with income. If this were the only effect, the right-hand side of the Equation would get smaller, thus the rent gradient of residential lands would get flatter. However, income affects K as well as

12) To know this in detail, please refer to W.C. Wheaton, "Income and Urban Residence: An Analysis of Consumer Demand for Location", ***American Economic Review*** 67, 1977, pp.620~631.

q. A rise in income causes a rise in the opportunity cost of time.[13] This raises the time cost of commuting, which raises the overall cost of commuting.[14] Thus the increase in K tends to offset the increases in q in Equation(1).

After all the impact of income increase depends on which of two effects prevail: the income elasticity of land consumption versus the income elasticity of the opportunity cost of commuting.

But the best available evidence suggests that the income elasticity of commuting cost is only modestly smaller than the income elasticity of land consumption,[15] thus rent gradient of residential lands is going to flatter as income rises, like the dotted llines in Figure 2. It results in a smaller proportion of green lands as time lapses(income increases), from the amount of green lands kK to the amount of green lands k′K and k″K.

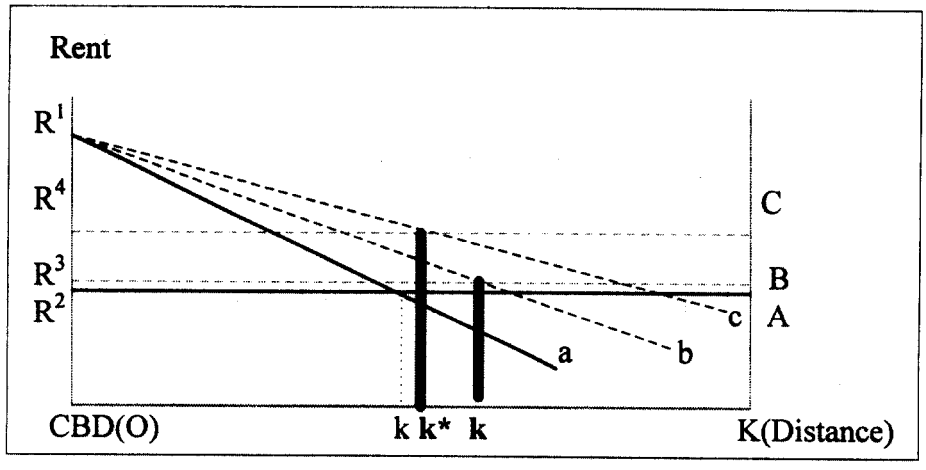
Figure 4 presents a meaningful implication that the proportion of green lands are going to be reduced as time lapses, if land use pattern is left entirely in charge of market function, as long as a rise in income does not have an effect on the demand for green lands.

But a rise in income is likely to affect not only the rent gradient of residential lands but the rent gradient of green lands. Now let's look Figure 5, the conclusive analysis on the underlying rationale of 'green' belt.

Figure 5 builds up a strong counterargument against those who stick to the market mechanism by presenting that greenbelt functions as tool that complement the market failure, that is the resource misallocation on the contrary.

13) E.S. Mills and B. Hamilton, Urban economics, Glenview, IL. 1988, p.117.
14) Ibid, pp.117~118.
15) Ibid, p.118.

Figure 5. underlying rationale of 'green' belt



Now I introduce my final assumption that demand for green lands also increase according to the increase of income, as well as the demand for residential land consumption. This is based on some intuition and past experiences. One of these experiences is the fact that we have experienced the explosive increase of demand for tourism during last some decades, as income level become higher.

And let's suppose 3 period. At the present period the rent gradient of residential lands is R^1a, and the rent gradient of green lands is R^2A. So the effective allocation of land use in this urban area is to use the amount of lands Ok as residential lands, and to preserve the amount of lands kK as green lands in the free market. And by this the market is in the equilibrium.

