THE UNIVERSITY OF HONG KONG

A PROBIT ANALYSIS OF PLANNING APPLICATION STATISTICS ON MINOR RELAXATION OF DEVELOPMENT RESTRICTIONS ON HONG KONG ISLAND

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BY

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DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgment is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed: _____

Name: _____

Date: _____

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LIST OF ABBREVIATIONS

C	Commercial zone
CDA	Comprehensive Development Area zone
CPA	Coastal Protection Area zone
CR	Commercial/Residential zone
DPA	Development Permission Area
GFA	Gross Floor Area
GIC	Government/Institution/Community zone
HKPSG	Hong Kong Planning Standards & Guidelines
IDPA	Interim Development Permission Area
LP	Linear Probability
OU	Other Specified Uses zone
OZP	Outline Zoning Plan
PR	Plot Ratio
RA	Residential (Group A) zone
RB	Residential (Group B) zone
RC	Residential (Group C) zone
RE	Residential (Group E) zone
s.16	section 16
SA	Site Area
SC	Site Coverage
TPB	Town Planning Board
TPBG	Town Planning Board Guidelines
V	Village Type Development zone

ABSTRACT

This dissertation launches a pioneer study on the relaxation of development controls (i.e., the minor relaxation of development restrictions) under the statutory Outline Zoning Plans. Despite the significance of the minor relaxation of development restrictions as a means of increasing the monetary worth of development projects, the amount of research in this area has been very limited. This dissertation tries to reveal the rules of the game by identifying what the Town Planning Board favours when it decides on planning applications for relaxing development restrictions.

This dissertation makes use of the planning application statistics of the minor relaxation of development restrictions from 1986 to September 2005. Refutable hypotheses were tested using the Probit Model. The results of the tests, together with an additional finding on the question of the extent of "minor," are summarised below in Table 0.1.

Table 0.1

Summary of test results of hypotheses and other tests

Hypothesis/Test	Test Result	Implications
1A) Proposals with larger site areas (SA) will have a higher chance of getting approval.	Hypothesis is not refuted.	The TPB's act is in line with its assertion that the amalgamation of sites is favoured.
1B) Proposals with larger proposed Gross Floor Areas (GFA) will have a higher chance of getting approval.	Hypothesis is refuted.	The TPB's act is not in line with its assertion that comprehensive development is favoured. It contradicted itself, as GFA = SA x PR, SA and GFA should go the same way.
2A) Applications for a minor relaxation of development restrictions in the "R(C)" zone will have a higher chance of getting approval.	Hypothesis is not refuted.	The TPB favours applications for a minor relaxation for sites zoned "R(C)".
2B) Applications for a minor relaxation of development restrictions in the "R(B)" zone will have a higher chance of getting approval.	Hypothesis is refuted.	The TPB does not favour applications for a minor relaxation for sites zoned "R(B)".

Hypothesis/Test	Test Result	Implications
3A) Among the four types of minor relaxation of development restrictions, the relaxation of site coverage restrictions has a higher chance of getting approval.	Hypothesis is not refuted.	The TPB favours applications for a minor relaxation of site coverage restrictions.
3B) Among the four types of minor relaxation of development restrictions, the relaxation of GFA restrictions has a higher chance of being refused.	Hypothesis is not refuted.	The TPB does not favour applications for a minor relaxation of GFA restrictions.
3C) Among the four types of minor relaxation of development restrictions, the relaxation of plot ratio restrictions has a higher chance of being refused.	Hypothesis is not refuted.	The TPB does not favour applications for a minor relaxation of plot ratio restrictions.

Hypothesis/Test	Test Result	Implications
4A) Applications with a smaller percentage of relaxation have a higher chance of getting approval.	Hypothesis is not refuted.	The lower the percentage of relaxation, the higher an application's chance of success.
To test which group of percentage relaxation the TPB favours among the groups "0% < x <= 5%", "5% < x <= 10%," "10% < x <= 15%," "15% < x <= 20%," "20% < x <= 25%," and "others," where x = percentage of relaxation.	The group "15% < x <= 20%" was found to have a higher chance of getting approval.	If the percentage relaxation of a particular application is within the range of 15% < x <= 20%, then the application will have a higher chance of getting approval compared to other percentage relaxations.

CHAPTER 1

INTRODUCTION

Development Controls in Hong Kong

There are two forms of development control in Hong Kong — contractual control and statutory control. Contractual control is imposed through land leases, while statutory control is imposed through two pieces of local legislation, namely the *Buildings Ordinance*[1] and the *Town Planning Ordinance*.[2]

Contractual Control through Land Leases

According to Lai (1998a), Hong Kong has adhered to a leasehold land tenure system since colonization. All lands in Hong Kong belong to the government except the piece of freehold land in Central, where St. John's Cathedral is situated. These government-owned lands are leased to individual "owners" by means of grants, exchanges of land, or leases. These "owners" are not owners, but actually lessees because they do not have ultimate ownership of the land. Rather, they enjoy the property

1. Chapter 131, Laws of Hong Kong.
2. Chapter 123, Laws of Hong Kong.

rights attached to the land for a specific period of time, as specified in the terms of the lease. The period of a lease may be 999 years, 99 years, 75 years, or 50 years, and may contain a right of renewal upon expiry.

A land lease is capable of providing development controls because it contains clauses specifying requirements regarding development, such as car park spaces, the provision of footpaths and bridges, height restrictions, and, more importantly, a user clause. The user clause states the uses that are allowed or not allowed. In this way, the lessee's property rights with respect to development are clearly defined and controlled. The leasehold system is thus a "planning control institution based on a civil contract between the government on the one hand and private individuals on the other hand" (Lai 1997a, 19). As a lease is essentially a contract between the government and the lessee, the leasehold system is argued to be "a means of planning by contract" (Lai 1998a). The terms in such contracts are enforceable in contract law.

Statutory Controls through the Buildings Ordinance

The *Buildings Ordinance* contains a part called *Building (Planning)*

Regulations.[3] Schedule 1 of the *Building (Planning) Regulations* prescribes the allowed percentage site coverage and plot ratio for domestic or non-domestic buildings in each of the three site classes for several categories of building height. Development potential is thus restricted. The details of other parts of the *Buildings Ordinance* are beyond the scope of this dissertation.

Statutory Controls through the Town Planning Ordinance

The *Town Planning Ordinance* was first enacted in 1939. During its life of more than 60 years, there were two major amendments to it. The first one was made in 1974 regarding the introduction of the planning application system. The second one was the amendment made in 1991 relating to planning enforcement by means of Interim Development Permission Area plans (IDPA plans) and Development Permission Area plans (DPA plans), and the setup of the Town Planning Appeal Board. In 2004, there was an amendment to the ordinance that aimed to enhance the transparency of the planning system, streamline the town planning process, and strengthen enforcement controls against unauthorized

3. Chapter 123F, Laws of Hong Kong.

developments in the rural New Territories[4].

The objective of the *Town Planning Ordinance* is:

> to promote the health, safety, convenience and general welfare of the community by making provision for the systematic preparation and approval of plans for the lay-out of areas of Hong Kong as well as for the types of building suitable for erection therein and for the preparation and approval of plans for areas within which permission is required for development.[5]

Attenuation of Property Rights

Under the *Town Planning Ordinance*, a statutory organization, the Town Planning Board (TPB), is empowered to prepare statutory plans.[6] These statutory plans are Outline Zoning Plans (OZPs), DPA plans, and IDPA plans. The first two are prepared by the TPB, while the authority of designation of the third lies with the Director of Planning.[7] These statutory plans restrict the property rights of leaseholders. The content of these plans are imposed unilaterally on the lessees, despite the fact that

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4. Planning Department. 2004. (http://www.pland.gov.hk/tech_doc/tp_bill/pamphlet2004/index_e.html).

5. Long Title, *Town Planning Ordinance*, Chapter 131 of the Laws of Hong Kong.

6. Section 4, *Town Planning Ordinanc*e, Chapter 131 of the Laws of Hong Kong.

7. Section 26, *Town Planning Ordinance*, Chapter 131 of the Laws of Hong Kong.

representations may be made to the TPB in respect of a draft plan[8] because the details of the plans are, to a large extent, determined by the TPB.

As most of the land in Hong Kong was developed according to land leases prior to the introduction of statutory plans, Lai (1997a) argued that, "the plans, by restricting the redevelopment rights defined on the land, attenuate the existing property rights defined by the government leases." Lessees who want to redevelop their land or change its use cannot solely refer to their leases, but also have to look at the provisions of the relevant statutory plan. The rights conferred by a lease to a lessee are attenuated because even if a use is permitted under the lease (i.e., no lease modification is required), the lessees may not be allowed to use the land for such a purpose, as it may not be permitted in the statutory plan or permission for it is required from the TPB.

