# Why do urban villages have shorter life expectancies? Observations in three Chinese cities and economic explanations



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## Abstract

It has been identified in the paper by Nie and Wong (2012) that substantial rental value losses can be induced by excessive land exploitation in urban villages in the mainland of China. It has also been suggested that incomplete and unclearly delineated property rights, transaction cost, and consequently the absence of effective building regulations have played important roles leading to such tragic results. Through a comparison of 96 pairs of cases collected from three major Chinese cities (Shenzhen, Guangzhou, and Xi'an), it has been found that compare to non-village estates, an average of 72% of the urban villages studied have been overbuilt, which leads to a problem of "more construction but less rental values". The overdevelopment problem can be viewed as, according to institution theories, a production change (a distortion of resource combination), given the constraint of defective institutional environment. It is natural then a different timing of contract change may follow, since certain conditions for renewal projects can be met differently. Throughout the lifetime of a building, natural rent dissipation happens due to outdated design, changing market condition, or simply building aging. As a result, a building has an economic life, which may be shorter than its physical life. An empirical test conducted in this study on 16 non-village estates demolished in recent years in Shenzhen, 14 in Guangzhou, and 10 in Xi'an shows that the average economic lifetimes for non-village residential estates in the three cities are respectively 19.8, 22.5, and 28.9 years. However, urban villages have shortened life expectancies. In this study, an empirical study of 1054 online samples in Shenzhen, 138 samples in Guangzhou, and 122 samples in Xi'an shows a paradox that the average building ages in urban villages in the above three cities are quite new, respectively only 12.1, 12.2, and 14 years, but many such villages are already demolished or planned for demolition soon. The data for non-village buildings were collected through a scan of the official renewal documents on the governments' websites. The data for urban villages were collected online from real estate websites, on which landlords post their "for rent" information. Such a paradox can be explained in connection to the previous pattern identified by Nie and Wong (2012), that in comparison to non-village estates, urban villages suffer a problem of more severe rent dissipation induced by defective initial institutional settings. The problem can make the critical condition for renewal due earlier, thereby shortening the life expectancies for urban villages. Besides, the income transfer effect caused by the state-villager interaction and the possible cost difference for negotiation can also bring forward renewal schedules. The combination of the three reasons then leads to earlier renewals.

**Keywords** Urban villages, Land economics, Urban renewal, Building regulation and control, Property rights

## 1. Introduction

In the past several years, large scale urban village renewal projects have been initiated across the country in China. In Shenzhen, the city government has set a plan

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to renew more than 100 villages in 5 to 10 years. In the 5-year plan for urban village renewal, which was released in 2006, 11.5 million square meters of urban village buildings are planned for total demolition (Shenzhen Municipal People's Congress, 2006). 33.7 million square meters of urban village buildings are listed for government-led renovation and environment improvement projects. The 2006 annual plan listed 40 villages for complete renewal and 73 villages for renovation and environment improvement (Shenzhen Land and Planning Council, 2006). Following that, in 2007, a supplementary plan listed 45 more villages for complete renewal and 70 for renovation and environment improvement (Shenzhen Land and Planning Council, 2007). The total numbers listed in the two documents then add up to a total of 85 villages for complete renewal (around 25% of all villages in Shenzhen) and 143 for renovation and environment improvement (around half of all villages in Shenzhen). The actual result, by the year of 2011, shows that approximately 18 villages have been completely demolished. Table 1 listed the 18 villages demolished and the years of the demolitions.

**Table 1.** Demolished urban villages from 2006 to 2011 in Shenzhen

| Name | District | Demolition Time |
|---|---|---|
| Liantang Old | Luohu | 2007 |
| Tiabei | Luohu | 2006 |
| Huangbeiling | Luohu | 2011 |
| Xilingxia South | Luohu | 2010 |
| Hubei Old | Luohu | 2011 |
| Gangsha West | Futian | 2009 |
| Xiasha | Futian | 2009 |
| Tiansha New | Nanshan | 2006 |
| Guimiao New | Nanshan | 2006 |
| Dachong | Nanshan | 2010 |
| Nanguang | Nanshan | 2007 |
| Shuiwan | Nanshan | 2009 |
| Anjing East | Yantian | 2007 |
| Shangyu | Yantian | 2008 |
| Shanghe Old | Baoan | 2007 |
| Guoxia | Baoan | 2008 |
| Luoruihe Old I | Longgang | 2010 |
| Hulongpu Old I | Longgang | 2009 |

In Guangzhou, a similar plan has listed 52 villages (around 37% of the total 139 villages) for complete renewal (Guangzhou Municipal People's Congress, 2009), 14 of which have been demolished or are being planned for demolition by the year of 2012. Table 2 listed the 14 villages and their demolishing years.