Now income increases in the second period, so the rent gradient of residential lands become flatter like R^1b, and the rent gradient of green lands move up like R^3B. So at the second period, the equilibrium land use is achieved by allocating the amount of llands Ok to residential lands, and the amount of kK to green lands. Thus the amount of lands kk will be converted from natural lands to residential lands in the second period.

Again, income increases once more in the third period, so the rent gradient of residential lands become R^1c, and the rent gradient of green

lands become R'C. Thus at the third period the equilibrium land use is achieved by using the amount of lands Ok* as residential lands, and the amount of lands k*K as green lands.

So in Figure 5, this equilibrium can be achieved again by restoring the amount of lands k*k to the original state, say natural green lands.

But the problem is that once the green lands are developed, it is almost impossible to restore them. If a certain natural mountain were developed as residential estate, would it possible to produce the same mountain or, to expel all the people and structures in the mountain in order to re-achieve market equilibrium?

In particular in case that the elasticity of green lands with respect to income is greater than the income elasticity of demand for residential lands, the free market will always produce this problem.

This is the very rationale that underlies the establishment of 'green' belt. Thus as long as the social demand for green lands exists at any rate, the appropriate amount of green lands, especially in the case of metropolitan areas in which the demand for natural lands is relatively high, should be kept.

In this context 'Green' belt itself as a method to meet the future market equilibrium, is not the problem to be censured. The real problem is where and how much 'green' belt should be established in term of economic efficiency.

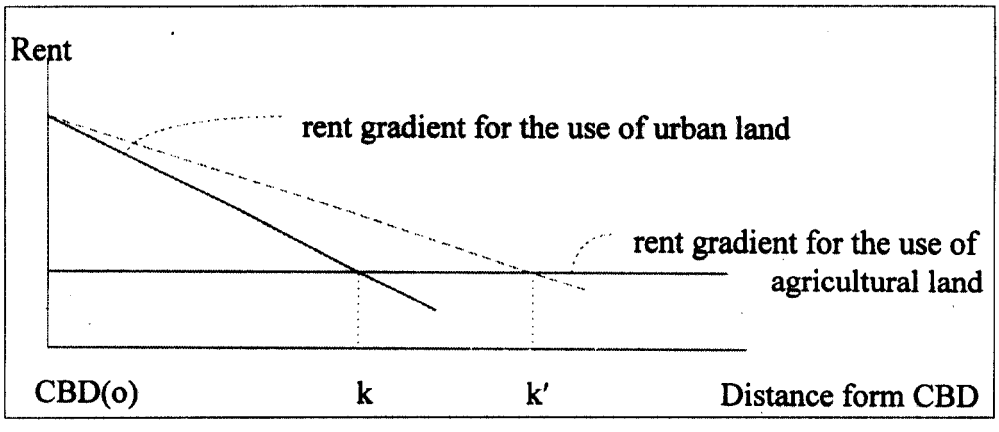
2. Green 'belt' as a method of checking urban growth

Cities have fundamental dynamics to growth. If land use pattern is left to the free market, households and firms are going to maximize their own benefits without thinking of the spillover of other households and firms, thus bring about the plane spatial spreading and the disordered development of the cities.

One of the intents underlying the establishment of greenbelt is to restrict

these disordered urban spread. To do this, a green 'belt' puts a ring-shaped wall around the urban fringe that forces urban growth to be dissolved within the 'belt.' So this idea stands on the premise that a greenbelt help to secure the appropriate urban size at which the external economics of scale is maximized. Figure 6 presents this rationale of the establishment of the greenbelt.

Figure 6. Green 'belt' securing appropriate urban size



In the Figure 6, the free market will determine the appropriate land distribution to urban lands and agricultural lands at the point where two solid lines meet. Thus the amount of lands Ok will be used as urban lands, and the remains will be allocated for agricultural use. If this allocation is considered to secure the maximum benefits of agglomeration economies, a greenbelt can be established at this point to do that. And if some excessive demand for urban lands occurs owing to income increase or population growth after establishing the 'belt', these increased demands are going to be met by the outside of the city through such methods as building new towns.