Planning Application (section 16 application or s.16 application)

In the 1974 amendment to the *Town Planning Ordinance*, the

8. Section 6, *Town Planning Ordinance*, Chapter 131 of the Laws of Hong Kong.

current planning application system was added. Section 16 of the *Town Planning Ordinance* sets out the procedures and requirements for planning applications. Planning permission from the TPB may be required for an intended use, depending on circumstances. For areas covered by OZPs, the problem of whether planning permission is required is explained as follows in more detail.

An OZP comprises three sets of documents. The first set is an annotated zoning map, showing the zoned uses of different parcels of land in that planning area. The second set comprises notes that are expressly stated as being part of the plan. These two documents are statutory. The third set is the non-statutory Explanatory Statement, which expressly states that the statement shall not constitute a part of the plan. The Explanatory Statement is intended to assist in an understanding of the approved plan by reflecting the planning intentions and objectives of the TPB for the various land use zonings of the Plan.

The set of notes states the uses that are always permitted in all zones. It also contains a Schedule of Uses, and for each use (or "zone"),

there are two Columns (Column 1 and Column 2). Column 1 lists the uses always permitted in that zone, while Column 2 lists the uses that may be permitted in that zone with or without conditions upon application to the TPB. In many zones, there will also be a part called "Remarks" after the two columns. This part may state some uses that require a planning application. An example is the "minor relaxation to plot ratio".

If the intended use is either an existing use, a use always permitted in all zones, or a use in Column 1, no planning permission is required. However, if the intended use falls within Column 2, planning permission is required unless it is an existing use. In addition, if the applicant's development idea falls within the ambit of the use in the Remarks, a planning application is needed. One should be reminded that the TPB may only grant planning permission to the extent specified in the relevant plan.

Review and Appeal

If an applicant is aggrieved about the refusal or conditional

approval of his application, a right of review of the case by the TPB is given by Section 17(1) of the *Town Planning Ordinance*. Section 17 of the *Town Planning Ordinance* sets out the procedures and requirements of a review. If the result is still unsatisfactory, the aggrieved party can appeal to an independent Appeal Board under Section 17B of the *Town Planning Ordinance*.

Material Considerations

In the *Town Planning Board Guidelines* (TPBG) issued by the TPB, it is often claimed that, "the decision to approve or reject an application rests entirely with the Town Planning Board and will be based on individual merits and other specific considerations of each case." However, the TPB has never provided concrete ideas in any guidelines on what the individual merits or other specific considerations are and weightings attached to these considerations. Also, there is no statutory requirement under the *Town Planning Ordinance* for the decisive criteria of planning application cases.

Hence, the mindset of the TPB is not known. It is very difficult

for applicants, usually developers of large projects, to know whether their applications will be successful. Time costs are involved for engaging in the planning application process, which is time-consuming. Such a delay may also cause a developer to miss an optimal development opportunity. Therefore, the current planning application system generates great transaction costs to the society.

Planning Application Data Published by the TPB

The TPB will make some information on planning application cases public. Such information includes the OZP number, location, lot number, Zoning, Use(s) applied for, application status, meeting data, decision, application data, site area, existing GFA (gross floor area), proposed GFA, whether it is a redevelopment or a change of use, and so on (Lai and Fong 2000). The information can be obtained from the Planning Department.

Such data is not useful on the surface. Lai and Fong (2000) stated that, "…the statistics provided by the annual reports of the Town

Planning Board are…too aggregated to be of any practical use."[9] However, ideas and arguments may be developed by analyzing the data using statistical techniques and models.

Objectives of the Study

In the above context, this dissertation aims to:

1) Start a pioneer study on a minor relaxation of development restrictions on Hong Kong Island.
2) Examine the use of development control data
3) Use aggregated and disaggregated statistical techniques to evaluate the planning application data for a minor relaxation of development restrictions on Hong Kong Island
4) Examine the factors affecting the probability of approval for a minor relaxation of development restrictions on Hong Kong Island.

Significance of the Study

There is a considerable demand for the minor relaxation of

9. L.W.C. Lai and K. Fong, *Town planning practice: Context, procedure and statistics for Hong Kong* (Hong Kong: Hong Kong University Press, 2000), ix.

development restrictions.[10] However, there is no literature or guidelines that talk about this kind of planning application. No one knows the rules of the game. This dissertation is thus a pioneer study of this area.[11]

The study can benefit developers who want to apply for a minor relaxation of development restrictions. Factors affecting the probability of approving planning applications for the minor relaxation of development restrictions and the extent of their effects have not been made known to developers. This dissertation attempts to identify those factors and the extent of their effects. This will help developers ascertain the probability of approval of their proposals so that they can plan ahead. In this way, transaction costs related to the planning application system can be reduced as certainty increases.

There are four types of planning application for the minor relaxation of development restrictions. They are a minor relaxation of the GFA, plot ratio, site coverage, and building height restrictions. For the GFA and plot ratio, a relaxation of such restrictions involves a direct

10. There were 121 cases from 1986 to September 2005. Read Chapter 2.

11. Thanks to Professor Lai, my dissertation supervisor, for raising this interesting and important area of research. The idea was provided by him.

gain in wealth because more units can be built, and these units can be sold for money. For height restrictions, there is probably a gain in wealth too. The reason is that floor spaces on the higher levels of a building are often sold at higher prices. The net worth of a building will increase if the increase in the selling price of its units offsets the increase in the building costs of the units on its higher levels.

For site coverage restrictions, a relaxation of such restrictions can benefit developers by increasing the higher permitted site coverage of each floor, which means greater flexibility in planning floor spaces.

Hence, a minor relaxation of these development restrictions can create more wealth for developers. This study attempts to help them capture this marginal wealth. In terms of economics, it helps developers maximize their profits under the statutory constraints.

Structure of the Dissertation

There are six chapters in this paper. Chapter 1 is the introduction (above), which describes development controls in Hong Kong and

provides a context for the study. Chapter 2 is a study on the minor relaxation of development restrictions on Hong Kong Island. Chapter 3 is a literature review on the minor relaxation of development restrictions and the use of development control data. The hypotheses and methodologies used are provided in Chapter 4. Chapter 5 discusses the findings. Chapter 6 is the conclusion, in which the limitations of the study and areas for further research will be presented.

CHAPTER 2

THE MINOR RELAXATION OF DEVELOPMENT RESTRICTIONS ON HONG KONG ISLAND

The Power to Impose Development Restrictions

The precondition for the minor relaxation of development restrictions is that there must be expressly stated development restrictions in the OZP, including GFA restrictions, plot ratio restrictions, site coverage restrictions, and height restrictions. These restrictions are currently commonly used in many OZPs on Hong Kong Island.[12] However, the imposition of these development restrictions must, in the first place, be supported by the TPB's power to impose them. In order to ascertain the power of the board, reference to the *Town Planning Ordinance* is needed.

Section 4 of the *Town Planning Ordinance* summarizes the power of the TPB. Section 4(1) states that, "The Board's draft plans prepared under Section 3(1)(a) for the lay-out of any such area may show…" This section confers power to the TPB to include in the plan matters

12. The details of this will be provided later in Chapter 2.

concerning the "layout" of the area only. However, the function of the TPB, as stated in Section 3 of the *Town Planning Ordinance* is that, "...the Board shall undertake the systematic preparation of draft plans for the **layout** of such areas…**as well as for the types of building suitable for erection** therein."[13]

Hence, the function of the TPB is to not only prepare draft plans on matters relating to the "layout" of an area, but also for the "types of building suitable for erection therein." Section 4 of the *Town Planning Ordinance* is silent about the power of the TPB to prepare plans for "types of building suitable for erection therein." This raises the question of whether the TPB has the power to carry out one of its functions, which is to prepare draft plans for the types of building suitable for erection.

The matter is clarified in the court case *Attorney General vs. C.C. Tse (Estate), Ltd.*[14] In that case, the respondent company was originally granted a declaration, which stated that the plot ratio restriction of maximum 0.6 in the relevant draft plan was void. But the government

13. Section 3(1)(a), *Town Planning Ordinance*, Chapter 131, Laws of Hong Kong.

14. *Attorney General vs. C.C. Tse (Estate), Ltd*. [1982] HKLR (CA).

appealed to the Court of Appeal by arguing that the plot ratio restriction of 0.6 in the draft plan was not void. It held that the TPB had the power to impose plot ratio restrictions:[15]

> …the list of powers in S.4(1)…were not exhaustive of the Board. The Board had the power to make plans for "types of buildings" under S.3 because the words "as well as" in Section 3 were to be construed as meaning "in addition to" and not meaning "including" (*Attorney General vs. C.C. Tse (Estate), Ltd.* [1982] HKLR (CA)).

Plot ratio was held as an attribute that was sufficient to make buildings of the same plot ratio fall into a category. The reason was provided in the judgement. It stated that if a number of buildings have a plot ratio of 0.6, they have that in common. Unless the sites differ greatly in size, buildings erected on them having the same plot ratio as one another will almost certainly not differ greatly in other attributes.

