

# A Comparative Study on the Financial Characteristics for Development Methods of Urban Development Project - Focusing on Multi-level Replotting Method -

Jin hui Kim, Hyung kwan Cho, Ji won Moon, and Hoon Chang

**Abstract**—The purpose of this study is comparing and analysing of the financial characteristics for development methods of the urban development project in the established area, focusing on the multi-level replotting.

Analysis showed that the type of the lowest expenditure was 'combination type of group-land and multi-level replotting' and the type of the highest profitability was 'multi-level replotting type'. But 'multi-level replotting type' has still risk of amount of cost for the additional architecture. In addition, we subdivided standard amount for liquidation of replotting and analysed income-expenditure flow. Analysis showed that both of 'multi-level replotting type' and 'combination type of group-land and multi-level replotting' improved profitability of project and property change ratio. However, when the standard was under a certain amount, amount of original property for the replotting was increased exponentially, and profitability of project.

**Keywords**—Urban development, multi-level replotting, financial characteristics, expropriation type, combination type, urban meteorology.

## I. INTRODUCTION

RECENTLY according to increasing demands of redeveloping the established area, the development project on 「Urban Development Act」 is needed more and more, which makes mixed-use development possible. And multi-level replotting is also required to introduce in the urban developing of the established area for planning land and architecture simultaneously and resettlement of original residents who are petty landowner mostly. But in Korea multi-level replotting hasn't been applied, so analysing on the effect of it is necessary.

## II. SCOPE OF STUDY

This research consists of two sections. One is a documentary study on multi-level replotting, and the other is the application and analysis of replotting method in a case district.

First, through the documentary study in this research, the

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legal system related with replotting such as 「Urban Development Act」, etc, and the previous researches related with multi-level replotting system improvement were analyzed. Also contents, problems, solutions in the existing multi-level replotting system were considered. Second, we planned a replotting, after designating a case area, applying replotting methods, and setting scenarios according to a project method. For designating a case area, we only choose among the development area where the multi-level replotting method needs to be applied. So, urban development project area including built-up area is designated. We prepared scenarios to analyze according to business methods, and in the scenarios we planned replotting by these project methods; 'accepting or using method', 'multi-level replotting method', and 'business method'. Third, in each scenario classified by project methods, financial analysis of the business was executed. For materials for the financial analysis of the business, the contents in the development plan notification of the case area were reflected. For estimating the price of buildings and land for sale after project, site cost and neighborhood price are reflected. Finally, in case of 'multi-level replotting method' and 'grouping+multi-level replotting method', we analyzed the change of proportion and business profit according to adjustment of the replotting selection criteria. This was to analyze the effectiveness according to modification of the replotting selection criteria.

## III. GOAL OF STUDY

The purpose of this study is comparing and analysing of the financial characteristics for development methods of the urban development project in the established area, focusing on the multi-level replotting.

## IV. PREVIOUS STUDIES

**Multi-level replotting:** This is the way to replot the co-ownership portion of parts of the building and the building site to owners of the buildings and etc, to prevent a too small lot after arrangement in a land readjustment project. Replotting method enforcement procedure.

**Land burden rate:** Burden rate is a replotting method, and is the percentage of the reserved land, designated by the reserved land designation plan, in the area which urban development project in replotting methods is executed in to the project area

where replotting method applied.

Land burden rate = (reserved land area - free attribution public facilities area) / (replotting district area - free attribution public facilities area)

**Grouping replotting district:** After implementation of a project, a project operator, when it's necessary, may replot a lot to 2 people or more jointly after receiving approval from a land owners, to prevent a depopulation land. This is called, Grouping replotting.

**Multi-level replotting district:** Multi-level replotting is approved for building an apartment houses or a shopping mall. With this, the land and the building are replotted according to the proportion after estimating a previous value on the basis of land area.

**Proportion:** The proportion in the evaluation-based replotting method is the result of the replotting subject index after rearrangement divided by the index before the rearrangement. Proportion: post asset value / previous asset value.

## V. FEATURES OF A CASE DISTRICT

### A. Overview of a Case District

This purpose of this research is to analyze how the application of multi-level replotting method effects on a house owner and a project operator. Therefore, the target was limited to the district where multi-level replotting method needs to apply, and the urban development district including built-up area is designated as a case subject.