Suppose that income rises after the establishment of the greenbelt at the point k, so the rent gradient becomes flatter in the Figure 6. In this case, the increased demands for urban lands kk′ may be accepted by other places outside the city to keep the city size appropriate levels.

Ⅳ. The economic efficiency of greenbelt

1. Efficiency Criteria

To evaluate greenbelt policy in terms of economic efficiency, we need to look closer at the concept of efficiency. The term ***efficient*** in everyday parlance means a situation in which no resources are wasted.[16] The economic definition of efficiency was introduced by an Italian economist, Vilfred Pareto, and when economists say an outcome is efficient, they almost always mean ***Pareto efficient.***[17] Meanwhile another word ***pareto improvement*** is usually used to clarify the meaning of Pareto efficient. Pareto improvement is an exchange whereby at least, one person's utility is increased, while no one is worse off. Thus when we say ***Pareto efficient,*** it means the situation in which there is no room for potential Pareto improvement.

By the way, as this ***pareto efficient*** is realized in the pure competitive market in the sense of economics, so the government intervention is usually justified only when the market can not realize ***pareto efficient.*** Land use regulation is one of the types off such government intervention of which the purposes are the control of the negative externalities, a proper supply of public goods and the reduction of cost in supplying public services.[18]

Thus when we evaluate whether greenbelt is efficient mean of land use regulation, we should inquire into whether the free market can not realize the very purpose of the establishment of the greenbelt: the appropriate supply of green lands as public goods and the restriction of the disordered urban spread. If these purposes are realized in the free market, thus resources are being properly allocated, there would be no justification of government intervention.

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16) Eban S. Goodstein, ibid. p.44.

17) Ibid. pp.44~45.

18) Lee Jung Jun, ***Land Economics,*** Park Youngsa, Seoul,1988, pp.402~422.

And besides this condition, the costs according to the establishment of the greenbelt, if it is to be evaluated as efficient, should not exceed the benefits from it. In case that the costs exceed the benefits, the government had better seek out another method.

2. Efficiency of 'green' belt

As already mentioned, one of the purpose of a greenbelt is to secure appropriate supply of green lands as public goods. If this purpose is not realized through the free market, then the greenbelt policy may satisfy the first condition of being efficient. So far as this condition, we already illustrated in section 3 that the free market is likely to fail in securing the appropriate supply of green lands, thus resource misallocation may result.

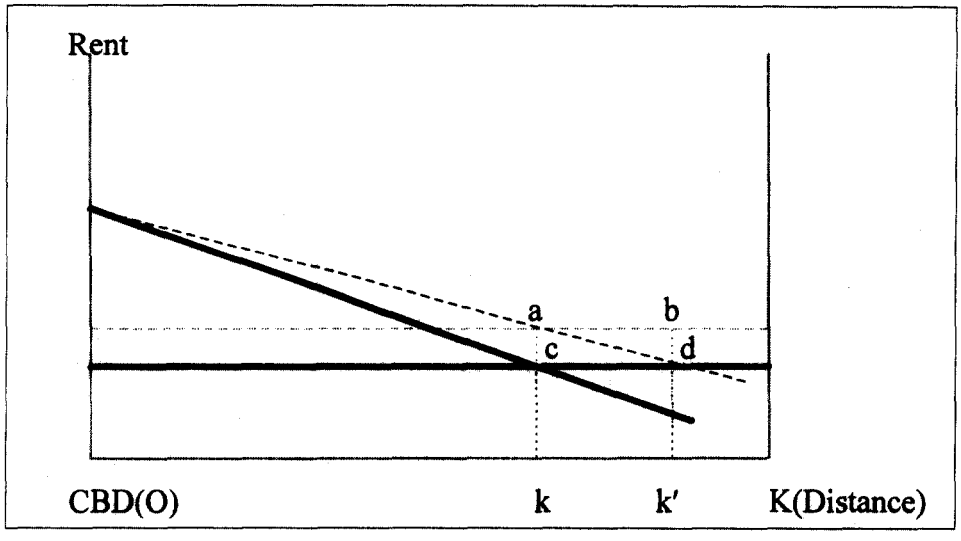
Then, the next condition that should be satisfied concerns the cost/benefit analysis. What are the costs and the benefits of the establishment of 'green ' belt for the purpose of securing the appropriate supply of green lands?

