

# GFA HYPOTHESIS MODEL - AN ALTERNATIVE MODEL TO EVALUATE THE TREND OF REDEVELOPMENT IN HONG KONG

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## ABSTRACT

*This paper investigates the trend of redevelopment in Hong Kong by identifying and examining the factors affecting the decision to launch a redevelopment project. Empirical data from Western Hong Kong Island during 1980-2001 is used to identify the characteristics of past redevelopment projects. Such data also reveals that there is no obvious relationship between the fluctuations in the property price/rent and the rate of redevelopment. As a result, this paper will mainly focus on the supply side factors. We make use of a GFA ratio to decide the feasibility of a redevelopment project. We further analyse how the characteristics of the existing site affect in GFA ratio (or the profit level). This study provides insights for the government, as well as private developers that may help them consider redevelopment projects.*

**Keywords:** Redevelopment, gross floor area, property, Hong Kong.

## INTRODUCTION

Urban redevelopment in Hong Kong has long been discussed by researchers in terms of its benefits to society, such as the removal of slums and the rehabilitation of living conditions. Another topic that attracts a great deal of attention from researchers is how developers and public redevelopment bodies evaluate the feasibility and difficulty of engaging in one particular redevelopment project. In hindsight, urban redevelopment is beneficial to society as it improves the quality of living and the rate of land utilization. On the other hand, problems of the duration of such projects and the lower profitability, due to the extra costs stemming from lawsuits, by owners and tenants, over the issue of compensation, is frequently viewed as a major obstacle in the redevelopment of old urban sites (Ng, 1998).

These arguments brought forth by scholars of the subject partially reflect the difficulties that developers encounter nowadays. They mainly focus on the “high cost, low return” nature of redevelopment projects. Meanwhile, they tend to ignore other factors that affect the decisions of redevelopment. Although it is generally believed that the property market trend is one of the most crucial factors affecting the developers’ decisions, other factors such as the time-consuming land

resumption process (Li, 2001) and statutory limitations, for instance lease conditions and premiums, should not be neglected as well (Pritchard, 1999).

It is important to assess the factors affecting redevelopment in Hong Kong, because the supply of virgin land is extremely limited. This is particularly so in established districts like the Central & Western District and WanChai District. There had been only 12 new developments on virgin land, compared to over 1,300 redevelopments between 1980 and 2000 (Centamap, 2003). As undeveloped land is seriously lacking in the two districts, the option of the availability of alternative developing sites sold by the government is simply non-existent. Because of that, the only option for the developers would be redeveloping the old sites.

This paper is organized as follows: First, we present a review of the history of redevelopment works in Hong Kong in the past twenty years. Next, we briefly examine some previous studies on the causes of redevelopment in Hong Kong. For instance, we will be comparing the trend of redevelopment projects over the years to the property price/ rental movements in the market. Since it is generally assumed that these two items are positively related, we will be able to determine if this belief is applicable to the situation in Hong Kong.

We then perform a two-step analysis on the data collected thus far on redevelopment. The focus of this analysis is on GFA ratios, in order to examine its importance on redevelopment decisions. We begin the analysis by presenting descriptive statistics in search of the characteristics of previous redevelopment projects. We then run a regression analysis on the data to find out what affects the GFA ratio the most. In this way, we will be able to determine factors which are crucial to the consideration of redevelopment projects in Hong Kong. Finally, based on the findings, a conclusion will be drawn on the major causes of the trend of redevelopment rate observed.

#### **Background review – the redevelopment process in Hong Kong**

In Hong Kong, any redevelopment project has to be in accordance with the rules and regulations outlined by the Lease conditions, Outline Zoning Plans (OZP) and the Building (Planning) Regulations. The Lease conditions usually enlist the possible uses, designs, dimensions and heights (DDH clauses) allowable for a particular site. The OZP states the usage and maximum plot ratio permitted for a site, while the Building (Planning) Regulations require developers to construct their buildings within the specific plot ratio and site coverage limits. An increase in plot ratio and site coverage may be granted only if a developer is able to fulfil extra conditions illustrated in the Buildings Ordinance. Furthermore, modifications of the lease for extra permitted building area will only be allowed if the developer pays a premium to the government (Pritchard, 1999).