### B. Pre- and Post Valuation

TABLE I  
CASE THE DISTRICT

Area	Design Population	Population	Owner	Project Period
972,000m <sup>2</sup>	29,808	26,675	8,242	8 years

TABLE II  
LAND USE PLAN

Division	Area(m <sup>2</sup> )	Ratio(%)
Total	971,892.2	100.0
Residential	194,892.0	20.1
Commercial	242,706.0	25.0
Based of Urban	516,792.2	53.2
ETC	17,502.0	1.8

Regarding the time to estimate the pre- and post value, according to the urban development affairs guidance, the value before rearrangement is on the basis of the implementation plan approval(the status in which, any decision or modification of urban management planning according to an urban development project is not applied, i.e. the status before project), and the value after rearrangement is on the basis of replotting disposal, but it should be estimated before setting a replotting plan.

TABLE III  
PRE VALUATION

Division	Land	Building
Amount (one million won)	668,000	1,052,800

TABLE IV  
POST VALUATION

Division	Land	Building
Amount (one million won)	1,631,764	2,371,310

## VI. A STUDY ON THE SCENARIO SET-UPS

This study has set up mainly three different scenarios and compared them one another to analyze what effects could be gotten with business profits by applying 'vertical land disposal method' to the city development project which includes existing roads and streets. At first, reception methods were applied to make them as the standards for analysis by setting up the scenarios which carry forward the business and reviewing both the scenario with 'vertical land disposal method' and the one that compromises between 'group land disposal' and 'vertical land disposal'. The scenarios respectively have the primary principle such as 'to sell the land after building up the site', but as for the reception method, the scenario was chosen, in which building houses for migrants housing and special supply was additionally conducted, while, as for the 'vertical land disposal method' and 'group+vertical land disposal method', the scenario was set up, in which constructing the targeting housing and shopping arcades was additionally conducted 'the vertical land disposal method'.

VII. PLANS ON THE SCENARIO

A. Replotting plan of Initial scenario

TABLE V  
REPLOTTING PLAN OF INITIAL SCENARIO

Division	Reception method	Grouping replotting district	Group+vertical disposal
to sell the land	Area 258,834m <sup>2</sup>	Area 242,500m <sup>2</sup>	Common: 224,492m <sup>2</sup> Grouping replotting district(Commercial): 34,342m <sup>2</sup>
architectural planning	apartment houses property: 196,266m <sup>2</sup>	apartment houses property: 196,266m <sup>2</sup> Commercial property: 16,334m <sup>2</sup>	apartment houses property: 196,266m <sup>2</sup>
Multi-level replotting		*Owner(Only land, Houses, Houses+shopping center) (over250)→number1(Houses) (over450)→number2(Houses+shopping center) *Owner(Houses+shopping center) (over250)→number1(Houses) *Owner(shopping center) (below250)→number1(shopping center) (over500)→number2(shopping center)	*Owner(Only Houses) (over250)→number1(Houses) (over450)→number2(Houses+shopping center) *Owner(Houses+shopping center) (over250)→number1(Houses) (over450)→number2(Houses+land) *Owner(shopping center) (below250)→number1(shopping center) (over500)→number2(Houses+land)

B. Analysis on business Profit

The schedule for how many times to invest for each business phase is set.

TABLE VI  
ANALYSIS ON BUSINESS PROFIT - 1

Division	1 year	2 years	3 years	4 years
Project phases	District designation/development plan		Implementation plan/compensation	Compensation/Land construction
Cost	Compensation Land construction Cost		70%	30%
Income	Housing supply Shopping supply Ladn supply			20%

TABLE VII  
ANALYSIS ON BUSINESS PROFIT - 2

Division	5 year	6 years	7 years	8 years
Project phases	Construction	Shopping supply/Land construction	Housing supply	Construction cost
Cost	Compensation Land construction Cost	40%	40%	
Income	Housing supply Shopping supply Ladn supply	10%	30%	30%
			30%	70%
		40%	60%	

C. Gathering Materials and Precondition

Plans on land usage reflect the statements on the development plans, and plans on buildings are established separately within the range of development plans. The expense of business uses the statements of plans for funding among the ones in the notification on the development plan. At this point, the value of existing assets is the notified price from actual appraisal and assessment. This was assumed that the recipient for substitute lot applies for the replotting 100 per cent and the target land and buildings for selling should be sold 100 per cent as well.