**Table 2.** Demolished urban villages by the year 2012 in Guangzhou

| Name | District | Demolition Time |
|---|---|---|
| Yangqi | Yuexiu | 2011 |
| Bazhou | Haizhu | 2011 |
| Lijiao | Haizhu | 2012 |
| Hongwei | Haizhu | 2011 |
| Huadi | Liwan | 2008 |
| Dongjiao | Liwan | 2011 |
| Liede | Tianhe | 2007 |
| Xiancun | Tianhe | 2012 |
| Linhe | Tianhe | 2010 |
| Xiao Xintang | Tianhe | 2011 |
| Tangxia | Baiyun | 2010 |
| Hengsha | Huangpu | 2011 |
| Wenchong | Huangpu | 2012 |
| Xiangang | Luogang | 2009 |

In Xi'an, 83 villages (around 25% of the total 326 villages) have been included in the first phase of renewal plans (Xi'an Municipal People's Congress, 2009). By the year 2011, 36 have been demolished. Table 3 listed the 36 villages and their demolishing years.

**Table 3.** Demolished urban villages by the year 2011 in Xi'an

| Name | District | Demolition Time |
|---|---|---|
| Zaoyuan Liu | Baqiao | 2010 |
| Mujiangwang | Baqiao | 2010 |
| Bianjia | Beilin | 2009 |
| Jinhualuo | Beilin | 2009 |
| Lvguan,Lujia | Beilin | 2009 |
| Caochangpo | Beilin | 2008 |
| Nanguo | Beilin | 2008 |
| Yongning | Beilin | 2008 |
| Nanguan | Beilin | 2008 |
| Jitai | Beilin | 2009 |
| Baijiakou | Lianhu | 2009 |
| Datumen | Lianhu | 2009 |
| Guojiakou | Lianhu | 2009 |
| Jianxin | Lianhu | 2009 |
| Wuyi | Lianhu | 2009 |
| Yangjiaweiqiang | Lianhu | 2009 |
| Chenjiazhai | Lianhu | 2008 |
| Fenghe | Lianhu | 2010 |
| Jiejia | Lianhu | 2010 |
| Erfuzhuang | Lianhu | 2011 |
| Zhongbaozi | Lianhu | 2010 |
| Xinxiaozhai | Qujiang | 2009 |
| Wahutong | Qujiang | 2011 |
| Fangjia | Weiyang | 2009 |
| Hutuo | Weiyang | 2009 |
| Dabaiyang | Weiyang | 2011 |
| Zhangjia North | Xincheng | 2009 |
| Hujiamiao II | Xincheng | 2009 |
| Shijiajie | Xincheng | 2010 |
| Bafuzhuang | Xincheng | 2008 |
| Houcun | Yanta | 2009 |
| Qiwang | Yanta | 2009 |
| Yanbei | Yanta | 2010 |
| Xijiang | Yanta | 2010 |
| Xiangtang | Yanta | 2010 |

To justify the above renewal projects, the city governments have listed a reason. The reason, as stated by the governments, is that urban villages have poorer environmental conditions. Another non-listed but obvious reason is that due to the rapid urbanization process in the past years, empty lands in cities are getting scarce so as housing demand increases it is necessary to demolish old buildings and replace them with high-rise ones to ensure enough housing supplies. The two reasons imply that urban villages are no longer efficient in terms of extracting land values.

This may seem natural, as when buildings are getting old and housing demand increases, such buildings become less efficient. But it is at the same time not natural, since given the same level of change in market conditions, when we look at the facts, very often we can find that buildings in urban villages are, in fact, not the oldest ones--most of them are less than 20 years old. Meanwhile, there are still many non-village buildings being older, but not listed in any renewal plans. A common sense as we can feel is that old buildings may have priority in renewal plans, but the truth here is, new buildings in villages are getting demolished earlier than old non-village ones.

## 2. The paradox

To find out a reasonable explanation, the first step, of course, is to confirm the pattern in details. Before anything can be done, one issue has to be clarified. To compare life expectancies between different types of buildings, it may be necessary to control the construction size. For illustration, a heavy duty vehicle can certainly last longer than light cars, therefore to compare life expectancies fairly, only two heavy duty vehicles or two light cars can be comparable to each other. In the current study, such a "type" parameter can be replaced by total floor area, implying that theoretically only those buildings with similar construction sizes can be fair comparables. Practically since we observed shorter life expectancies in urban villages, it is not necessary to exclude those non-villages with less construction sizes. If non-village buildings with less total floor size still have longer life expectancies, it is easy to conclude that those with similar floor size with village buildings must have longer lifetimes. But of course, if those non-village buildings with less total floor size have shorter life expectancies, then we will have to do a more precise comparison by excluding such non-village buildings.