On the other hand, the land resumption process is usually lengthy under the Landlord and Tenant (Consolidation) Ordinance. The Ordinance requires a developer to inform the tenants in writing between six and seven months before the date of termination (Laws of Hong Kong, 2003). But tenants usually respond with legal actions through the Lands Tribunal. Therefore, it usually takes more than one-and-a-half years (Li, 2001) to complete the whole process of resumption, even if the Lands Tribunal finds the case in favour of the developer (Jones, 1996). Hence, the premium and legal costs should also be taken account when calculating the cost of redevelopment (Jones and Watkins, 1996).

In Hong Kong, redevelopment projects are mainly carried out either by the Urban Renewal Authority (URA) or by private developers. The Land Development Corporation, antecedent of the URA, had carried out 30 redevelopment projects between 1988 and 2000, spending more than \$70 billion in the process (Land Development Corporation, 2000).

According to the URA's principles on the acquisition of properties, compensation for a domestic property is defined, on the basis of a seven-year-old building situated in a similar locality in terms of characteristics and accessibility, as a "Home Purchase Allowance" to the owners. An allowance, based on market value, is even paid to owners of roof-top structures, even though the construction of such structures is illegal under the Buildings Ordinance (URA, 2003). This puts considerably more financial pressure on the URA when initiating urban renewal projects. According to Mr. Lam Chung-lun, Managing Director of the URA, the average amount of compensation paid to property owners in redevelopment projects carried out in 2001 was \$3,380 per square foot, about 3.1 times the amount the properties would have fetched in the open market (approximately \$1,095 per square foot) (Mingpao, 2002).

Private developers, unlike the URA, are able to buy up the titles at market value without following URA's principles. On the flip side, owners are likely to ask for compensation comparable to that offered by the URA. As a result, it takes more time for developers to reach an agreement with the owners, and the cost of the redevelopment project would be higher.

Also, a private developer does not have statutory power to resume land for redevelopment unless the consent of more than 90% of the owners has been obtained. In this case, under the Land (Compulsory Sale for Redevelopment) Ordinance (Hong Kong Rating and Valuation Department), a developer can buy up all of the titles of the site for redevelopment through a compulsory auction. However, some studies still consider the current legal environment too rigid for redevelopment. As these legal requirements tend to complicate the process for private developers to launch redevelopment projects, these studies suggest that majority rule should be applied in such cases (Wang, 2003).

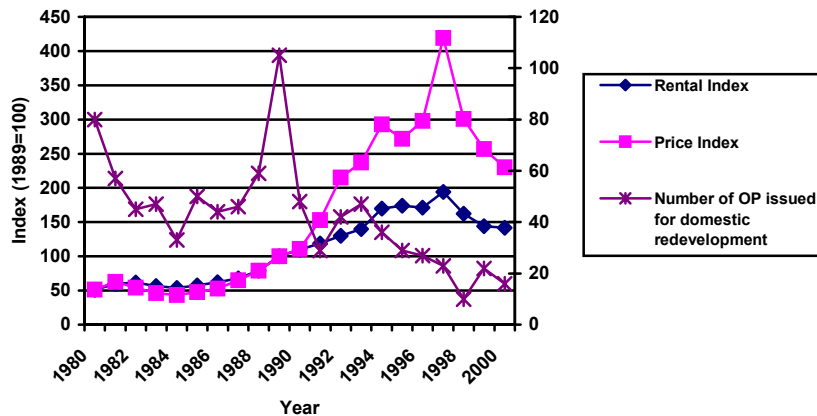
Although extra costs may be incurred in redevelopment projects, developers may still be able to make a profit by optimizing the sites with unused plot ratios, and offering better layouts and designs (Tang and Tang, 1999). In old districts like Sheung Wan, Wan Chai, Mong Kok and Sham Shui Po, buildings of only three to five stories are still commonplace. That is to say, in these areas, the plot ratios of existing buildings have not been fully utilized. If exemptions from the Buildings Ordinance, such as balconies and machine rooms, are included, the actual gross floor area of construction can be raised by 15%-20%, even if the maximum plot ratio has already been used by previous developments. Theoretically, this would encourage construction as well as redevelopment.