In respect to the price estimation for the target land and buildings for selling, the buildings are reflecting the local market value while price for the land is decided around 100 per cent of the original construction cost. However, 110% will be applied to the site for central commercial district, with 90% for the site for both National Rental and public offices. Also, for the case of public rental (5 years), the cash-flow by the transition time of selling in 5 years is converted with NPV of the time for completion and applied to. The interest rate for the construction funds is 5.25% (according to 3 years of corporate bond, -AA, 1st quarter of 2010) and the business profit is analyzed based upon the time of completion.

VIII. ANALYSIS RESULTS OF EACH SCENARIO

According to the result of analyzing business profit based upon the business measures, the lowest business expense is shown on the 'group+vertical disposal method' at the working expenses of 3,132,035 million Won, while the finest business profit is shown on the whole vertical disposal method with 9,570 million Won business profit. In the case of whole vertical disposal method, it is thought that the business profit went high because of good profitability of the building comparing the expense by planning additional shopping district within the commercial property for replotting, while in case of low profitability for the additionally planned buildings, there could

also be the increased risks at the same price of the additional investment. However, the general standard for the vertical disposal (the minimum living space, post valuation higher than minimum assets) was considered when fixing the replotting price based upon the lowest price (250 million Won), which is the lowest for housing and shopping district provided after the business in the previous replotting plans. However, according to the distinct characteristics for the example district, the target for replotting is only 39% for whole vertical disposal and 40% for group+vertical disposal measure, which made the good points on vertical disposal measure faded, in which the re-settlement for the natives could rise. Therefore, analysis on the disposal/replotting is planned to be broken down and detailed by adjusting the standard for disposal target to have more recipients(the landlords). The previously planned standard for disposal plans, the targeting price was 250 million Won, which is now decreased and broken down to 200 million Won, 150 million Won, and 100 million Won. The disposal target price rates are increasing due to the lowering adjustment on disposal target lands, which is shown on [Table VIII].

TABLE VIII  
THE REPLOTTING RATES FOR TARGET PRICE

Targeting price	whole vertical replotting		group+vertical replotting	
	Disposal target (millon)	Rates(%)	Disposal target (millon)	Rates(%)
Over 250 million Won	601,267	38.7	621,670	40.1
Over 200 million Won	563,087	42.1	673,490	43.4
Over 150 million Won	747,272	48.1	767,675	49.5
Over 100 million Won	1,087,406	70.1	1,107,809	71.4

#### A. Whole Vertical Replotting

TABLE IX  
WHOLE VERTICAL REPLOTTING

Replotting targeting price	250	200	150	100
	millon Won	millon Won	millon Won	millon Won
Total cost	3,304,140	3,245,381	3,143,309	2,801,631
Total income	,135	,141	,057	,231
Replotting price payments	3,313,709	3,261,962	3,167,777	2,827,643
Replotting price recovery	,679	,988	,512	,656
Business Profit	-262,151,478	-262,151,478	-262,151,478	-262,151,478
Disposal target cost	478	478	478	478
Pre valuation	363,309	363,309	46,637,833	688,193,978
post asset value	9,569,544	16,581,847	24,468,455	26,012,425
Proportion	601,266,731	653,086,691	747,272,167	1,087,406,022
	610,909,544	670,031,847	818,378,455	1,801,612,425
	610,909,544	669,668,538	771,740,622	1,113,418,448
	1.016	1.025	1.033	1.024