To simplify the sampling process, the variable "total construction size" can be converted into height. Since almost all non-villages have lower site coverage values, qualified non-village samples can then include those with the same or less floors, or slightly more floors. Calculated based on the site coverage values from the previous paper by Nie and Wong (2012) --the average site coverage values for villages and non-villages are 0.54 and 0.33 in Shenzhen, 0.58 and 0.39 in Guangzhou, and 0.61 and 0.36 in Xi'an, it gives non-villages a flexibility to include slightly 1-2 more floors. Given the average floor numbers in urban villages in the three cities to be respectively 7-8 in Shenzhen, 4-5 in Guangzhou, and 3-4 in Xi'an, the qualified heights for non-village comparables can roughly be <=11 in Shenzhen, <=7.4 in Guangzhou, and <=6.7 in Xi'an. Moreover, a typical urban village building is normally a multiple storey building with no lift. To control building structure, non-village buildings with more than 9 floors may be excluded as well since 9 is already the upper limit for walk-up buildings. Hence, feasible non-villages samples in the three cities are controlled by height limit as, <=9 in Shenzhen, <=7 in Guangzhou, and <=6 in Xi'an.

Since most village renewals are for community-level economic improvement purpose, the non-village buildings then has to be selected as for the same reasons, that is, a renewal has to be for community-level economic improvement other than for city-level road or any public interest infrastructure construction projects. A scan through

thousands of the official renewal documents for the recent approximately 5-10 years has retrieved, in the above three cities, respectively 16, 14, and 10 non-village renewal projects meeting the criteria. The below tables (Table.4 to 6) listed the qualified non-village renewal projects and their economic lifetimes.

**Table 4.** Demolished non-village estates and their building ages in Shenzhen

| Name | District | Completion | Demolition | Demolition Age | Floors | Mark |
|---|---|---|---|---|---|---|
| Huatai Estate | Futian | 1990 | 2010 | 20 | 7 | |
| Jianye Estate | Luohu | 1991 | 2010 | 19 | 6 | |
| Longxi Garden | Futian | 1991 | 2010 | 19 | 7 | |
| Nanyuan New | Nanshan | 1990 | 2010 | 20 | 7 | |
| Hetang Estate | Nanshan | 1993 | 2010 | 17 | 7 | |
| Haitao Garden | Yantian | 1989 | 2010 | 21 | 6 | |
| Jintian New | Futian | 1990 | 2009 | 19 | 7 | |
| Zhonghangyuan I | Futian | 1990 | 2009 | 19 | 7 | |
| Zhonghang North | Futian | 1985 | 2008 | 23 | 7 | |
| TuchuInc Dorm | Luohu | 1990 | 2009 | 19 | 6 | * |
| Futian Port Dorm | Futian | 1995 | 2009 | 14 | 7 | |
| Nanyuan New | Futian | 1988 | 2007 | 19 | 8 | |
| Aihua Estate | Futian | 1988 | 2012 | 24 | 8 | |
| Xiangmi New | Futian | 1990 | 2012 | 22 | 7 | |
| Zhuyuan Estate | Futian | 1992 | 2012 | 20 | 7 | |
| Sihai Estate | Nanshan | 1990 | 2012 | 22 | 6 | |

**Table 5.** Demolished non-village estates and their building ages in Guangzhou

| Name | District | Completion | Demolition | Demolition Age | Floors | Mark |
|---|---|---|---|---|---|---|
| Huanghua New | Yuexiu | 1984 | 2015 | 31 | 6 | |
| Qinglong Fang | Yuexiu | 1990 | 2015 | 25 | 9 | |
| Youdian New | Yuexiu | 1991 | 2015 | 24 | 8 | |
| Heyuan Dorm | Fangcun | 1961 | 2000 | 39 | 5 | * |
| Xiangjiao New | Haizhu | 1980 | 1999 | 19 | 5 | |
| CAS Guangzhou Dorm | Dongshan | 1985 | 2002 | 17 | 5 | * |
| Dongfeng Estate | Yuexiu | 1985 | 1999 | 14 | 5 | * |
| Meihuayuan | Baiyun | 1984 | 2000 | 16 | 5 | * |
| Dashatou New | Dongshan | 1993 | 2002 | 9 | 8 | |
| Tianhe AF Garden | Tianhe | 1980 | 2005 | 25 | 5 | * |
| Shishuyuan | Yuexiu | 1995 | 2012 | 17 | 8 | * |
| Zhujiangyuan | Yuexiu | 1995 | 2012 | 17 | 8 | |
| Baishadun No.10 | Yuexiu | 1975 | 2009 | 34 | 5 | * |
| Nongken Garden | Tianhe | 1980 | 2008 | 28 | 5 | * |