### Urban redevelopment situations in Hong Kong

In order to explore the factors behind the trend of redevelopment in Hong Kong, property market trends and their relationships to the rate of redevelopment are first discussed in this section.

Fig.1 shows the movements in the rent and price of domestic units in the Central & Western District and Wanchai District from 1980 to 2000. The redevelopment rate is represented in terms of the number of Occupation Permits (OPs) issued for redevelopment projects throughout the years (See Table 4 in Appendix).

**Figure 1: Rental and price movements of domestic units in Hong Kong Island in 1980-2000 and the domestic redevelopment rate in Central & Western District and Wanchai District in terms of OP issued**

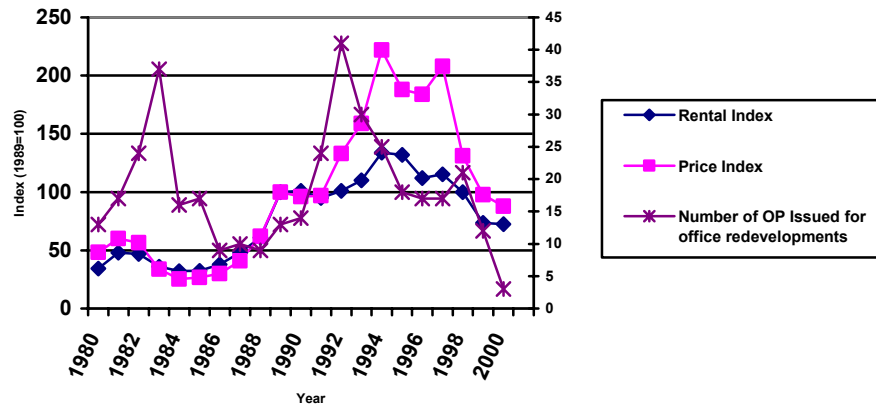


Before 1985, the number of OPs issued for the redevelopment of domestic buildings in the districts and the price/rental levels were quite stable. But in 1990, there was a sharp increase in the number of OPs issued for domestic redevelopment. In fact, it reached its highest level over the 20-year period. After 1990, the rate of

redevelopment diminished, even though both the price and rental index escalated. We have not been able to find any relationship between market prices and the rate of redevelopment. The most obvious case was the time when the prices reached its all-time high in 1997, and a slight decline in the number of OPs issued was actually recorded. In this case, it can be concluded that market prices do not directly affect decisions on domestic redevelopment.

Fig. 2 shows the movements for office buildings, where the figures were expressed in the form of indexes, based on the 1989 valuation (See Table 5 in Appendix).

**Figure 2: Overall rental and price movements of offices (Grade A to Grade C) from 1980 to 2000 and the rate of office redevelopment in Central & Western District and Wanchai District in terms of OP issued**



The same situation appeared in the office buildings market. No similar pattern was found in the movements of the price index and the number of OPs for the redevelopment of office buildings. Similar to residential market, the number of OPs issued for office buildings had also been dropping during the years when the property market boomed.

This contradicts the belief that market demand dominates the decisions of developers in launching redevelopment projects, though there was a study indicating that economic considerations have been at the forefront of decision-making on renewal schemes in Hong Kong (Drakakis-Smith, 1976). Therefore, we are looking for an alternative theory to explain how a developer decides whether a site should be redeveloped or otherwise, regardless of the changes in market conditions.

### **Previous studies on redevelopment**

Harvey (2000) pointed out seven stages of developing property: 1) Choose among development projects; 2) Estimate the demand for different developments; 3) Decide on the quality of the building; 4) Calculate how intensively the site shall be developed; 5) Estimate how much he can bid for the site 6) Obtain finance; and 7) Decide whether to proceed with the development alone or in partnership with a local authority. Redevelopment is no different, but since this paper mainly focuses on supply side of matters, it would touch upon the stages of 1, 3, 4, 5 and 6.

A study, conducting a scenario analysis for several cities in the People's Republic of China where redevelopment has been carried out, suggested that the Floor Area Ratio (we use the term GFA ratio instead in this paper) is the most important determinant of the feasibility of redevelopment projects. This is because the more additional space that can be constructed, the more commodity space can be put up for sale. Thus, the break-even commodity housing price can be reduced and brought closer to the cost of the project (Dowall, 1994). In this paper, we make use of the data on urban redevelopment sites in Hong Kong from 1980-2001 to judge the validity of the conclusions drawn in previous studies.