Now let' s revisit the simple assumption that was presented in section 3: a urban area with only two kinds of land use, that is residential lands and green lands. And let' s suppose a community X with green lands in the suburb. Now the community comes to the fork of the decision whether develop the green lands or not, because the community needs more residential lands to satisfy the new housing demands according to the population growth.

Figure 7 explains this situation. At present this community holds the amount of kK as green lands, while the amount of Ok was already developed as residential lands. Now according to the increase of housing demands(the rent gradient of residential lands become flatter like a slope-dotted line in the figure), the community is thinking over the matter whether develop or keep the green lands. If it decides to develop the green lands, the environmental amenities from the green lands would be reduced, in contrast if it decides to keep the green lands undeveloped, it should

seek out another solution such as encouraging high-density land use in the already developed areas.

Figure 7. The cost and benefit of 'green' belt



In this case the cost of keeping green lands become its opportunity cost, say the value of land in residential use. And the community considers that the cost of keeping green lands amounts as much as the width of the trapezoid adkk', and the benefit of keeping green lands amounts cdkk'. Thus the community will continue to convert the green lands to the point of k' until the marginal cost of keeping green lands meets the marginal benefit, resulting in the reallocation of the amount of lands Ok' as residential lands and the amount of lands k'K as green lands.

But the problem is that if the option value[19] of the green land is involved together, the real benefit of keeping green lands is not the amount of ' cdkk'', but 'abkk'' under the assumption that the marginal benefit of the green lands is maximized at the level of a horizontal-dotted line in the figure.

In the above case, if the community convert the amount of lands kk' into

19) It means the willingness to pay to reserve the opportunity to purchase a depletive good in the future. About this, refer to Eban S. Goodstein, ibid. pp.62~105.

residential lands, then the cost will exceed the benefit, and the total cost will amount as much as the width of the triangle 'abd'.

What I am emphasizing in this paper is that the government intervention in the form of establishing 'green' belt can achieve the effective resource allocation, which the free market fails to secure, at the point where the community feel the benefit from keeping green lands at its maximum, regardless of the cost side. The reason is because the marginal benefit of keeping green belt increases till a certain point, and then falls downward, reflecting the fact that people, as income increases, put more value into the amenities until the sufficient amenities are secured, but after securing the appropriate amount of environmental amenities, people are not going to put much value to the additional supply of them any longer, and because the marginal cost curve certainly passes the maximum benefit point.

The premise that the marginal cost curve meets the maximum point of marginal benefit of keeping green belt, is supported the following realistic prospects.

One is the fact that the residential lands, in the future, are likely to have a lot of substitutes such as high density land use, owing to the technological advance. This means that the supply of residential lands have a possibility of increasing to some extent within the existing city areas. In contrast, the lands with environmental resources can not be duplicated even though there are a remarkable progress in technology. Thus the fact that the supply of green lands has a limit in nature, while and tthe supply of residential lands has a potentiality to increase, implies that the social value of green lands compared to the residential lands will continue to rise as time lapses.

The other prospect is that the elasticity of green lands with respect to income is likely to be greater than the income elasticity of demand for residential lands, as income rises, because the technological advance will not only improve the accessibility to the green lands through the innovations in transportation or in recreational facilities, but increase the demand for green lands indirectly through the rising desire for leisure and

the enhancement of educational levels.[20]

After all, due to the technological advance and the rise in income, the community possesses the social demand for the green lands at its maximum benefit level potentially.

Besides, since the marginal cost of keeping green lands will pass at the highest point of the marginal benefit in the future, and the green lands have the nature of irreversibility in substance, the community had better preserve the green lands to the amoount that the green lands themselves give their highest amenities, in order to secure the effective resource allocation in the long run.