**Table 6.** Demolished non-village estates and their building ages in Xi'an

| Name | District | Completion | Demolition | Demolition Age | Floors | Mark |
|---|---|---|---|---|---|---|
| Xinxili Estate | Yanta | 1979 | 2008 | 29 | 6 | |
| Shengchan Estate | Xincheng | 1993 | 2008 | 15 | 5 | |
| Mijiaqiao Estate | Gaoxin | 1995 | 2011 | 16 | 6 | |
| Dongxin Garden | Beilin | 1992 | 2007 | 15 | 6 | |
| Longshou Estate | Weiyang | 1970 | 2005 | 35 | 5 | * |
| Guomian No.4 Dorm | Baqiao | 1950 | 2002 | 52 | 5 | * |
| Jiaoda 1-2 Estate | Yanta | 1950 | 2007 | 57 | 5 | |
| Xihang Old | Baqiao | 1990 | 2009 | 19 | 6 | |
| Cheliang Garden E | Weiyang | 1986 | 2008 | 22 | 5 | |
| Dongguan South 8 | Beilin | 1980 | 2009 | 29 | 5 | |

The above tables show that the average economic lifetimes for non-village residential estates in the three cities are respectively 19.8, 22.5, and 28.9 years. In the tables, the building completion years and the heights were collected from various real estate websites. The demolition years can be found in government plans and official renewal notices. Due to the issue of data availability, the * marks mean that the floor numbers for those estates were estimated based on their completion years. In Shenzhen, if a building was built before 1990, then mostly likely it is a 6-floor building. In Guangzhou and Xi'an, such a number reduces to 5 given the fact that buildings in Guangzhou and Xi'an are older and lower in average than Shenzhen.

The building ages in urban villages in the three cities were estimated based on floor numbers. The floor number data were generally based on the first phase online survey on rental data conducted in July to August, 2011. In the first phase online survey, a total of 878 effective samples for Shenzhen, 469 in Guangzhou, and 394 in Xi'an were collected and processed (Nie and Wong, 2012). Among these samples, 138 samples in Guangzhou, and 122 sample in Xi'an have floor number information. The first phase rental survey in Shenzhen did not include any floor number information,

so an extra survey on floor numbers in Shenzhen was re-conducted in December, 2011, which brought a total of 1054 online samples for the villages selected in the first phase.

The building ages are then estimated based on floor numbers. In urban villages in Shenzhen, most buildings with 7 to 8 floors were built in early 2000. Wang (2009) explained the reason as "a wave of illegal house building in urban villages" triggered by the policy to legalize illegal buildings in urban villages (Shenzhen Municipal People's Congress, 2001). Similarly, buildings with 5 to 6 floors were built in early to late 1990s. And buildings with less than 5 floors were built in 1980s (Shenzhen City UrbanVillage Redevelopment Planning Working Group, 2004). In urban villages in Xi'an, a similar study was conducted by Shen (2003). It shows that in general buildings with 4 to 5 floors in villages were built in late 1990s to early 2000 and buildings with less than 4 floors were built in early to mid 1990s. Studies on Guangzhou could not be found, but given the current building heights in Guangzhou, it is reasonable to estimate that buildings with 5 to 6 floors in Guangzhou were built in 2000s and buildings with less floors were built early.

In the actual conversion, the formula used is as follows. In Shenzhen, for buildings with 7 to 8 floors, the completion year can be marked as year 2000, for those with 5 to 6 floors, marked as 1995, and for those with 3 to 4 floors, marked as 1990. In Guangzhou, the formula is, year 2000 for 5 to 6 floors, 1995 for 3 to 4 floors, and 1990 for less than 3 floors. In Xi'an, the formula is, year 2000 for 4 to 5 floors, 1995 for 3 floors, and 1990 for less than 3 floors. The estimation results show that the average village building ages in the three cities (Shenzhen, Guangzhou, and Xi'an) are respectively only 12.1, 12.2, and 14 years. Of course, there exist alternative estimation methods which can bring variations in results, but given the significant difference in life expectancies, that is, the life expectancies of the non-village buildings are much longer than the village buildings, it seems that even variations are allowed, it is unlikely that such variations may bring reversed results.

With the height criteria taken into account, the answer is still positive. In Shenzhen and Xi'an, all non-villages meet the height criteria. So further tests are not needed. In Guangzhou, only 9 demolished non-villages meet the criteria. The average demolishing age for them is 24.8 years, still longer than villages.

In summary, it seems conclusive that the paradox of urban village renewals (built later but demolished earlier) exists in Shenzhen, Xi'an, and Guangzhou. The empirical study on the demolished non-villages confirms the hypothesis that such comparable non-village buildings are very likely to be demolished at a much older age, or they may remain old, with the demolishing time due in an unplanned future, supported by the fact that few existing old non-village buildings have been listed in any renewal plans. As for urban villages, despite the fact that they are much newer in age, they are often likely to be renewed earlier, with much shorter life expectancies.