Therefore, it was affirmed in this case that the TPB has the power to impose plot ratio restrictions in OZPs within the ambit of the *Town Planning Ordinance*. It may be argued that GFA, site coverage, and

15. There was a case, *Crozet, Ltd. & Others vs. Attorney General* HCMP 409/73 in 1973, that dealt with the same question. In that case, it was held that the TPB did have the power to impose density controls. However, this case was unreported.

height are attributes that can also produce buildings of the same type because, "if a number of buildings have the same plot ratio they have that in common". However, the TPB's power to impose these restrictions has not been affirmed in court.

Development Restrictions in OZPs Covering Hong Kong Island

Hong Kong Island is within the scope of the *Town Planning Ordinance* since the enactment of it. The first OZP on Hong Kong Island was Plan No. LH 8/15 covering North Point, which was exhibited in September 1956. Since then, more OZPs have been exhibited covering different parts of Hong Kong Island. Nowadays, there are a total of 21 OZPs on Hong Kong Island. Over the years, 404 OZPs or amendments to OZPs have been exhibited by the TPB on Hong Kong Island.

Development restrictions[16] were not present in the first OZP (no. LH 8/15) of Hong Kong Island. It was not until April 1973 that the first

16. In this dissertation, development restrictions mean specific controls on development parameters, including GFA restrictions, plot ratio restrictions, site coverage restrictions, and height restrictions. They are all maximum restrictions.

development restriction was introduced.[17] In that OZP, a plot ratio restriction of maximum 0.5 was imposed in the "R" zone. Other development restrictions then proliferated one by one. Their introductions are summarised in Figure 2.1.

Year	Event
1956	First OZP on Hong Kong Island exhibited.[18]
1973	Plot ratio restrictions first existed.[19]
1985	Height restrictions first existed.[20]
1987	Site coverage restrictions first existed.[21]
1987	GFA restrictions first existed.[22]

Figure 2.1 Introduction of the first OZP on Hong Kong Island and of different development restrictions

At present, all of the 21 latest OZPs on Hong Kong Island contain at least one of the four development restrictions in some of the zones. There are various forms of restriction. For example, plot ratio restrictions can be imposed in the form of an exact maximum plot ratio stipulation, or as a plot ratio not in excess of existing buildings. Height

17. Plan No. LH14/20 was exhibited on 13 April 1973.

18. Plan No. LH8/15 was exhibited on 29 September 1956.

19. Plan No. LH14/20 was exhibited on 13 April 1973 in the "R" zone.

20. Plan No. S/H12/1 was exhibited on 9 August 1985 in the "R(C)1" and "R(C)2" zones.

21. Plan No. S/H17/1 was exhibited on 18 September 1987 in the "R(B)" and "R(C)" zones.

22. Plan No. S/H15/3 was exhibited on 20 November 1987 in the "R(A)1" zone.

restrictions can be imposed in the form of restrictions on the number of storeys, or in the exact number of metres above principal datum. GFA restrictions can be imposed on the domestic or non-domestic parts of buildings, or in the form of total GFA.

Minor Relaxation of Development Restrictions on Hong Kong Island – the Past and the Present

The above section discussed the introduction of development restrictions. However, at the time development restrictions were first introduced, a minor relaxation of those development restrictions was not possible. As a minor relaxation of such restrictions is done through the planning application system,[23] it must have appeared at least since 1974, when the current planning application system was established.

After reference has been made to all the past and current OZPs on Hong Kong Island, a minor relaxation of development restrictions was found to be possible in the Pok Fu Lam OZP S/H10/2, which was exhibited on 21 November 1986. There was a height restriction in the "R(C)" zone of the OZP.

23. This will be explained later in Chapter 2.

Year	Event
1986	Minor relaxation of height restrictions first made possible[24]
1987	Minor relaxation of plot ratio restrictions first made possible[25]
1987	Minor relaxation of site coverage restrictions first made possible[26]
1999	Minor relaxation of GFA restrictions first made possible[27]

Figure 2.2 Introduction of minor relaxations of different development restrictions

The following statement was included in the 'Remarks' Column of the Notes of the 'Residential (Group C)' zone in the Pok Fu Lam OZP S/H10/2:

> Minor Relaxation of the stated restrictions may be considered upon individual merit of the development/redevelopment proposals, by the Town Planning Board, under Section 16 of the Town Planning Ordinance.

The reason for the sudden inclusion of the minor relaxation clause is a mystery. No records on it have been discovered.

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24. Plan No. S/H10/2 was exhibited on 21 November 1986 in the "R" zone.

25. Plan No. S/H17/1 was exhibited on 18 September 1987 in the "R(C)" zone.

26. Plan No. S/H17/1 was exhibited on 18 September 1987 in the "R(C)" zone.

27. Plan No. S/H17/7 was exhibited on 30 April 1999 in the "OU(cyber port)" zone.

At present, there are 130 development restrictions[28] within the 21 OZPs covering Hong Kong Island. Figure 2.3 shows the distribution of development restrictions in different zones. The development restrictions are mainly present in the "R(C)" zone.

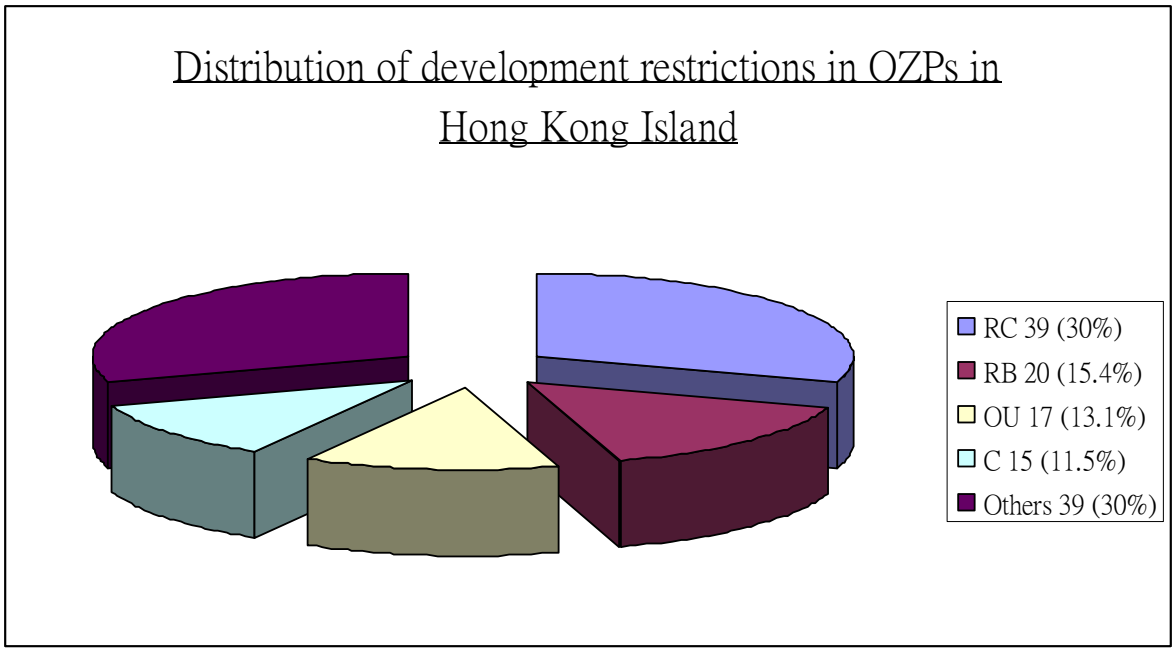

Figure 2.3 Distribution of development restrictions in OZPs on Hong Kong Island

98 out of 130 development restrictions may be relaxed, as effected by the minor relaxation clause.

28. As mentioned before, there are four types of development restrictions – GFA, plot ratio, height, and site coverage. In Wong Nai Chung OZP No. S/H7/11, there are height, plot ratio, and site coverage restrictions in the "R(C)" zone, and height restrictions in the "R(B)" zone, so there are four development restrictions in this OZP.

Table 2.1
Percentages of "relaxable" restrictions in different zones

Zone	No. of Restrictions	May be Relaxed	Percentage
RA	7	7	100%
RB	20	20	100%
RC	39	39	100%
RE	1	1	100%
V	2	2	100%
OU	17	13	76.5%
C	15	11	73.3%
CR	4	2	50.5%
GIC	2	1	50.0%
CDA	11	2	18.2%
CPA	12	0	0%

Table 2.1 stated that all development restrictions in different residential zones (i.e., "RA," "RB," "RC," and "RE") could be relaxed under a minor relaxation clause. Development restrictions in Village Type Development zone ("V") may all be relaxed too. Other Specified Uses ("OU") and Commercial ("C") zones showed more than 70% "relaxability,"[29] which is quite high. Commercial and Residential ("CR") and Government/Institution/Community ("GIC") zones showed a medium "relaxability" of about 50%. Comprehensive Development Area ("CDA") zones showed a low "relaxability" of 18.2%. All development restrictions in Coastal Protection Area ("CPA") zones could

29. It means the ratio of restrictions relaxable to the total no. of restrictions, but not the percentage increase allowable.

not be relaxed, as no minor relaxation clause was present.