Since the intensity and the maximum area allowable for redevelopment are regulated by statute, and the minimum quality allowed is controlled under the Buildings Ordinance, these areas will not be discussed in this paper. The focus is not on government policies. Also, the data required for a detailed analysis of issues such as partnership is usually labelled as confidential, which makes the publishing of such results hardly feasible. Hence, this paper is aimed to evaluate the redevelopment potential of previous redevelopment projects to deduce the rationale behind the decisions of developers, and to explain the decline in the number of redevelopment projects in the last decade.

According to the Land Development Corporation, a significant number of street blocks in Central and WanChai District had the redevelopment potential of more than 100% gain in GFA.

If the number of redevelopments occurring in the studied area during the observed period share the same trend as the amount of gain in extra GFA by redevelopment, it can be concluded that, apart from the movements in the property market, the redevelopment potential of sites in terms of gain in GFA could be an important factor affecting the decisions to be involved in redevelopment.

## **METHODOLOGY AND SOURCES OF DATA**

### **Information on past redevelopment projects**

The first part of the analysis reviews redevelopment projects that had taken place in western Hong Kong Island including the Central & Western District and WanChai

District during 1980-2001<sup>1</sup>. The purpose is to gauge if there were common characteristics in the buildings that had been torn down for redevelopment. Western Hong Kong Island has been selected because it had been the major area of redevelopment in the past 20 years. This is probably the most representative empirical data available on redevelopment in Hong Kong in that time period, as the area had undergone the most intensive process of redevelopment in Hong Kong. In addition, the Buildings Department has documented details of each redevelopment project, thus providing us an accurate set of data on redevelopment in the area.

Data, regarding the sizes and ages of both the previous buildings and the buildings replaced the demolished building, was collected from the Buildings Department and the Centamap website ([www.centamap.com](http://www.centamap.com)). The numbers of buildings demolished for redevelopment projects were also collected to evaluate the extent of land-reassembly taking place.

To investigate the factors that can affect the GFA, the mean, median and standard deviation of the following items have been calculated and evaluated: 1) the number of stories of the demolished buildings; 2) the size of the demolished buildings; 3) the number of buildings demolished for each redevelopment project; 4) the age of the demolished buildings; and 5) the number of stories of the redeveloped buildings. This allows us to observe the overall pattern of redevelopment in the past 20 years. We will then be able to determine whether our regression results can explain the actual pattern of redevelopment.

The average and median values of the size and the number of demolished buildings reflect the extent of land-reassembly. They are included because, granted the limited supply of land in the two districts, it is possible that developers would combine a couple of pieces of nearby lands in order to launch a redevelopment project. The number of stories of the demolished buildings serves as a reference item, as one is able to earn relatively more profit if the old buildings are lower (or fewer storeys), under the limitations set by the Buildings Ordinance. The standard deviation tells us whether the size of various redevelopment projects was close to or far from the median.

The evaluation of the age of demolished buildings would be useful in determining the best time for redevelopment, by calculating the discounted value of the existing development against a vacant site (Harvey, 2000). But in a sense, the age of such buildings can reflect the demand for similar units in a particular district. If the demand for similar units in the district is comparatively fewer, there is no incentive for developers to carry out redevelopment projects, as the returns would not be that

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<sup>1</sup> It should be noted that Happy Valley, along with Central and Wanchai, is considered part of western Hong Kong Island.

promising. Developers would choose sites with more profit potential to work with, while the less attractive ones would be left behind.

In order to assess whether the factor of locality has any affect on the decisions of developers to engage in redevelopment projects. Each district will be analysed independently.