## 3. Discussions

To explain the above patterns, a general framework on building renewal may be required. Suppose in a renewal project, the main payment method for compensation is in cash form. Denote the total building value after the renewal as NV and the total construction cost as C. Denote the compensation for the existing structure as CP, the demolishing cost as D, and the total amount of the market land rent as R. It is then necessary for a renewal project to be feasible if these variables satisfy the two equations below.

$$NV-C-CP-D>=0 \quad (1)$$

and

$$NV-C-R= 0. \quad (2)$$

Substitute equation 2) into 1) we have R>=CP+D. Since CP=R'+C1. R' denotes the total land rent not dissipated before renewal if the existing structure remains and C1 is the residual building value of the old structure. We have then R-R'>=C1+D as the feasibility criteria, indicating that a renewal project may be feasible when the dissipated rent reaches a level so it is greater than the sum of the residual value of the old structure plus the demolishing cost, which, in total, is then the breach cost.

A similar framework has been used by Cheung (1975) in his paper on rent control and building reconstruction in Hong Kong. In Cheung's format, the renewal condition is simply when the value difference between the new project value, the old project value, and the reconstruction cost is greater than zero. To fit Cheung's framework into the current study, certain adjustment has been made, that is, the new and the old project values have been decomposed into construction cost and land rent respectively and the reconstruction cost has been decomposed into construction cost and demolishing cost for old construction. Besides, for any short-term decision, the feasibility criteria can be stricter since positive net benefit is usually expected by the decision maker for the foreseeable future to exclude the impact of uncertainties. Hence, given the fact that a building can physically last to more than 50 years, the value of the new or the old structure then refers to the assessable value for one single renewal project.

As discussed above, when there is a demand shift (R increases), it is possible that R-R' can be larger than C1+D, suggesting that a renewal project is feasible. For village buildings, since they are newer in age, other things equal, they should be renewed no earlier than non-villages. That is, both their land rent value R' and their residual building value C1 should be higher than that of non-villages. In other words, if it is possible to renew a village now, it should be possible to renew a non-village as well.

However, the observation is the opposite. There may be one possible reason that leads to the early renewal for urban villages, that is, the rent loss for urban villages may be much more than that for non-villages. In the previous paper by Nie and Wong (2012), a test has been done showing that due to the distortion of their resource ratios more than 70% urban villages from the selected samples have more severe rent

dissipation problems than their non-village neighbours. Such a fact, explained using institution theories, has shown that incomplete property rights and consequently lack of regulations have contributed as the main factors leading to such inefficiencies. It is then possible that the paradox discussed may be attributed at least to the above reason, if no more reasons can be found.

An alternative compensation form is in housing. If so, the situation is different. Suppose that the ratio between the total old construction area and the total new construction area is 1-α, then all variables need to satisfy two equations: 1). NV* α -C-D>=0; and 2). NV-C-R=0. Substitute equation 2) into 1) we have R>= [(1-α)C+D]/α. Since all variables are identical for both villages and non-villages, it seems that for housing arrangement, urban villages may have identical life expectancies as non-villages. However, since buildings in urban villages have less rental values, in the renewal process, there is room to introduce a less than 1:1 housing compensation ratio (an artificially increased α). Or if only a 1:1 ratio can be agreeable, then the developers will increase the plot ratios in order to recover the loss, that is, the new project will be in higher overall density, R will decrease, α will increase, and C will increase. As long as the effect brought by the increase of C and decrease of R is less than the effect brought by the increase of α, there will still be rooms for density increase. The new project can then be overdeveloped.

The result is the same. Urban villages will still be demolished earlier than non-villages. But since for a less than 1:1 compensation ratio the negotiation cost can increase but for a 1:1 compensation package, the plot ratio of the new project will increase. Very often as we can see, the most likely results may be that new projects are built with even higher densities.

Whether a cash arrangement or a housing arrangement will be chosen then depends on the actual cost analysis. Separate studies can be made in the future to illustrate which one is more likely chosen. But technically, different methods only affect negotiation cost, without which taken into account, the above analysis may already provide enough justification on the paradox discussed.

As to why the initial setting in urban villages prevails, the reasons can be complicated. Besides all other possible reasons such as information uncertainty, defective knowledge, and cognitive problem, it can also be a good example of the principle-agent problem, in which officials setting initial environment may act at their own convenience without considering the total social costs and returns. Further discussion on this issue may be beyond the scope of the current study and will be conducted in separate studies in the future. But one thing is for sure--proper setting of an initial institutional environment, including all its parameters, can be extremely important, for it is one of the most important ways to ensure better efficiencies afterwards.

So far, only rent dissipations caused by non-resolvable externalities among villagers are discussed. There is, still, another type of externality, which is the externality between villagers and the state. Although the original law governing the collective land system defines that villagers can only use their lands for self-housing purpose, there have been no detailed descriptions to further define such boundaries. If

a village household with three members builds a small house with two floors, it is then, of course, natural to conclude that it must be for self-housing purpose. Equally, if such a village household builds a high-rise with more than 20 floors, it is then most likely that such a building must not be for self-housing purpose. However, for a building with eight floors, it is then disputable to say whether it is for self-housing purpose or not. Such a problem leads to non-resolvable externalities in urban villages. If a village household builds too many floors, basically it is taking advantage of the state, since a certain part of the rent collectable by the state may be transferred to the pocket of the village household.