In this context the very role that the planners should take is not to draw a restrictive lines in the urban planning map, but to help steer the community to the social consensus about the amount that their green lands make the maximum amenity.

3. Efficiency of green 'belt'

In this section, I am going to examine the efficiency of green 'belt' policy that aims at checking compulsorily the disordered urban spread through establishing a powerful walls(belt) around the urban fringe.

As already mentioned, the establishment of greenbelt as one of the most powerful government interventions can be justified for the moment only when the market fails in controlling the disordered urban spread. And about this, as we investigated in the previous section3-2, the market is not likely to succeed in checking the continuous urban growth, because households and firms are going to maximize their own benefits without thinking of the spillover of other households and firms. Besides some fiscal-sociaal problems such as high taxes, low quality of public schools and government services, racial tensions, crime and congestion are also

20) Lee Jung Jun, ibid, pp.450~461.

suggested as the causes of urban spread.[21]

The cost and consequences of unchecked growth have been documented among academics and planning experts for more than two decades.[22] The remarkable point about the cost of unchecked urban spread is that no one in and around the urban areas is unaffected from the cost.[23]

Now let's think about the cost and the benefit of these physical growth control in order to evaluate the efficiency of green 'belt' policy.

In fact a cost-benefit analysis on growth control policy is not easy to do mainly because of the difficulty in measuring numerically the benefit such as the insurance of proper urban scale economies or the preclusion of spillover. Consequently, most studiees focus on the impact on the cost side with a few exceptions.[24]

The cost of greenbelt as a method of growth control is the loss in the welfare of the affected residents in terms of increased housing costs.[25]

The impact of greenbelt as a method of growth control upon the urban housing market can be illustrated using a simple demand-supply diagram in Figure 8.[26]

The enforcement of greenbelt around the urban fringe is a kind of restriction on proper land and housing supply. The market supply curve of housing is derived from the marginal cost schedules of individual housing producers and slopes upward.[27]

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21) P. Mieszkowski and E.S. Mills, The Causes of Metropolitan Suburbanization, ***Journal of Economic Perspectives*** 7, 1993, pp.135~147.

22) http://www.greenbelt.org/gba/beyond.html

23) http://www.greenbelt.org/gba/beyond.html

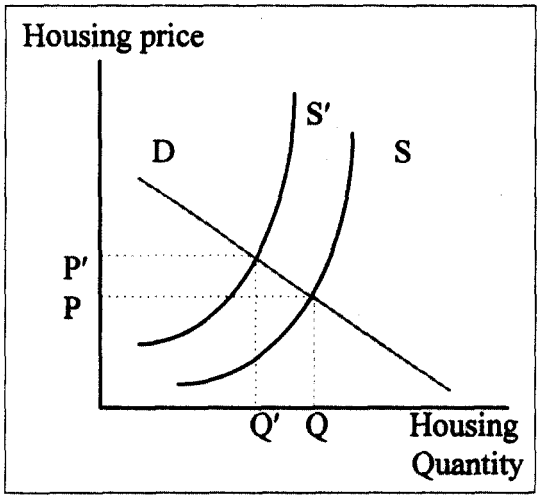
24) Kim Kyunghwan, Land use regulation and urban housing markets in Korea, Major ***Planning Issues in the 1990s: Decade of Turning Point***, KRIHS, Seoul,1990. p.376

25) Kim Kyunghwan, ibid, pp.371~377. But some economists including W.Fiscal, see this higher housing prices as benefits by their owners.

26) As this paper divides the major function of greenbelt into two : keeping green lands and growth control, I will not consider the demand stimulation effect of green 'belt' owing to the increase of amenities in this section, because the main object that this section deals with is the 'belt' which is not quite relevant to the green lands.

27) Kim Kyunghwan, ibid, pp.372~373.