Table 2.1 also showed that the development restrictions in OZPs are more restrictive in some zones. Those restrictions in Residential zones are less restrictive in the sense that they may be relaxed through the s.16 planning application system if the applicant can satisfy the requirements of the TPB. In contrast, restrictions in "CDA" and "CPA" zones are more restrictive because they can almost never be relaxed.

Content of the Minor Relaxation Statement in Notes of OZP

Nowadays, the minor relaxation statements in OZPs remain, to a large extent, in their original form from 1986. They may differ in some of the wordings or sentence structures, but their meaning is the same. A typical clause is provided as follows: (The Peak Area OZP No. S/H14/7 "R(C)" zone "Remarks" section, Paragraph (4)):

> Minor Relaxation of the stated restrictions in Paragraphs (1) and (2)[30] above, based on merits of individual development or redevelopment proposals, may be considered by the Town Planning Board on application under Section 16 of the Town Planning Ordinance.

30. These are plot ratio restrictions and height restrictions.

There are four main parts in the statement. First, the proposed relaxation must be "minor". Second, the relaxation must be based on the restrictions stated in the OZP (i.e., in this case Paragraphs (1) and (2)). Restrictions in the First Schedule of the *Building (Planning) Regulation* are therefore irrelevant for the purpose of minor relaxation. Third, the application is judged on the basis of the individual merit of the proposal. Fourth, the application is done through the current s.16 planning application system in the TPB. In the s.16 application form available from the TPB, there is a part about minor relaxation. This is shown in Figure 2.4.

☐ **Minor relaxation of stated development restriction(s)** for Column 1 use or use/development always permitted under the covering Notes (please specify the intended use/development and development particulars, and illustrate on plan the boundary of such use/development)
爲了第1欄用途或《註釋》說明頁內經常准許的用途/發展而要求略爲放寬已列明的發展限制（請註明有意進行的用途/發展和發展細節，並用圖則顯示這個用途/發展的界線）

Intended use/development 有意進行的用途/發展

.....

.....

Development restriction(s) proposed to be relaxed 建議放寬的發展限制

.....

.....

Proposed domestic floor area 擬議住用樓面面積 ..... sq. m. 平方米
Proposed non-domestic floor area 擬議非住用樓面面積 ..... sq. m. 平方米
Proposed total floor area 擬議總樓面面積 ..... sq. m. 平方米
Proposed plot ratio 擬議地積比率 .....
Proposed site coverage 擬議上蓋面積 ..... %
Proposed number of blocks 擬議座數 .....
Proposed number of storeys of each block每座建築物的擬議層數 .....
Proposed building height of each block 每座建築物的擬議高度 ..... m. 米

Figure 2.4 The part of minor relaxation
in the s.16 planning application form S16-5
(*Source*: Town Planning Board, http://www.info.gov.hk/tpb).

Figure 2.4 stated that the form provides for a minor relaxation of stated development restriction(s) "for Column 1 use or use/development always permitted under the covering Notes". This does not mean that an application for the minor relaxation of development restrictions is only possible for Column 1 use and use is always permitted. The simple reason for the inclusion of a minor relaxation of development restrictions for these uses is that these uses do not require planning permission if the restrictions are not violated. Application for Column 2 uses with

development parameters beyond the limit of the stated restrictions is still possible under the same s.16 planning application system.

Purpose of the Minor Relaxation of Development Restrictions

The purpose of allowing for the minor relaxation of development restrictions has to be investigated. However, the *Town Planning Board Guidelines* issued by the TPB do not contain a part about the minor relaxation of development restrictions. Neither did the *Hong Kong Planning Standards and Guidelines* (HKPSG) issued by the Planning Department provide any related information. Hence, the purpose of a minor relaxation of development restrictions can only be deduced from other documents.

In the Explanatory Statement attached to the OZP, some elaborations on minor relaxation can be found. Refer back to the previous example in The Peak Area OZP No. S/H14/7, in which the Explanatory Statement 7.4.4 is written as follows:

> Minor relaxation of the stated restrictions may be considered by the Board through the planning permission system. Consideration

of such application for minor relaxation would be on individual merits, taking into account site constraints, innovative architectural design and planning merits that would enhance the amenity of the locality.

It is thus deduced that the purpose of allowing for the minor relaxation of development restrictions is to encourage innovative design and provide planning merits that would enhance the amenity of the locality. As a minor relaxation may eventually result in an increase in the net worth of a project, it is an incentive for applicants to propose more innovative designs. This can result in a win-win situation in which the applicant increases his wealth and the community benefits from the enhancement of its amenity.

Planning Applications for the Minor Relaxation of Development Restrictions

As mentioned above, minor relaxation was first made possible in November 1986. The first decision on a s.16 planning application for a minor relaxation on Hong Kong Island was provided in May 1990.[31] The applicant sought a relaxation of the restrictions on residential building height and site coverage in the "R(C)2" zone in Wong Nai

31. Case No. A/H07/064 decided on 11 May 1990.

Chung OZP No. S/H7/2, but was rejected. Figure 2.5 below shows the number of planning application cases[32] for the period 1986 to 2005. As the figure is quite small, Figure 2.5 shows the number of cases every two years instead of yearly to smooth over irregularities.

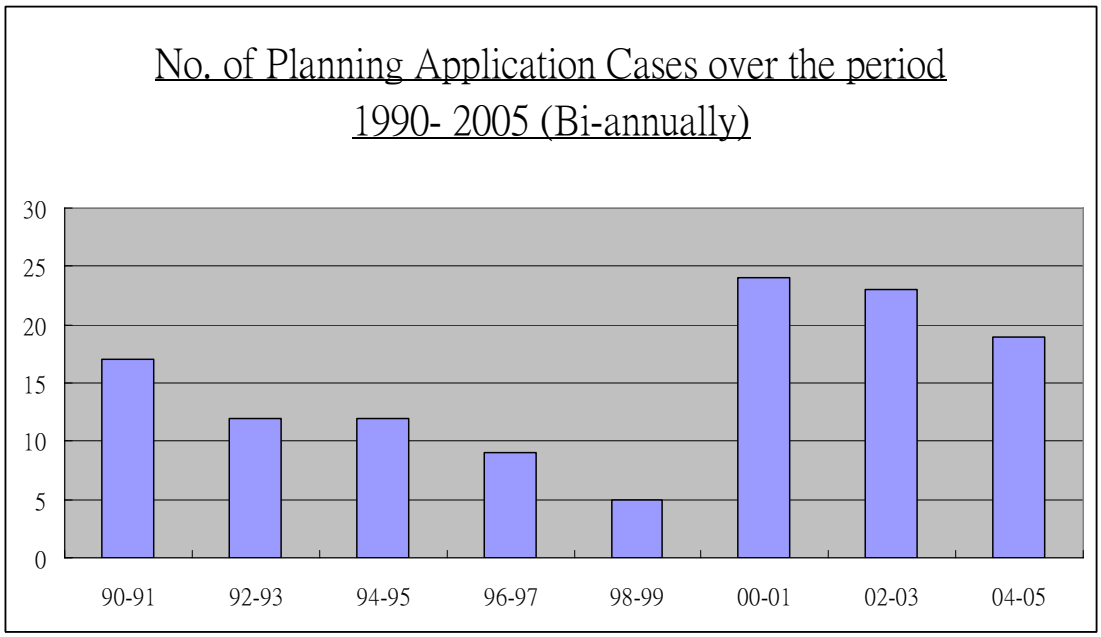

Figure 2.5 No. of planning application cases for the period 1990-2005 (biennially)

The author does not intend to establish an argument about the trend of the number of cases or explain the irregularities observed. Figure 2.5 was provided to show that there was a considerable amount of usage of the minor relaxation clause on Hong Kong Island.

32. It includes S.16 application cases, review cases, and appeal cases.

Uncertainties in the Applications for Minor Relaxation of Development Restrictions

Applications for the minor relaxation of development restrictions are similar to planning applications for other uses in the sense that material considerations affecting the decision made by the TPB and the weightings attached to them are not known.

Adding to this is that the most important part of the minor relaxation of development restrictions — the word "minor" — is undefined. The TPB has never made clear what "minor" means exactly. Does it refer to the magnitude of relaxation or the percentage of relaxation? This obviously creates a lot of transaction costs to society. Given the minor nature of the relaxation, only marginal benefits can be obtained by an applicant. The presence of large transaction costs may effectively eliminate the possible marginal benefits.