To deal with the above problem, almost all city governments have announced certain policies. For example, the Shenzhen municipal government has announced in 1986 that each household can build a maximum of three floors. The average construction yard should be under 40 square metres per person (Shenzhen MunicipalGovernment, 1986). As the housing demand continues to increase after 1986, the enforcement costs for such standards are getting increasingly higher. In 1993, such standards have been adjusted. The new standards defined a reduced size for new yards, from 150 to 100 square metres per household; and the permitted housing construction area was also capped at 480 square metres for each household regardless of the population size of the household (Shenzhen Municipal Government, 1993). If a village household builds beyond the standards, then by the time of renewal, only construction cost will be compensated for the oversized part. Similar metrics have also been available in Guangzhou (Guangzhou Municipal People's Congress, 2011) and Xi'an (Xi'an Municipal Government, 2007), but as well, were unable to stop illegal constructions. The reasons are possibly two: 1). Such standards were introduced after the original "household contract responsibility system" was formally implemented starting in 1982 (Chinese Communist Party Central Committee, 1982), so without being written down in the original contracts, the legitimacy is questionable since villagers may not agree with such standards. 2). There have been too many villages and village households so the supervision cost is high. Due to the two reasons above, the total enforcement cost for such standards can be way too high. Besides, encouraged by the high rental return rate and the guaranteed compensation for construction cost of the oversized part, the villagers simply have nothing to lose.

Technically, both the higher site coverage problem caused by villager-villager externality (Nie and Wong, 2012) and the above villager-state externality can bring contract changes. The first brings an earlier renewal and the second may bring a buy-back scheme. The buy-back scheme means that before a renewal is feasible, the government can breach the contract by buying all buildings back, given the fact that, due to the high system change cost to alter the state level land laws, it is, for now, not possible to charge the villagers reversely any land premium to let them exclusively own the lands. The villagers can get full payment for the building values of the part that complies with the government's standards but for the oversized part, only construction cost will be paid and any extra market value will be collected by the government. A buy-back scheme is a type of contract change, but it should be distinct from a renewal-type contract change since it may not necessarily lead to demolition

and renewal. Such a buy-back scheme is ideally possible, but never happened in reality. A possible reason may be that the extra market value receivable by the government may be too small compare to the possible negotiation cost involved. If it is too costly to negotiate with the villagers, the buy-back scheme may end up unprofitable. As an alternative, a renewal then serves as a combination of the two contract changes. It can be seen that, with the second externality taken into consideration, the actually compensation to villagers can be lower (CP<R'+C or a larger α), but the extra market value (the difference) can only be recovered by the government through renewal projects if it is too costly to initiate a pure buy-back scheme. Such a value difference can also bring forward the schedule for renewals since from the government's perspective the depreciation effect is lowered down. Hence, without any exclusion of the possibility for any pure buy-back action for some occasions in the future, the actual contract change that prevails, for now, is a combination, of the two resolutions for both the villager-villager and the villager-state externalities, in the form of a possible earlier renewal.

One more issue has to be covered: the negotiation cost. Since in Cheung's case (Cheung, 1975), only self-reconstruction was discussed, the negotiation cost for compensation in his case is, in fact, mostly internalized. In the current study, however, besides the demolishing cost D, there may be a separate negotiation cost NC for arrangement of an agreeable compensation scheme. Hence, the framework used by Cheung to define the feasibility criteria then needs to be improved further. It is worth noting that the value of NC not only includes the physical cost for negotiation, but also the possible extra value, the overpriced part, demanded by the inhabitants. The equation for cash compensation then becomes R-R'>=C1+D + NC. As we have demonstrated earlier that due to dissipations in urban villages the left side part of the equation is larger for urban villages, it is reasonable then to conclude that a higher value of NC can be tolerable in urban villages if the villages are to be demolished at the same age as non-villages. It also implies that if NC is small enough in urban villages, the value C1 can be higher (C1 is higher when a building is newer) by the time of a renewal. that is, the negotiation process for renewal may start earlier in urban villages than in non-villages.