Figure 8. Housing market in case of supply restriction



If there is no growth control(the 'belt') and the market equilibrium obtains at price P and quantity Q. Suppose now that the government restricts the supply of developable lands by enforcing greenbelt around the urban fringe. Then the housing supply curve will shift upward to S′ as land price rises.

As a result, housing price rises to P′ and housing production drops to Q′.

And this inflationary effect of the growth control on housing prices will be greater, when the price elasticity of housing demand is smaller.

Although many empirical studies report evidence for the impact of various forms of land use controls including growth controls upon prices of land and housing, the magnitudes vary substantially across studies.[28] Lawrence Katz and Kenneth Rosen(1987) found that houses selling in the growth controlled communities 17 percent to 38 percent more expensive than those in other communities in the San Francisco Bay Area. Schwartz, Hansen, and Zorn(1986) report a 9 percent increase in the per unit price of new housing in Davis, California.

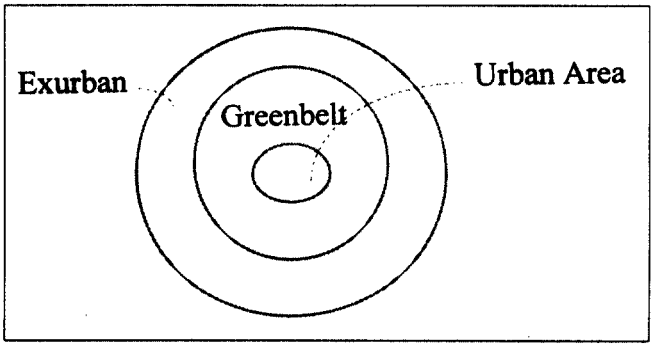
Meanwhile a study about the effect of greenbelt around Seoul metropolitan in 1982 reported that there are no significant effects of

28) W. Fischel, Do growth Controls Matter?, Lincon Institute of Land Policy, 1989.

greenbelt on land value dynamics.[29]

But the more serious costs according to the greenbelt regulation is the fact that it leads to the so called 'leap-frogging' development beyond the greenbelt. Figure 9 helps to understand this problem.[30]

Figure 9. Leap-frogging development caused by greenbelt regulation



Suppose that a city establish a highly restrictive growth controls in the its fringe labeled 'greenbelt' in Figure 9. Prices of lands under existing housing will rise in such areas, and prices of lands subject to the new restrictions will fall. But another effect will occur as well: developers will move to communities still father from the CBD, labeled 'exurban' in the figure.[31] Land values in the exurban areas will rise, but because of their remoteness, they will not be as high as the greenbelt area would have been had no growth controls been implemented.[32]

I think this leap frogging phenomena is inevitable as long as people would not willingly to leave the city and move another areas where they feel to get more benefits. And one of the typical leap frogging phenomena would be found in the Seoul metropolitan area, Korea in the previous Figure 2.

A careful look at the value of land in different locations around Seoul city reveals a discontinuity: the land values decline as distance to the city

29) Jo JungJae et al, Population, Its Density and Land Value Dynamics: Role of Green Belt, ***The Journal of Korean Planners Association***, Nov. 1982.
30) W. Fischel, ibid, p.38.
31) Ibid, p.38.
32) Ibid, p.38.

center increases, and drop sharply inside the greenbelt, and bounces back again at farther out locations. This is a sign of exurban sprawl caused by the greenbelt.

The long-run effect of this is a lower standard of living.[33] People will commute longer, creating more congestion and pollution and eventually requiring more transportation investment.

A recent survey by Korea Transport Institute reports that about 600,00C people living outside the Seoul's greenbelt commute to job site or to school towards Seoul city everyday in 1987, and the additional cost due to longer commuting would exceed one million dollars.[34] Besides, another subtle loss from inefficiently dispersed homes and businesses is the loss of agglomeration economies for firms.[35] Thus ironically, the establishment of greenbelt, intended to secure the agglomeration economies, is likely to hamper them on the contrary.