### **GFA ratio hypothesis**

We hypothesize that the gain in GFA by the better utilization of land contributes significantly to the profitability and, hence, the attractiveness of redevelopment projects. From a developer's point of view, the only reason to launch a redevelopment project is to obtain a positive payoff. In other words, profit is what lures developers into this game. The capacity to sell more space, given a higher gain in GFA, the more revenue can be obtained from a redevelopment project. However, it will not be the GFA gain in numerical terms that would be evaluated. Instead, the gain in terms of a GFA ratio would be used for the hypothesis. The GFA ratio is interpreted as: *GFA of building(s) after redevelopment divided by GFA of buildings before redevelopment*. The reason is that a gain in GFA by the same amount does not mean the same level of profit obtainable. For instance, a developer can earn the same amount of profit in two sites, but he still is able to choose one from the other due to the different cost incurred in redeveloping the two sites. The site with lower old buildings would be more profitable as the cost of redevelopment being lower, other factors being constant. Therefore, it is better to use GFA ratio instead of the gain in GFA for the analysis. Mathematically, it can be said that  $\text{expected profit} = f(\text{GFA ratio}) - \text{cost of redevelopment (as a function of cost of financing and the area that has to be resumed)}$ .

In addition, while the GFA ratio is an indication of the revenue generated, such a gain is somehow related to the redevelopment rate (in terms of the number of OPs issued). This is because the greater the profits potentially gained from redevelopment, the more incentives there will be for developers to carry out this kind of projects. Therefore, OP can be described as a function of expected profit, or  $\text{OP} = f(\text{expected profit})$ .

The redeveloped properties observed in this study are divided into four groups according to their time of occupation, namely 1980-1984, 1985-1989, 1990-1994 and 1995-1999. Redevelopments in 2000 and 2001 are not examined simply because the respective numbers are too small to tell us something useful. The data have been also grouped into five-year intervals, instead of one-year intervals, to minimize the possible errors caused by extreme values.

## RESULTS AND DISCUSSION

**Table 1: Data on redevelopment projects in the Western Hong Kong Island from 1980 to 2001**

		<b>Overall</b>	<b>Central</b>	<b>Wanchai</b>
Number of stories of the demolished buildings	Mean	5.81	5.98	6.34
	Median	5.00	5.00	10.50
	Std. Deviation	4.54	4.73	4.79
Size of the demolished buildings (sq. ft.)	Mean	20777.92	22853.49	18653.38
	Median	155079.39	5778.00	79759.15
	Std. Deviation	42387.13	44519.67	41846.23
Number of buildings demolished for a redevelopment project	Mean	1.68	1.69	1.78
	Median	4.00	1.00	3.00
	Std. Deviation	1.51	1.49	1.73
Age of the demolished buildings	Mean	33.6	33.12	34.60
	Median	34.00	34.00	41.50
	Std. Deviation	7.81	7.78	24.00
Number of stories of the redeveloped buildings	Mean	22.10	23.08	23.42
	Median	24.00	25.00	24.00
	Std. Deviation	10.39	10.27	8.31
GFA-Ratio- New bldg.: Old bldg.	Mean	8.19	8.23	9.75
	Median	3.57	3.73	3.61
	Std. Deviation	18.28	13.59	27.63
<b>Total number of samples observed</b>		<b>954</b>	<b>565</b>	<b>261</b>

As redevelopment involves changes in land use, the development potential of the site can be augmented by lease modifications. The Building (Planning) Regulation limits the maximum plot ratio of domestic and non-domestic developments to 10 and 15 respectively, subject to independent site conditions. In order to assess changes in the development potential by changes in land use, the redeveloped buildings would be grouped and compared according to their usages. It is expected that a change from domestic use to commercial (non-domestic) use would result in a higher GFA ratio, due to a higher allowable plot ratio.

Table 1 summarizes the descriptive statistics. The two districts under study differ greatly in terms of the median of the number of stories of demolished buildings, size of the demolished buildings, the number of buildings demolished for a redevelopment project and the age of the demolished buildings. These differences imply that locality is probably a significant factor when considering redevelopment projects.

From Table 1, the buildings demolished for redevelopment in the past 20 years in Central were much younger in age (median age =34) than those in Wanchai (median age = 41.5). In other words, the rate of regeneration of buildings in Central is faster. This supports our argument that older buildings located in Central are under greater redevelopment pressure than those located in Wanchai, making the age of a building as a more significant factor in determining the GFA ratio in Central. Also, the standard deviation of such for Wanchai (24) is much higher than Central (7.78). This shows that the buildings demolished in Wanchai were more diverse in terms of longevity.