CHAPTER 3

LITERATURE REVIEW

This study is all about evaluating development control data (planning application data) for the minor relaxation of development restrictions. Therefore, the literature review is concerned chiefly with the minor relaxation of development restrictions in Hong Kong and the uses of development control data.

The Minor Relaxation of Development Restrictions

The minor relaxation of development restrictions in Hong Kong is a new area of study. The only paper that has touched upon this area is the one written by Lai (1998b).[33] He distilled the principal rules of planning appeal cases by reviewing the cases. Some of the rules relate to the minor relaxation of development restrictions. A fact to note here is that the information obtained from the Town Planning Appeal Board[34]

33. L.W.C. Lai, "Hong Kong Planning Appeal Rules (1991-1997)," *Planning and Development* 14, no.2 (1998b):38-60. In this paper, Lai "gave an account of the principal rules, as found in 50 reported town planning appeal cases decided by the Planning Appeal Board from 1991 to1997."

34. Decisions of the Town Planning Appeal Board. (http://www.hplb.gov.hk/tpab/eng/decisions/index.html).

showed that out of the 94 cases decided by the Appeal Board from 1992 to 2004, five were concerned with the minor relaxation of development restrictions.[35]

The rules developed by Lai that relate to the minor relaxation of development restrictions are as follows:

> 'Minor relaxation of plot ratio' stipulated for a zone is to be adjudged on the basis of a comparison between the plot ratio proposed by the applicant and the plot ratio stipulated in the OZP, not any plot ratio approved by the Building Authority prior to the gazette of the OZP -- even though that plot ratio may still be achieved without planning permission.
>
> 'Minor relaxation of plot ratio' stipulated for a zone is to be adjudged on the basis of a comparison between the plot ratio proposed by the applicant and the plot ratio stipulated in the OZP, not any plot ratio approved or could have been approved by the Building Authority prior to the gazette of the OZP --- even though construction of that plot ratio had been in progress before the gazette of the OZP or the relaxation was part of an agreement made prior to the gazette of the OZP.
>
> Where a zone permits 'minor relaxation' of development restrictions, a ten percent (10%) increase in plot ratio can be permitted where it can be shown that the proposed scheme is aesthetically better than alternatives designed to meet the prescribed plot ratio.
>
> The restriction in the Notes of a certain number of storeys 'above

35. Case Nos. 1/1991, 2/1992, 3/1992, 12/1996, 12/1999.

> one storey of carport' does not imply that no residential or other always permitted uses on the carport level: such restrictions refer to building heights rather than uses.
>
> Where an Explanatory Statement states that "Each proposal will be considered strictly on its own merits," no problem of precedent will arise" (Lai 1998b, 38-60).

In the paper, Lai tried to interpret the mindset of the Appeal Board. The interpretation above is stated "as they are" without any evaluation. It may serve as a guideline for any future applications of planning permission for the minor relaxation of development restrictions.

The Use of Development Control Data

Development control data has been widely used for research purposes. The data can be broadly divided into two types – Aggregated data and non-aggregated data. Carlos (1979) provided definitions for aggregated and non-aggregated data:

> If each observation in our data set consists of a value of the attribute vector (representing an individual who has been interviewed), and an observed choice, we say that we have disaggregated data. If, on the other hand, the data include information on groups of people, we call it aggregated or grouped.[36]

36. D. Carlos, *Mutinomial Probit, the Theory and Its Application to Demand*

There have been studies using both types of data. Dobry (1975) first demonstrated the use of planning application statistics. Various scholars in the UK and the US then carried out studies using a qualitative approach or aggregated development control statistics (McNamara and Healey 1984; Preece 1990; Sellgren 1990; Brotherton 1984, 1992a, 1992b; Gilg and Kelly 1996). The debate between Brotherton and McNamara and Healey (Brotherton 1982; McNamara and Healey 1984; Brotherton 1984) showed us some problems of using aggregated data for planning studies.

The Use of Aggregated Data

McNamara and Healey (1984) proposed the following formula for the index of pressure for residential development in an area:

$$P = \frac{\text{No. of Dwellings Refused}}{\text{No. of Dwellings Approved}} \times \text{Total Expressed Demand for Dwellings}$$

If more planning applications are refused (approved), the pressure for residential development will be higher (lower). However, Brotherton (1984) disagreed by pointing out the occurrence of

---

Forecasting (New York: Academic Press, 1979), 6.

unreasonable special cases. He stated that when all applications are approved, the formula implies there is no pressure for development. At the other extreme, when all applications are refused, infinite development pressure will result. Therefore, the index is given a non-linear dependency on the refusal rate between these extremes.

The problems of using aggregated data are not limited to those described above. Sellgren (1990) reviewed the aggregated approach, and argued that the problems include those above, using the ratio of failure to the success of development applications as proxies for measuring development pressure, and other major problems, such as ambiguous definitions, measurements of planning variables, problems with the choice of weighing criteria, the loss of essential information about individual planning permission statistics, etc. Preece (1990) stressed that there are some preconditions for a meaningful quantitative analysis of development control data. A study has to be carried out by a proper process of data collection, hypothesis formulation, and testing. However, Preece claimed that too many works in this area were using the less rigorous method of "confirmation" rather than the method of

"falsification" in hypothesis testing.

Despite its inherent problems, the use of aggregated data is still common among researchers. Aggregate studies make use of collecting a huge number of statistics, and the studies will sometimes be supported by case studies, which provide more detailed investigations. According to Larkham (1990), a general picture can be provided by a study using aggregated data, but the study can serve as a basis for more detailed case studies that could "penetrate beneath the 'hard facts' readily obtainable from aggregate data".[37] Larkham (1990) continued to argue that although case studies "would permit examination of the minutiae of the system of processing applications,"[38] they could "rarely stand alone" and needed "the support of data gathered from a wider area…in order to substantiate the argument that the case study is not atypical."[39]

37. P.J. Larkham, "Development control information and planning research," *Local Government Studies* 16, no.2 (1990): 4, 1-7.

38. P.J. Larkham, "Development control information and planning research," *Local Government Studies* 16, no.2 (1990): 6, 1-7.

39. P.J. Larkham, "Development control information and planning research," *Local Government Studies* 16, no.2 (1990): 5, 1-7.

The Use of Non-aggregated Data

The use of non-aggregated data, or disaggregated data, is gaining importance in planning research. According to Lai and Ho (2002b):

> The current state of art of urban planning research is the debate on the usefulness and limitations of aggregate planning data, notably the average success rates of development applications as measures of development pressures. The better view is that non-aggregate data, which are amenable to rigorous statistical analysis, are essential (Lai and Ho 2002b, 128).

The work of Willis (1995) is the first statistical work to utilize non-aggregated development control data. Willis adopted two models – the "cognitive continuum" and "lens" models to analyze how decision makers make development control decisions. The "lens" model assumes that "there is some actual, underlying, hidden condition or state – planning permission – which the planning officer (or planning committee) is trying to identify and classify, from observable signs, cues, or indicators it produces."[40] Willis continued to argue that, "in the lens...a proposed development is thought of as emitting signals, differing in character, frequency, and strength. The particular pattern of cues, signs

40. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1071, 1065-1079.

or indicators which decision-markers see, or assume will arise, is what they have to work back from to arrive at the underlying object/condition."[41]

Willis also argued that, "Professionals in practice, whether planners, physicians, estate agents or lawyers, typically make intuitive judgements…Intuitive thought involves unconscious, often rapid, data processing that combines the available information by averaging it."[42] However, "people have limited information processing abilities, and this (bounded rationality) affects how people interpret values and make choices."[43]

Hence, the task for the decision theorist is to discover "the relative weight the person (or committee) assigns to each of the cues; the functional form of each cue in relation to the individual's (or organisation's) judgement; the principle by which the data from the cues

41. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1071, 1065-1079.

42. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1070, 1065-1079.

43. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1071, 1065-1079.

are organized; and the consistency with which the judgement is exercised (Hammond, 1975)."[44]

Willis used a Logit function to study the probability of not obtaining planning permission. He argued that the use of statistical decision making techniques could probably "improve the decision making within the planning framework…by making the actors involved in the process more aware of how they reach decisions, and the weights they attach to the different factors involved in refusing or granting planning permission."[45]

Besides the Logit model, there are other probability functions, such as the linear probability (LP) model and Probit Model.[46] These models are known as the qualitative response, quantal, categorical, or discrete models (Amemiya 1981). Lai and Ho (2001c) stressed that "non-aggregate statistics open the gate of rigorous analysis of three types

44. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1072, 1065-1079.

45. K.G. Willis, "Judging development control decisions," *Urban Studies* 32, no.7 (1995): 1078, 1065-1079.

46. Aldrich's book "Linear probability, Logit and Probit Model" (Aldrich 1984) provides details on a mathematical deduction for the models.

of planning studies."[47] They include the direct measurement of the effectiveness of development controls on the externalities (Lai 1994, 1997b). The second one (Lai and Ho 2001b, 2001c) is the evaluation of the behaviour of players in the land market. The third one (Lai and Ho 2001b, 2001c) consists of those empirical verifications of economic theories concerning the behaviour of planning authorities.