In fact, although such a negotiation cost can be different case by case, but in general, it seems highly possible that for non-villages the negotiation cost may not be less than that of villages. There are at least four reasons for it. First, there are generally more owners in non-village buildings. A village building has only one household owner, but a non-village building with the same construction size may have a number of apartments and each may have an owner of its own. It is reasonable to believe that the more the owners, the more difficult the negotiation can be since more bargaining activities will be involved and there may also be a higher chance of having nail households. Besides, each village has a village council as its representative so the negotiation process can be more manageable. Second, due to the incomplete rights and the higher densities in urban villages, the local governments in fact may have more excuses to demolish village buildings. For instance, most of the village buildings do not comply with planning standards so to enforce a demolition may be less costly since

people may believe that a demolition may be in fact the right thing to do. Furthermore, the disputable income mentioned earlier serves as a very useful justification for the government to enforce the transaction and even a compensation price in the name of protecting the government's own rights. Of course, the government still has to spend enforcement efforts preventing the villagers from building more floors, but that cost is not high enough to dissuade the government now given the fact that the property rights issue has been naturally better clarified if the villagers are to demolish their multiple storey buildings and replace them with high rise ones. That is, as long as the sum of the tax revenue increase (developers' profit tax for the renewal project plus the tax paid by the house buyers who buy houses built in the project) and the foreseeable land premium payable by the developers who actually handle the renewal exceeds the above enforcement cost, the government will have the incentive to initialize a renewal. Hence, such a project may receive more legislative support and the negotiation cost (the tax revenue increase can cover part of it and the rest will be covered by the extra rent recoverable by the renewal project) can be lowered down more effectively. Third, apartments in villages can not be sold to outsiders so by the time of demolition the market rental value may be even under-priced since tenants will be moving out. However, it is easy to observe that the market value for non-villages may go rocket high and remain overpriced by the time of demolition since many opportunists may rush in to buy such properties. Finally, many village renewal projects were in fact initialized by their village councils or share holding enterprises, so the negotiation cost may be partially internalized. For example, in Shenzhen, the renewal projects for Tiansha and Tianbei were in fact self-renewals organized by their village councils and share holding enterprises with the special endorsement by the government.

It is more complicated if housing compensation is selected. With negotiation cost taken into account, the equation for renewal can be rewritten as $R >= [(1-\alpha)C+D]/\alpha + nc$. In the equation, nc is the physical negotiation cost and the overpriced part is integrated into the equation with the variable $\alpha$. The logic remains the same though.

For non-villages, the situation is different. The recoverable rent is lower of course. In the meantime, since the residents have full rights over the land, it is hard to enforce a transaction by paying them only the value of their existing structure. Thus the negotiation cost is higher since the residents' choices can not be easily constrained. Unless a mutually agreeable compensation price can be fixed, the negotiation cost will remain high since the residents basically can insist asking for a full compensation. That is, the negotiation cost is low only when the compensation represents the value of the existing structure plus all the recoverable rent, which then leaves no rent recoverable for the developers and no land premium payable to the government. Even so, some nail households can still ask for more, which may then cause the developers end up losing money. The government can still receive some tax increase, but that amount may not be surely sufficient enough to settle down the nail households given the fact that the loss of the developers will have to be paid by the government eventually or no developer may be willing to participate. Therefore, the government may in the end receive no positive net return or may even suffer a deficit.

Of course if the residents can be organized by themselves to hire a qualified developer to upgrade their buildings legally, it is still possible that the renewal project can be initiated. But the organization cost is usually high. A non-village estate usually has hundreds of households, to get all of them organized is hard since without effective constraints everybody involved may seek benefits at others' cost. Given the fact that the recoverable rent is lower in non-villages than that of urban villages, it is unlikely that such a self-organized project can be feasible earlier than urban village renewals unless the organization cost for such a project is much less than the negotiation cost for the government-led urban village renewals.

It is, of course, not to exclude the possibility that there may be exceptional cases, due to reasons not covered in this study, in which the negotiation cost for village renewals may be large enough to block the renewals, so the neighbouring non-villages can be renewed earlier. But so far the analysis has shown that the odds may be low for having such exceptions.

To summarize, three main reasons have been discussed above, without which taken into account the pattern of shorter building life expectancy in urban villages can hardly be reasonably explained. First, although their buildings are newer, the urban villages have more dissipated rent due to the "overbuilt" issue analyzed in Nie and Wong (2012). Second, some disputable income can be extracted and retrieved by the developers and a land premium can be paid to the government if renewal happens in such villages. The two reasons together, give a higher total recoverable value for urban villages. Hence, it is possible that when demand arises, at a certain demand level it would be more likely for village renewals to be feasible but not yet for non-village renewals.

The above two reasons have pointed out that unless the negotiation cost[1] for urban villages is higher enough to offset the differences and to postpone and make it infeasible to renew a village but a non-village, the villages are very likely to be renewed earlier. In other words, a high enough NC surely can affect the issue of feasibility and postpone the schedule for renewals.

The third reason is that it is very likely that there may even be a negotiation cost for urban village renewals not larger than that of non-villages by the time of demolition. It is so for the four reasons mentioned earlier. It further ensures that it is indeed conclusive that the feasibility criteria can be satisfied more easily for urban villages. Thus, we can conclude that with a lower current value, some disputable income, and a lower negotiation cost, for a given market state, urban villages can be renewed more easily and more feasibly.