Furthermore, it is not hard to distinguish the differences in the size of demolished buildings. The demolished sites in Wanchai (median= 79759.15 sq. ft.) were bigger than those in Central (median= 5778 sq. ft.). A skyscraper would be the most profitable replacement on the new site. The last noticeable difference is the GFA ratio. Even though Wanchai has a higher mean GFA ratio (9.75 to 8.23 in Central), the standard deviation is exceedingly high (27.63), which implies that the GFA ratio varies a lot more in Wanchai. Thus, it is risky to redevelop in Wanchai because of possible fluctuations in revenues.

We have constructed an overall time series regression model, using data on all of the sites that had undergone redevelopment in the Western Hong Kong Island between 1980 and 2001. We attempt to discover the possible relationships between the increase in GFA, the dependent variable, and the following independent variables: the age of the demolished buildings, increase in the number of stories, size of the demolished buildings, locality, and the number of buildings demolished for a project. The results are summarized in Table 2.

**Table 2: Results of regression on data regarding Central and Wanchai districts.**

	<b>Beta</b>	<b>t-statistics</b>	<b>Significance</b>
Constant	33.546	3.77	0.0001
Age of old buildings	-0.179	-1.25	0.2117
Number of storeys (demolished buildings)	-0.820	-3.52	0.0004
Best Lending Rate	-1.127	-2.41	0.0161
Locality	-5.887	-2.29	0.0222

*N.B. 1) Dependent Variable: GFA ratio*

*2) Predictors: Age of the demolished buildings, the number of stories for demolished buildings, Locality and best lending rate (cost of financing)*

*3) Locality is a dummy variable where 1 represents Central and 0 represents Wanchai.*

In the overall model, it can be observed that the factor of locality is the most significant factor in the calculation of GFA ratio (profit). As mentioned in Table 2, the GFA ratio turns out to be lower in Central than that in Wanchai, other things

being constant. It is due to the higher land prices in Central. As developers are needed to pay compensation to the original owners in order to resume the sites for redevelopment, it is reasonable to say that the cost of land resumption in Central is much higher than that in Wanchai. Therefore, the profit level would be lower even if a developer constructs an identical building in Central. In other words, it takes a higher GFA ratio for developers to obtain the same level of profit in Central, because of this locality factor.

The second most significant factor is the best lending rate. The best lending rate is used as a proxy for the cost of financing. It is one, if not the only, way for developers to raise capital for these kinds of projects. If the lending rate is higher, the cost of financing would also be higher. This would affect the profit level of any redevelopment projects in a negative light.

The number of storeys of the demolished buildings demonstrates a negative relationship with the GFA ratio. The height limit set by the Building Ordinance on redevelopment sites is 61 meters, which is the maximum level that developers can work on. As a result, other factors being constant, the revenues generated from redevelopment would be similar, if not identical. An old building with fewer storeys implies less space sold, which means the cost of resuming the sites being lower than that of a building with more storeys. So, it is not hard to understand that a higher profit level can be obtained by redeveloping a building with fewer storeys, thus the negative relationship between such and the GFA ratio.

Lastly, it appears that developers would likely get a lower GFA ratio as the buildings get older. This is likely to be the effect of the availability of alternative old sites for redevelopment. For example, if there are two buildings of different longevities available for redevelopment, developers would tend to redevelop the relatively newer sites. Under competitions among developers over a very limited quantity of land, they would choose the sites that bring them the most profit potentials, while leaving the other sites behind. One has to wonder why there are so many old, obsolete buildings in certain areas. The reason is that those old sites are the less attractive ones. Though the cost of resuming the older site may be a bit cheaper, still the location of the site does not favour the developers. Therefore, the age of a building and its GFA ratio are inversely related.

In order to investigate how these factors affect the GFA ratio when locality changes, we choose to divide the data into two groups: redeveloped sites located in the Central district, the centre of the CBD; and in the Wanchai district, where a mixture of both residential and commercial buildings can be observed. The results of the separate regression models are summarized in Table 3.