The usefulness of non-aggregated statistical analysis results in a more common use of such a technique. In Hong Kong, Tang and Tang (1999) were the first to use the non-aggregate technique to evaluate the effectiveness of a new zoning incentive (two-tier plot ratio system) in Hong Kong. In that study, a logistic regression analysis was performed, and it found that private sector site amalgamation, which is an objective of the system, was not achieved.

Tang and Choy (2000) made another attempt to use non-aggregate statistical analysis. They also used a logistic regression function to study a total of 162 private applications for commercial office

47. L.W.C. Lai and W.K.O. Ho, "A probit analysis of development control: A Hong Kong case study of residential zones," *Urban Studies* 38, no.13 (2001c): 2426, 2425-2437.

redevelopment over a 12-year period in Kowloon. They identified a four-factor model that could correctly predict up to 77% of the outcomes. The four factors are proposed development scale, the number of previous attempts, the timing of decisions, and the existing market supply.

The logistic function was used again by Tang, et. al. (2000) to consider the certainty and discretion in planning controls by considering the planning applications for office use on Hong Kong Island. They concluded that the planning system in Hong Kong offered both certainty to developers and flexibility to the planning authority.

Beside logistic functions, the Probit Model, which is also a non-aggregate model, was used by Lai and Ho (Lai and Ho 2001a, 2001b, 2001c, 2001d, 2002a, 2002b, 2002c, 2002d) for planning studies. The model was used to analyse development control data on planning applications in Hong Kong. The modelling exercise provides predictive power in obtaining planning permission for similar developments in the future. Examples of the arguments developed by Lai and Ho included:

1. the decisions made by the Town Planning Board [that] are not independent of [the] exogenous policy influence of government[48];
2. the probabilities of mixed industrial/office and pure office uses in industrial zones being approved were dependent on the rise and fall of the manufacturing sector[49]; and
3. planning applications for houses have no greater chance of success than other uses in Green Belt zones.[50]

48. L.W.C. Lai and W.K.O. Ho, "A probit analysis of development control: A Hong Kong case study of residential zones," *Urban Studies* 38, no.13 (2001c): 2425, 2425-2437.

49. L.W.C. Lai and W.K.O. Ho, "An econometric study of the decisions of a town planning authority: Complementary & substitute uses in industrial activities in Hong Kong," *Managerial and Decision Economics* 23, no.3 (2002b): 127, 127-135.

50. L.W.C. Lai and W.K.O. Ho, "Low-rise residential developments in green belts: A Hong Kong empirical study of planning applications," *Planning Practice & Research* 16, no.3/4 (2001a): 331, 321-335.

CHAPTER 4

HYPOTHESIS AND METHODOLOGY

Hypotheses

Hypothesis 1

The Explanatory Statement attached to the Kennedy Town & Mount Davis OZP No. S/H1/4[51] states that, "Upon submissions of comprehensive redevelopment proposals with amalgamation of sites, favourable considerations may be given to [the] minor relaxation of the restrictions and each proposal will be considered on its own merits."

The above statement indicates that "favourable consideration" may be given upon "comprehensive" redevelopment with "amalgamation" of sites. The adjective "comprehensive" has the meaning of "large and broad". Large and broad developments are usually developments with a higher proposed GFA. Also, although larger sites do not necessarily result from the amalgamation of sites, amalgamation can still mean that larger sites are favoured. These two phrases (comprehensive

51. This is the first OZP covering Kennedy Town & Mount Davis with a minor relaxation clause. It was exhibited on 21 May 1993.

redevelopment and amalgamation of sites) indicate that there is a tendency for the TPB to grant permission if the site area or the proposed GFA of the proposals is large. However, large developments will usually have a larger impact on the environment. As environmental impact is a consideration of the TPB when it decides whether or not to grant planning permission, it's therefore difficult to conclude that proposals with larger site areas or GFAs will have a higher chance of getting approval. This requires empirical tests using appropriate statistical techniques.

Hypothesis 1A

Proposals with larger site areas will have a higher chance of getting approval.

Hypothesis 1B

Proposals with larger proposed Gross Floor Areas will have a higher chance of getting approval.

Hypothesis 2

In Chapter 2, Fig. 2.3 and Table 2.1 showed that development restrictions and minor relaxation clauses appeared in many different zones. There were 121 applications for a minor relaxation of development restrictions on Hong Kong Island from 1986 to September 2005. Of these, 103 applications were in the "R(C)" zone, 13 were in the "R(B)" zone, three were in the "C" zone, and one was in both the "R(E)" zone and "OU" zone. Due to the lack of literature support and guidelines from relevant government bodies, whether the TPB favours a minor relaxation of development restrictions in some particular zones is not known. As the "R(C)" and "R(B) zones are less restrictive in the sense that all restrictions in these zones may be relaxed, perhaps the TPB favours them.

Hypothesis 2A

Applications for a minor relaxation of development restrictions in "R(C)" zones will have a higher chance of getting approval.

Hypothesis 2B

Applications for a minor relaxation of development restrictions in "R(B)" zones will have a higher chance of getting approval.

Hypothesis 3

As mentioned above, there are four types of minor relaxation of development restrictions. Relaxation of GFAs and plot ratios can result in a direct gain in wealth by the applicant. In addition, such relaxations will cause an increase in population density and traffic load in that area. Hence, the relaxation of GFAs and plot ratios should be more difficult compared to the other two types of relaxation. For the relaxation of height restriction, there may also be a gain in wealth by the applicant. However, an undesirable effect of such a relaxation is that an increase in the height of buildings may block the views of nearby buildings. Compared to the relaxation of site coverage, which is just a lateral, rather than a vertical, increase in size, the relaxation of height restrictions should be more difficult. Nevertheless, this argument has to be tested empirically so that it can be more convincing. Therefore, the following hypotheses are provided.

Hypothesis 3A

Among the four types of minor relaxation of development restrictions, the relaxation of site coverage restrictions has a higher chance of getting approval.

Hypothesis 3B

Among the four types of minor relaxation of development restrictions, the relaxation of GFA restrictions has a higher chance of being refused.

Hypothesis 3C

Among the four types of minor relaxation of development restrictions, the relaxation of plot ratio restrictions has a higher chance of being refused.

Hypothesis 4

In the phrase "minor relaxation of development restrictions," the word "minor" denotes the extent of relaxation in brief. Applicants will apply for a "minor" amount of relaxation according to their definition of

the word. This is a rather subjective exercise, as the TPB has not defined in quantitative terms the meaning of "minor".

An investigation of the planning applications data for the minor relaxation of development restrictions revealed that the percentage of relaxation can be as high as 225%.[52] However, a case in which the applied relaxation was just 7.7%[53] was rejected because "the proposed relaxation of building height restrictions **could not be considered as minor** in nature." These cases showed that the TPB does not judge the percentage of relaxation systematically. Nevertheless, the inclusion of the word "minor" should mean that the TPB favours a smaller percentage of relaxation.

Hypothesis 4A

Applications with a smaller percentage of relaxation have a higher chance of getting approval.

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52. Case No. A/H03/271. In that case, the applicant applied for a relaxation of plot ratio and height restrictions. The proposed development has a height of 39 storeys, which is 225% higher than the 12-storey limit in the relevant OZP. The case was approved with conditions.

53. Case No. A/H14/50. In that case, the applicant applied for a relaxation of height restrictions from 13 storeys to 14 storeys. The application was rejected.

Methodology

This dissertation will first conduct aggregated studies to provide a general picture of planning application for the minor relaxation of development restrictions. In order that the hypotheses are tested in a more rigorous way, a non-aggregated analysis will also be performed. Previous studies using the Probit Model (Lai and Ho 2001a, 2001b, 2001c, 2001d, 2002a, 2002b, 2002c, 2002d) showed that the model can produce convincing arguments by analyzing planning application data. Therefore, this dissertation uses the Probit Model to analyse the planning application data for the minor relaxation of development restrictions.

Model Specification – the Probit Model

We would like to find the relationship between: (a) the probability of a town planning application being approved and (b) the characteristic of the particular application, as well as other material considerations that the TPB may consider when it decides whether an application should be approved or not.