The point is that greenbelt policy as a method of growth control is not efficient at all because it can not do that, rather imposing a excessive cost on the society additionally.

Meanwhile besides the side effects of the green 'belt' in terms of economic efficiency, it is not likely to be supported from the standpoint of social equity. Figure 10 illustrates this graphically.

Let's suppose that the amount of lands Ok was used as urban lands and the amount of lands kK was used as agricultural lands in a community. But the local government has recently established green 'belt' for the purpose of strong growth restriction in the suburban areas k'k.

As the result of the excessive supply restriction and urban sprawl, the rent gradient becomes the thick line: the land values of existing housing rises as much as 'A', and land values in the exurban areas rises as much as 'C', while the prices of land in the green 'belt' subject to the new restriction falls as much as 'B'. This results that the large number of

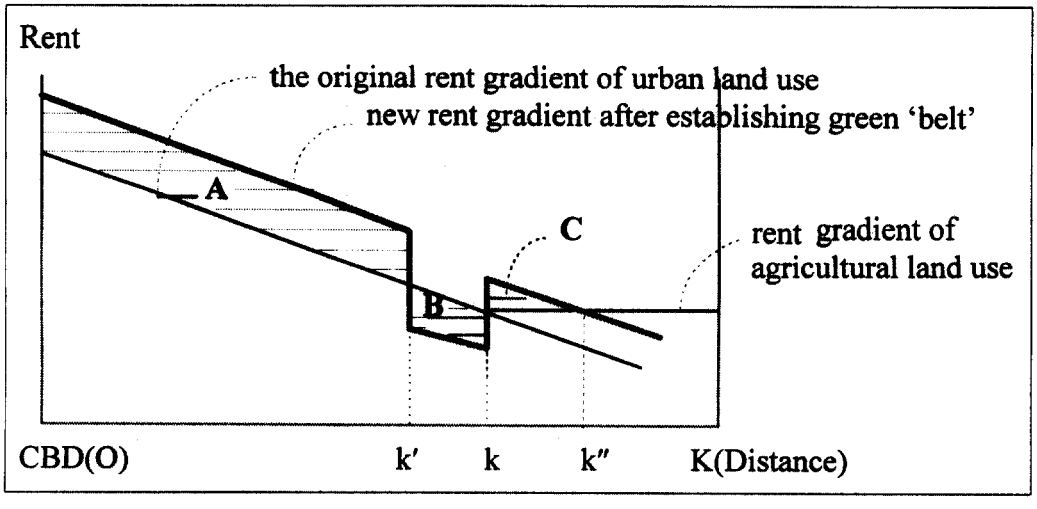
33) W. Fischel, ibid, P.56.

34) Korea Transport Institute, ***Report on Travel Pattern Survey of Commuters and Students in Metropolitan Area***, Seoul, 1989, p.24.

35) W. Fischel, ibid, p.57.

people who possess lands outside greenbelt make a fortune, in contrast the small number of people who have lands inside greenbelt lose a fortune. After all, growth control is excessive because the majority can obtain its benefits while imposing the costs on a minority who cannot prevent it.[36] Besides, the poor homeless people have to pay much higher rent, thus results in inequity of income redistribution socially.

Figure 10. The equity problem of green 'belt'



Accordingly, the desirable solution at least for the equity among land owners is simply to compensate the loss('B' in the figure) of property owners injured by the establishment of greenbelt through taking back the gains('A' and 'C' in the figure) of the profited property owners. But the problem is that it is only possible to do that in terms of theoretical base, but in reality it is nearly impossible and complicate job to taking back the gains completely. After all the suboptimal solution is to require that the local government compensate property owners injured by the rigid growth control policy. However, even if the local government compensates the loss fully, the problem of social inequity caused by the rigid growth control policy still remains.

36) E.S. Mills, Economic Analysis of Urban Land-Use controls, ***Current Issues in Urban Economics***, The John Hopkins University Press, 1979, p.536.