**Table 3: Results of the separate regression model**

	Central (Adj. R-square=0.99)			Wanchai (Adj. R-square=0.99)		
	Beta	T	Significance	Beta	T	Significance
Constant	20.1066	5.212	0.0000	48.1115	1.6986	0.0921
Age of the demolished buildings	-0.1958	-2.903	0.0039	-0.1199	-0.2545	0.7994
Number of storeys of the demolished buildings	-0.5028	-4.347	0.0000	-1.4012	-2.0103	0.0468
Best Lending Rate	-0.5207	-2.575	0.1054	-2.3954	-1.616	0.1089

N.B. 1) *Dependent Variable: GFA ratio*

2) *Predictors: Age of the demolished buildings, Number of stories of demolished buildings, Best Lending Rate.*

The separate models tell us how the factors affect the GFA ratio in the Central district and Wanchai district respectively. The age of the buildings induces a more significant change in GFA ratio in Central than that in Wanchai. This is probably because the price/rent in Central has been much higher than that in Wanchai, as a nature of the CBD. As it is easier to guarantee a return after redevelopment, developers would compete for the old sites in Central. Hence, old sites in Central would be redeveloped quicker. Also, judging from the significance level of Wanchai's statistics, it can be concluded that age is not really much of a factor affecting redevelopment decisions, due to the fact that there are quite a plenty of similar old sites waiting to be renewed. This can be justified in the statistics in Table 1, which shows a huge difference in the size of demolished buildings in the two districts. It is more likely the unattractiveness that keeps them from being redeveloped.

The negative effect of the number of storeys of the demolished buildings to GFA ratio is more significant in Wanchai. It is more likely the result of lower land cost in Wanchai. The more storeys the old building has, the lower the GFA gained after redevelopment. Given the lower land price/rent in Wanchai, it would be financially less feasible for developers to redevelop if lower GFA can be gained.

It is reported in Table 2 that a higher lending rate (cost of financing) would lower the GFA ratio (profit level). When this factor is analysed separately, it can be observed that its effect is much higher in Wanchai than that in Central. The reason is similar to the above factor, which constitutes to the lower and uncertain returns. It should be noted that the buildings demolished for redevelopment in Wanchai are older, which implies that the sites themselves are not attractive enough for the

developers. In other words, it is more risky to carry out redevelopment projects in Wanchai, due to such uncertainties in the demand.

## **IMPLICATIONS**

The GFA ratio is regarded as a key component in the evaluation of the profit potential of a redevelopment project by private developers. The regression results have a few significant implications.

First, the separated regression model has illustrated that the most significant factor in potentially bringing the highest level of GFA ratio and profits is different in various locations in Western Hong Kong Island. In areas where less space is available for redevelopment, like the Central district, developers tend to focus on the age of the buildings when they attempt to pick a site. In areas similar to Wanchai, sites with old buildings awaiting redevelopment are easier to find, developers would focus on number of storeys of the old buildings to bring the highest GFA ratio as possible.

Second, our findings have some useful implications for government policies on urban renewal. The GFA ratio in Central appears to be higher than that in Wanchai, demonstrated by the number of redevelopment projects over the observed period. But due to the much higher land resumption cost, the higher GFA recorded in Central means that a higher GFA ratio is needed to gain the given profit level. Even though it seems that Central looks to be an more attractive place for developers to engage in redevelopment projects, sometimes the resumption cost would be high enough to keep the developers from doing so. Once the really attractive sites have been already redeveloped, the redevelopment rate, in terms of the number of OPs issued, would be declining.

Furthermore, the residents of the existing buildings would have a great deal of bargaining power if their home is selected for redevelopment. Compensation to them needs to be much higher before the developer is permitted to resume the land. The higher GFA ratio generates higher revenues, but the higher cost of land makes it uncertain whether a project would be profitable or not. If this is the case, then the GFA ratio needed would be even higher if one has to ensure that a profit can be made from it.

However, it is imperative to redevelop these older buildings. To provide an incentive for this to happen, the government may need to offer subsidies. Indeed, urban renewal is no longer a profitable business in Hong Kong. It has become a social concern, and we should employ different means to tackle the problem. This is how the problem is perceived in many capitalist societies. As a capitalist society, this does not necessarily mean that we have to utilize the market for all the resource allocations. Many cities in America and Europe are trying to garner resources from

the government, the private sector and the third sector (NGOs, communities, etc.) to deal with the need for regeneration (Ng, Lego-Co Paper No. CB(1)711/00-01(08)).