Suppose there is an unobserved variable, y^*, which ranges from $-\infty$

to $+\infty$. This y* is assumed to be linearly related to the observed independent variables, Xs, such that:

$$y^* = \sum b_j X_j + e$$

y* is then linked to the observed binary variable y (the outcome) by the following equation:

$$y = \begin{cases} 1 & \text{if } y^* > 0 \\ 0 & \text{if } y^* \leq 0 \end{cases}$$

Hence, Pr (y=1) = Pr (y* >0), and Pr (y=0) = Pr (y*≦0) = 1- Pr (y=1). Since y* is continuous, the problems of specifying a linear probability model are avoided. We assume that the expected value of the error term is 0 (i.e., E (e | x) = 0). Since y* is not observable, the variance of the error term e (i.e., Var (e | x)) cannot be estimated. We have to assume the distribution of the error term. As "the probability of an event is unaffected by the identifying assumption regarding Var (e | x) (Long 1997, p.50), we hereby assume the error term e follows a normal distribution with a mean of 0 and a variance of 1. The cumulative distribution function of a normal distribution with E (e | x) = 0 and Var (e | x) = 1 is:

$$\Phi(e) = \int_{-\infty}^{e} \frac{1}{\sqrt{2\pi}} \exp(-\frac{t^2}{2}) dt$$

Pr (y=1) = Pr ($y^* > 0$) = Pr ($\sum b_j X_j + e > 0$)= Pr ($e > -\sum b_j X_j$).

Since the cumulative normal distribution is symmetrical, Pr ($e > -\sum b_j X_j$) = Pr ($e < \sum b_j X_j$). Hence:

Pr (y = 1)

= Pr ($e < \sum bjXj) = \Phi(\sum bjXj)$

$$= \int_{-\infty}^{\sum bjXj} \frac{1}{\sqrt{2\pi}} \exp(-\frac{t^2}{2}) dt$$

The Maximum Likelihood Method

Since y* is not observable, we cannot use the Ordinary Least Square (OLS) method to estimate the parameter b_j. The Maximum Likelihood Method is used instead.

Since there are only two possible outcomes, either approved (y=1) or rejected (y=0), and since all town planning applications are independent of each other, we can apply binomial distribution to find the likelihood of a particular event happening:

$$L(b_j) = \prod_{y=1} \Pr(y_i = 1) \prod_{y=0} [1 - \Pr(y_i = 1)]$$

where i denotes the i^{th} application. We may also obtain the Log Likelihood equation by taking logs on both sides of the above equation.

As we can never know what the exact values of b_j are, Maximum likelihood is used to find the set of values of b_j that can maximize the probability (likelihood) of a particular observation.

Since it can be shown that the Log Likelihood equation is globally concave (i.e., there will be only one maximum), we can use an iterative procedure to converge our estimations on the single maximum (Amemiya 1981). The iteration method starts with an initial value, attempts to improve on this guess by adding a vector of adjustments, and ends until there is convergence (Long 1997).

Nevertheless, all the above calculations can be facilitated by a suitable computer program (e.g. EView, SAS, SPSS, etc.).

Data Description

Planning application data is collected either from the website of the TPB[54] or from the Planning Information and Technical Administration Unit of the Planning Department.[55] A total of 121 applications for the minor relaxation of development restrictions were collected from 1986 to September 2005. The cases included s.16 applications and review and appeal cases. The information collected included case numbers, the relevant planning areas and OZPs, the zones in which the applications were based, applied uses, original development restrictions in the OZPs, the applied development parameters (GFAs, plot ratios, site coverage, heights), site areas, types of action (s.16, reviews, appeals), decisions, dates of the decisions, etc. However, as there was missing information in some of the cases, only 103 applications were suitable for modeling purposes.

The Dependent Variable

We wanted to know what factors affect the probability of an application being approved. Hence, in the analysis, the dependent

54. Statutory Planning Portal. http://www.ozp.tpb.gov.hk/default.aspx.

55. 17/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.

variable is the **probability of an application being approved**. The value of a dependent variable will be either 1 or 0. If an application is approved (in the case of a s.16 or review), with or without conditions, or allowed (in the case of appeal), the value of the dependent variable will be set to 1. If an application is rejected, that value will be set to 0. Only a final decision will be considered. So, if a s.16 application is rejected and a review is applied and subsequently approved, then the dependent variable of this datum will be set to 1.

Independent Variables

These are the proposed variables that may affect the probability of an application being approved (i.e., affect the dependent variable).

Site Area (SA)

The site area is hypothesized (Hypothesis 1A) to have a positive effect on the probability of an application being approved due to the TPB's preference for "comprehensive redevelopment" and the "amalgamation of sites". A dependent variable named "SA" will be included in the equation so as to test the hypothesis. The value of SA

will be the area of the site in m^2.

Table 4.1
Site area of the projects that applied for a minor relaxation of development restrictions

Site Area	Below 0.1 ha	0.1 to 1 ha	Above 1 ha	Other	Total
No. of Cases (%)	25 (20%)	87 (72%)	7 (6%)	2 (2%)	121 (100%)

Gross Floor Area (GFA)

The Gross Floor Area is also hypothesized (Hypothesis 1B) to have a positive effect on the probability of an application being approved for the same reason as above. So GFA will also be included in our analysis. The value of GFA will be the proposed GFA of the development/redevelopment in m^2.

Table 4.2
Gross Floor Area of projects that applied for a minor relaxation of development restrictions

Gross Floor Area	Below 0.5 ha	0.5 to 5 ha	Above 5 ha	Other	Total
No. of Cases (%)	80 (66.1%)	31 (25.6%)	2 (1.7%)	8 (6.6%)	121 (100%)

Zoning Dummies

No clues were found for the effect of the zoning of sites on the probability of getting approval. As the author wished to explore this area (Hypothesis 2), the zonings of the sites were included in the analysis as dummy variables.

Table 4.3
Zonings of projects that applied for a minor relaxation of development restrictions

Zoning	R(C)	R(B)	R(E)	C	OU	Total
No. of Cases (%)	101 (84%)	13 (11%)	1 (1%)	3 (3%)	1 (1%)	121 (100%)

The two zoning dummy variables are defined as follows:

RB = 1 if the application is made on a site zoned "R(B)";
0 if otherwise
RC = 1 if the application is made on a site zoned "R(C)";
0 if otherwise

Types of Applied Relaxation Dummies

It is hypothesized that applications for the minor relaxation of site coverage restrictions have a higher probability of getting approval (Hypothesis 3A) because their undesirable effects are smaller. It is also

hypothesized that applications for a minor relaxation of GFA and plot ratio restrictions have a lower probability of getting approval (Hypotheses 3B and 3C) because they have a large effect on population density, traffic loads, and wealth. Dummy variables of the types of applied relaxation are needed.

Table 4.4
Number of cases for the different types of minor relaxation of development restrictions

Type	GFA	Plot Ratio	Site Coverage	Height	Total
No. of Cases (%)	1 (1%)	32 (26%)	48 (40%)	65 (54%)	121[56]

The dummies are defined as follows:

RELAX_SC = 1 if the application is for the minor relaxation of site coverage restrictions;
0 if otherwise

RELAX_GFA = 1 if the application is for the minor relaxation of GFA restrictions;
0 if otherwise

RELAX_PR = 1 if the application is for the minor relaxation of plot ratio restrictions;
0 if otherwise

56. The total no. of cases was 121. However, in some cases, applicants sought a relaxation of more than one type of development restriction. The sum of all types of relaxation was not greater than 121.

Percentage of Relaxation (PERCENT)

It is hypothesized that applications with a smaller percentage of relaxation have a higher chance of getting approval (Hypothesis 4A). To test this hypothesis, a variable named "PERCENT" is included in the equation. The value of PERCENT is defined as follows:

PERCENT = (Applied development parameter – Magnitude of development restrictions in OZP)/(Magnitude of development restrictions in OZP)

Long (1997) proposed that at least ten observations per parameter should be reasonable, and that there should be a minimum of 100 samples to run the Maximum Likelihood Test. As we have fewer than ten parameters and more than 100 samples, our data set should be large enough to run the Maximum Likelihood Test if it is needed.

CHAPTER 5

FINDINGS AND DISCUSSION

Aggregate Analysis

Site Area

The number of cases and approval rates of planning applications for the minor relaxation of development restrictions **within different site areas** are provided in Table 5.1.

Table 5.1
Number of cases and approval rates of planning applications for the minor relaxation with different site areas

Site Area	No. of Cases	Approved
Below 0.1 ha	25 (20%)	13 (52%)
0.1 to 1 ha	87 (72%)	52 (59.8%)
Above 1 ha	7 (6%)	5 (71.4%)
Other	2 (2%)	0 (0%)
Total	121 (100%)	70 (57.9%)

Table 5.1 indicated that the average approval rate for all applications was 57.9%. The approval rate for projects within the site areas “below 0.1 ha” was 52%, which was 5.9% below average. The

approval rates for projects within the site areas that were “0.1 to 1 ha” and “Above 1 ha” were 59.8% and 71.4%, respectively, which were 1.9% and 13.5% above average, respectively. The larger the site area, the higher the approval rate. This does not refute Hypothesis 1A, which stated that proposals with larger site areas will have a higher chance of getting approval.

The no. of cases that were “Above 1 ha” (seven in all) was quite small. They may not be representative enough to indicate the actual approval rate of that group of site area.