An alternative theory provides a very simple explanation to the observed shorter building life expectancy in urban villages, but it can be easily rejected. The theory says that city governments demolish urban villages for public interests, which basically suggests that to demolish an urban village itself is not profitable at the project scale, but it is profitable at the city scale. There are, of course, a few urban villages demolished and replaced by public facilities (like highways, museums, parks, etc.), but most of them have been demolished for building new residential estates. Those demolished for public projects have already been excluded from the above analysis.

It is, still, possible to argue that city governments demolish urban villages for social interests [2], that is, to maximize the total social benefits. It is true that governments need to consider social interests, but under many circumstances, capability still remains an issue. If a government demolishes an urban village at its own cost but brings more benefits to the society, the cost has to be covered somehow, or otherwise the government will be in debt. For large size renewal project, even if it is socially beneficial (although to confirm it requires more detailed analysis), it is simply hard for the government to proceed without ensuring a project level economic feasibility. Therefore, leaving the large scale social benefit cost assessment to be conducted later, project level economic feasibility with conditions describing early must be satisfied first as a premise, which makes the result from a larger scale assessment a supplementary but not a necessary condition for the previous observations on life expectancies.

One extra question remains. If urban villages are to be renewed earlier by either an external developer (led by the government) or an internal village enterprise, then is it still possible that the villagers can, like discussed earlier in Nie and Wong (2012), self-upgrade their buildings illegally? In Nie and Wong (2012), it is discussed that when market price arose, villagers upgraded their farm houses into multiple floor buildings simply because the net benefits receivable was larger than all other options, that is, the profit receivable by self-upgrading net of the legal cost is larger than the compensation payable and any income derivable from it. In the early stage, when self-upgrading is feasible, any compensation from external developers is low (since the villagers do not have the legal rights to receive any of the recoverable rents). If the government enforced a renewal at the time, the rent recoverable would be insufficient to cover the enforcement cost then.

However, when empty farming lands are used up and buildings in urban villages are becoming higher, the ambiguity of the self-housing definition becomes less significant since it is hardly convincing to claim that you build a 30-floor building for self-housing purpose. As a matter of fact, when demand continues to increase, villagers may still try to build more than 10 floors by self-upgrading, but as the rights ambiguity becomes less significant, measurement cost reduces and disputes can be less. The recoverable rent also increases so the government can collect enough land premium to enforce the laws. The laws become more stringent as government's enforcing becomes more feasible. As a result, the legal cost for building more floors increases. In the meantime, it is also more difficult to collect enough funds to do the self-upgrading, since to build high rise buildings much more money is needed. Mentioned early in Nie and Wong (2012), the villagers can not get loans from banks so financing can be more expensive. Technical qualification is one more issue. To build high rise buildings, qualifications are needed, otherwise technical risks can be high. Consequently, it is less likely that the government will allow the villagers to continue upgrading. Besides, there will be no disputable income to recover if self-upgrades are to be launched by villagers. The above reasons probably can explain the distinction between the observations: in Nie and Wong (2012) villagers can upgrade their farm houses into multiple floor buildings all by themselves illegally, which causes the

overbuilt problem, while in this paper urban villages are torn down by developers and new buildings are built legally under planning regulations and controls.

## 4. Concluding remarks

Following the previous paper by Nie and Wong (2012) on the overdevelopment problem in urban villages, the current paper shows that a renewal in urban villages can happen earlier than their non-village neighbours, given the fact that the feasibility criteria for renewal projects can be met more easily. The study here demonstrates that constrained by the cost environment, initial setting of property rights can play a very decisive role in affecting the feasibility of building renewals. While it is at first sight very natural and logic to believe that older buildings should be demolished earlier, the actual observation, impacted by the different property rights settings, is indeed the other way around.

It is, of course, not to say that for some other occasions other institutional parameters can not be equally important. For example, legal education can reduce the number of opportunists so that the cost for voluntary exchange can be reduced. For another example, management innovations can reduce legal and regulation cost and they are also very useful indeed. In fact, such occasions demonstrating the importance of some other environmental settings are to be discussed soon in a following paper, in which the special case of Shajing, Shenzhen will be discussed. For now, the main intent here is to imply first, using the urban village case, that indeed for certain occasions when all other institutional parameters are fixed as cost constraints, different initial settings of rights may lead to different economic outcomes.

## Notes

[1] To be more precisely, NC in the equation refers to the part not covered by the tax revenue increase mentioned earlier.

[2] Public interest is different from social interest. Public interest represents the interest of a large number of individuals, the public. Social interest represents the interest of the society as a whole, which may overlap with but not necessarily be the interest of the public. For example, providing free food to the public during holidays can be considered for public interest, but may not for social interest since free food may be over-consumed and wasted.

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