Ⅴ. Conclusion: Revisiting the hot spot of arguments in Korea

The history of the heated disputes about greenbelt is as long as that of its establishment in Korea, even though they occurred among a certain group. The surprise of the outsiders of other countries at the greenbelt policy in Korea, is the facts that the initial greenbelt area was kept almost unchanged over 20 years, and any compensattion was not done when the government established the greenbelt area in Korea. Despite of sporadic controversy regarding the specifics of the regulation, greenbelt policy has enjoyed public support in Korea. Although the owners of the property inside the greenbelt complain about the rigidity of the land use regulation and express their frustration about not being able to reap capital gains, the existence of the greenbelt seems to be taken for granted.[37]

But as people get to harbor a doubt about the efficiency of the greenbelt policy due to the exurban sprawl, and as the owners of the property inside the greenbelt get to give pressure to the political process as a group with the change of political system from centralized government system to local autonomy system, the problem of greenbelt has become recently one of the hot issues both socially and politically in Korea.

The focus of the arguments is whether the greenbelt is to be relaxed or not, while few people argue that the restriction should be lifted entirely. The main ground of the argument for the greenbelt policy is that it keeps the urban amenities with greeen spaces, while the argument against the policy is that it causes urban sprawl in case of metropolitan area, and holds down the growth potentials in case of provincial large cities. As to the problem of compensation, both the disputants agree that the excessive sacrifice of the owners of greenbelt lands should be compensated.

After all, the supporters are emphasizing nothing but the 'green' that this paper supports, while the opposers are put up nothing but the side

37) Kim Kyunghwan, ibid, p.376.

effect of the 'belt' that this paper criticizes. No groups are wrong. Accordingly, such disputes are not likely to be ceased, unless people gaze at the 'green' and the 'belt' separately, because both the points of controversy themselves are right.

I think that the very way to seek out the solution for the problem of greenbelt begins when we discard the fixed idea of 'greenbelt' that was used in the old days at which the matter of the rapid urban growth, especially in metropolitan areas, did nnot happen.

What I am arguing through this paper is that we should keep the concept of the 'green', but discard the concept of the 'belt' in the word 'greenbelt'.

Cities have a fundamental dynamics to growth. As this paper illustrates, the physical method of building a wall to control the dynamics compulsorily are apt to produce a large amount of social costs in opposition. We had better seek out the way creating efficient growth patterns that secure the quality of life, and economic competitiveness of the city, instead of attempting to limit growth physically.

Meanwhile this paper supports the necessity of preserving green lands as a form of government intervention to prevent resource misallocation by unregulated private markets. And the effective allocation of lands between green lands and other lands can be achieved by allocating the lands to the way that the marginal benefit of the keeping green lands is in its highest without considering its cost.

Of course, this may produce another problem how we know the very amount of green lands that makes the maximum benefit. But the point that this paper suggests is that the establishment of 'green' lands should be accessed through socio-political consensus. Thus the real role of planners in the establishment of 'green' belt is not to draw a rigid lines in the map, but to lead out the social agreements about the amount of green lands that gives maximum benefit to the city in the future.

In this context, this paper emphasizes the conclusion that the problem of the 'green' belt is a socio-political one, not a pure economic one alone.

One of the way to solve the greenbelt problem of Korea is to consider

the greenbelt policy as a method of preserving green lands, not the method of growth control. Accordingly, the Korean government need to classify all the lands inside greenbelt into the green lands worth preserving and the other lands that is being used just for making the 'wall'. And then it is recommended that the government seek out the way of buying all the ' walls' that the private sector owns at the appropriate price, as well as compensate the excessive sacrifice, imposed on the owners of property inside the green lands that are going to be preserved continuously.

And it is also recommended that the government keep or develop those lands to the way of facilitating the effective land use pattern, after purchasing the 'walls'.

However, these new policies that I argue in this paper, may arouse some difficulties in terms of how to separate the lands into the two category, and how much the green lands should be preserved in order to secure the maximum benefits in the future. About these problems, much more elaborated studies are required in future.

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