## CONCLUSION

This study evaluated the pattern of urban redevelopment in the Central & Western District, and Wanchai District in 1980-2001. By comparing the changes in land-assembly patterns, land use, and land utilization for 954 redevelopment projects in the observed areas, we found that redevelopments had been carried out in various scales from “pencil redevelopment” to a very comprehensive redevelopment involving the land-reassembly of a number of streets.

The first part of the paper presented an alternative view that the rate of redevelopment is not directly related to price movements in the property market. Instead, we assumed that the gain in Gross Floor Area is more closely related to the rate of redevelopment, by using data on redevelopment projects between 1980 and 2001. Thus, we assessed the GFA ratio as a potential means for private developers to make profits, creating an incentive for them to launch redevelopment projects.

The overall regression model shows that the locality, age, number of storeys of the demolished building and the best lending rate (cost of financing) are all significant factors affecting the GFA ratio. Observing the relationship of these factors with the potential to gain extra profit through redevelopment projects will tell us the factors private developers and the government consider before launching redevelopment projects. Profit depends on the revenues generated, in terms of the GFA ratio, as much as the cost of a particular project. Since the cost of a project is relatively uncertain, this may render a project unprofitable. But cost analysis is not the focus of this study, so a more detailed cost analysis will be left to a future study. Still, GFA is the primary piece of information that needs to be obtained before any redevelopment projects are launched.

The approach in this paper puts more weight on the past pattern of redevelopment in Hong Kong. At the same time, it moves further towards the factors that developers and the government should take into account in redevelopment projects. The potential revenue to be generated from a significantly higher GFA ratio is no doubt a dominant factor behind the participation of a private developer in urban renewal. In order to provide a clearer guide to developers, this paper has further investigated how the various factors that developers and the government would consider influence the GFA ratio. The implications of the findings of this paper will give private developers and the government different views on the reasons behind redevelopment.

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## APPENDIX

Information on the property market in the base year 1989, from the Hong Kong Property Review:

**Table 1: Rental value for offices in 1989 (HK\$/sq. m. per month)**

	<b>Grade A</b>	<b>Grade B</b>	<b>Grade C</b>
Sheung Wan	365.5	280.3	184.4
Central	559.1	382.3	280.4
Wan Chai/ Causeway Bay	410.7	329.7	242.8

**Table 2: Price for offices in 1989 (HK\$/sq. m.)**

	<b>Grade A</b>	<b>Grade B</b>	<b>Grade C</b>
Sheung Wan	54912	38076	29387
Central	73068	67623	40427
Wan Chai/ Causeway Bay	59448	44510	36101

**Table 3: Rental value and price for domestic units on Hong Kong Island 1989 (HK\$/sq. m.)**

	<b>Grade A</b>	<b>Grade B</b>	<b>Grade C</b>	<b>Grade D</b>	<b>Grade E</b>
Rental (per month)	125.7	133.5	149	171.5	183.4
Price	18021	18229	18905	20105	21753

**Table 4: Details on prices, rents, and rates of redevelopment (OPs) on Hong Kong Island, 1980-2000 (Domestic units)**

	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>
Price Index	51.3	62.8	54.3	46.2	43.7	47.9	53
Rental Index	50.8	60.1	61.9	56.6	53.9	57.4	62
OPs issued	80	57	45	47	33	50	44
	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
Price Index	65	79	100	111	153	215	237
Rental Index	68	79	100	110	119	130	140
OPs issued	46	59	105	48	29	42	47
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Price Index	293	272	298	419	300.8	256.9	230.2
Rental Index	170	174	171	194	162.5	144.3	141.6
OPs issued	36	29	27	23	10	22	16

**Table 5: Details on prices, rents, and rates of redevelopment (OP) on Hong Kong Island, 1980-2000 (Office buildings)**

	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>
Price Index	48.3	60	56.6	33.8	25.2	26.6	30
Rental Index	34.2	48	47	35.9	32.1	32.3	38
OPs issued	13	17	24	37	16	17	9
	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
Price Index	41	62	100	96	97	133	159
Rental Index	48	61	100	101	95	101	110
OPs issued	10	9	13	14	24	41	30
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Price Index	222	188	184	208.1	131.3	97.7	87.8
Rental Index	134	132	112	115.2	99.9	73.5	72.4
OPs issued	25	18	17	17	21	12	3