TABLE X  
GROUP+VERTICAL REPLOTTING

Replotting targeting price	250	200	150	100
	millon Won	millon Won	millon Won	millon Won
Total cost	3,132,034	3,073,275	2,971,203	2,629,525
Total income	,580	,587	,502	,677
Replotting price payments	3,116,758	3,065,011	2,970,826	2,630,692
Replotting price recovery	,646	,956	,479	,264
Business Profit	-237,463,826	-237,463,826	-237,463,826	-237,463,826
Disposal target cost	826	826	826	826
Pre valuation	636,309	636,309	46,637,833	697,943,978
post asset value	-15,275,934	-8,263,631	-377,023	1,166,947
Proportion	621,669,749	673,489,709	767,675,185	1,107,809,041
	606,467,084	665,589,387	813,935,995	1,806,919,965
	606,467,084	665,226,078	767,298,162	1,108,975,988
	0.976	0.988	1.000	1.001

#### B. Group+Vertical Replotting

According to the analysis results by adjusting the standard price for disposal target, the lower the standard price for both whole vertical disposal and group+vertical disposal is, the better the business profit and rates tend to improve. However, in the stage of standard price at 150 million Won to 100 million Won, the rate for business profit increase slowed down for both the whole vertical disposal and group+vertical, while as for the rates, there was decrease in whole vertical disposal and slowed down increase in group+vertical disposal. That is, if the targeting price for disposal/replotting goes down below some level, the changes in improving business profit and rates are confirmed to slow down. It is assumed that the rates are reversed with the soaring value for existing assets without much fluctuation on the value of Post Valuation assets. That is confirmed when the abrupt increase for disposal target in section with the standard price of 100 million Won: 48% to 70% for whole vertical disposal and 49% to 71% for group+vertical disposal. This can bring the interpretation that this is because of the concentration of the value for the existing assets of the owners to this area. We have described inter-relationship between business profit and rates followed by the adjustment on the standard price for disposal targets as shown in the graphs on [Figure 1] and [Figure 2]

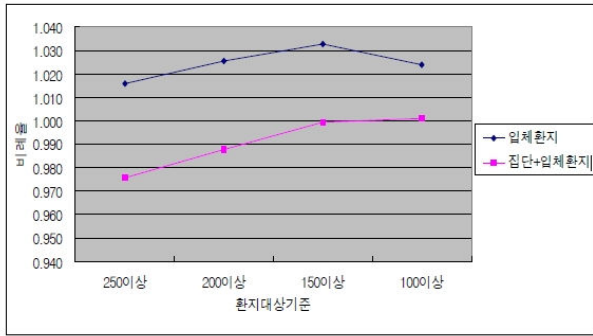


Fig. 1 Inter-relationship between business profit and rates followed by the adjustment on the standard price for disposal targets (1)

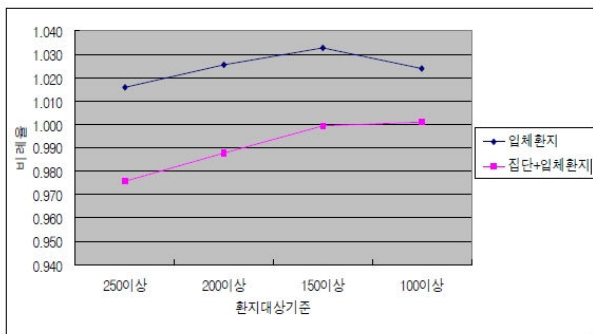


Fig. 2 Inter-relationship between business profit and rates followed by the adjustment on the standard price for disposal targets (2)

## IX. CONCLUSION

After scanning laws and procedures related to the multi-level replotting, we selected a sample urban development project in downtown and divided methods of the project into three types - 'expropriation type', 'multi-level replotting type' and 'combination type of group-land and multi-level replotting'. And we analysed income-expenditure flow of each types and analysed and compared financial effects.

Analysis showed that the type of the lowest expenditure was 'combination type of group-land and multi-level replotting' and the type of the highest profitability was 'multi-level replotting type'. But 'multi-level replotting type' has still risk of amount of cost for the additional architecture.

In addition, we subdivided standard amount for liquidation of replotting and analysed income-expenditure flow. Analysis showed that both of 'multi-level replotting type' and 'combination type of group-land and multi-level replotting' improved profitability of project and property change ratio. However, when the standard was under a certain amount, amount of original property for the replotting was increased exponentially, and profitability of project and property change ratio was rather slowing down.

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