GFA

The number of cases and approval rates of planning applications for a minor relaxation of development restrictions for developments **with different gross floor areas** are provided below in Table 5.2.

Table 5.2
Number of cases and approval rates of planning applications for a minor relaxation with different gross floor areas

GFA	No. of Cases	Approved
Below 0.5 ha	80 (66.1%)	49 (61.3%)
0.5 to 5 ha	31 (25.6%)	14 (45.2%)
Above 5 ha	2 (1.7%)	0 (0%)
Other	8 (6.6%)	7 (87.5%)
Total	121 (100%)	70 (57.9%)

Compared to the average approval rate of 57.9%, GFA that was "Below 0.5 ha" was 3.4% above average, while GFA that was "0.5 to 5 ha" was 12.7% below average. GFA that was "Above 5 ha" had a 0% approval rate. Surprisingly, the higher the GFA, the lower the approval rate. This tends to reject Hypothesis 1B, which stated that a larger proposed GFA will have a higher chance of getting approval.

Similar to the case of site area, the result of the analysis was a consequence of the problem of data insufficiency. The no. of cases of GFA being "Above 5 ha" was just two. To use a simple analogy, we cannot say that if a fair coin is tossed two times and shows two heads, then all tosses will come up heads.

Zoning

The number of cases and approval rates of planning applications for a minor relaxation of development restrictions in **different zones** are provided in Table 5.3.

Table 5.3
Number of cases and approval rates of planning applications for a minor relaxation in different zones

Zoning	No. of Cases	Approved
RC	103 (84%)	66 (64.1%)
RB	13 (11%)	2 (15.4%)
Others[57]	5 (5%)	2 (40%)
Total	121	70 (57.9%)

Most of the cases were in the "R(C)" zone (84%). The approval rate of the "R(C)" zone was 64.1%, which was 6.2% above average. However, the approval rate of the "R(B)" zone was low (15.4%), which was 42.5% below average. The approval rate of "Others," which includes the data of "C," "RE," and "OU," was 40%, which was 17.9% below average.

57. C 3 (1%) 1 (33.3%)
RE 1 (3%) 0 (0%)
OU 1 (1%) 1 (100%)

The results showed that applications in the "R(C)" zone tended to have a higher chance of getting approval (consistent with Hypothesis 2A). But the low approval rate in the "R(B)" zone tended to refute Hypothesis 2B, which stated that applications for a minor relaxation of development restrictions in the "R(B)" zone will have a higher chance of getting approval.

Types of Applied Relaxation

The number of cases and approval rates of the **different types** of planning application for the minor relaxation of development restrictions is provided in Table 5.4.

Table 5.4
Number of cases and approval rates of different types of planning applications for a minor relaxation

Type	No. of Cases	Approved
GFA	1 (1%)	1 (100%)
PR	32 (26%)	10 (31.3%)
SC	48 (40%)	35 (72.9%)
Height	65 (54%)	34 (52.3%)
Total	121[58](100%)	70 (57.9%)

58. See Footnote 57.

There was only one case of a minor relaxation of GFA restrictions. The approval rate can either be 100% or 0%. This is inadequate for the purpose of our analysis. But among the other three types of relaxation, site coverage relaxation had the highest approval rate of 72.9%. This was followed by height relaxation with 52.3%. Plot ratio relaxation had the lowest approval rate of 31.3%.

The approval rate of site coverage relaxation was higher than average. From this, it can be argued that site coverage relaxation has a higher chance of getting approval (which does not refute Hypothesis 3A). Hypothesis 3B (GFA) could not be tested due to a lack of data. A 31.3% approval rate for a plot ratio relaxation application, which was 26.6% below average, did not refute Hypothesis 3C, which stated that a relaxation of plot ratio restrictions has a higher chance of being *refused*.

Disaggregate Analysis

When all eight independent variables (SA, GFA, RB, RC, RELAX_GFA, RELAX_PR, RELAX_SC, and PERCENT) are put into the equation for analysis, the results are shown in Table 5.5.

Table 5.5
Probit results of all variables [Equation 1]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 98
Excluded observations: 3 after adjusting endpoints
Convergence achieved after 27 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient Std.	Error	z-Statistic	Prob.
C	-4.201575	10.50092	-0.400115	0.6891
SA	0.000106	7.76E-05	1.366294	0.1718
GFA	-0.000115	5.59E-05	-2.053530	0.0400
RB	3.841090	10.48498	0.366342	0.7141
RC	4.689372	10.48251	0.447352	0.6546
RELAX_GFA	11.86463	22091792	5.37E-07	1.0000
RELAX_PR	-0.543009	0.420812	-1.290385	0.1969
RELAX_SC	0.041004	0.338536	0.121120	0.9036
PERCENT	0.004381	0.003918	1.118311	0.2634

Mean dependent var	0.581633	S.D. dependent var	0.495827
S.E. of regression	0.452328	Akaike info criterion	1.268438
Sum squared resid	18.20945	Schwarz criterion	1.505833
Log likelihood	-53.15349	Hannan-Quinn criter.	1.364460
Restr. log likelihood	-66.61644	Avg. log likelihood	-0.542383
LR statistic (8 df)	26.92590	McFadden R-squared	0.202097
Probability(LR stat)	0.000728		
Obs with Dep=0	41	Total obs	98
Obs with Dep=1	57		

The McFadden R-squared value, a popular measure of the percentage of variations in the dependent variable being "explained" by the independent variable, should be as high as possible.[59] Numerous

59. Usually, this value will not be high because a "bad" observation will reduce the value of it significantly. What is sufficiently large is still a point of

trials were conducted by putting different combinations of variables into the equation. Equation 1 in Table 5.5, with all variables in it, had the highest McFadden R-squared value of 0.202.

However, only GFA was significant at the 5% level. Equation 1 was therefore undesirable for the purpose of testing our hypotheses. Other equations that still had a high McFadden R-square value had to be used.

Equation 2 had three independent variables that were significant at the 5% level. The results of Equation 2 are shown in Table 5.6.

Table 5.6
Probit results of the optimal equation [Equation 2]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 98
Excluded observations: 3 after adjusting endpoints
Convergence achieved after 8 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.000381	0.575615	-1.737933	0.0822
SA	0.000138	6.75E-05	2.038351	0.0415

contention among statisticians.

GFA	-0.000112	4.89E-05	-2.285148	0.0223
RC	1.392214	0.542265	2.567406	0.0102
PERCENT	0.002185	0.003554	0.614811	0.5387

Mean dependent var	0.581633	S.D. dependent var	0.495827
S.E. of regression	0.452717	Akaike info criterion	1.238766
Sum squared resid	19.06057	Schwarz criterion	1.370652
Log likelihood	-55.69952	Hannan-Quinn criter.	1.292111
Restr. log likelihood	-66.61644	Avg. log likelihood	-0.568362
LR statistic (4 df)	21.83383	McFadden R-squared	0.163877
Probability(LR stat)	0.000216		
Obs with Dep=0	41	Total obs	98
Obs with Dep=1	57		

That three independent variables were significant at the 5% level at the same time was the best we could achieve. With a rather high McFadden R-squared value of 0.164, Equation 2 was the optimal equation.

The results in Table 5.6 above showed that site area (SA), which had a positive coefficient, was significant at the 5% level. Therefore, the larger the site area, the higher its chances of getting approval. This was consistent with Hypothesis 1A, which stated that, "Proposals with larger site areas will have a higher chance of getting approval." The *result was the same as that of aggregate analysis*[60] using figures of percentage approval in different groups of site area. Hence, **Hypothesis**

60. See p.58-59.

1A was not refuted.

The results in Table 5.6 also showed that gross floor area (GFA), which had a negative coefficient, was significant at the 5% level. This implied that when the GFA of a project increases, the chances of an application being approved decreases. The *result was consistent with that of aggregated analysis*[61] using figures of percentage approval in different groups of GFA. They contradict Hypothesis 1B, which stated that, "Proposals with larger proposed Gross Floor Areas will have a higher chance of getting approval." Hence, **Hypothesis 1B was refuted.**

This result was surprising. While the TPB expressly states that comprehensive development is favoured, applications with a higher GFA have a lower chance of approval. Although projects with a larger GFA are not necessarily comprehensive developments, projects with a smaller GFA are hardly comprehensive. The result will not be this case that smaller GFA has higher chance of approval. Also, as GFA = SA x PR, with PR unchanged, a higher SA will result in a higher GFA. Given that

61. See p.60.

there are two sites with the same PR, Site A with a higher SA and Site B with a lower SA, Site A can have a **higher** chance of approval, as indicated by the positive coefficient of SA in Equation 2. But Site A can also have a **lower** chance of approval because it has a higher SA (higher SA causes a higher GFA, and higher GFA is not favoured, as indicated by the negative coefficient of GFA in Equation 2). This results in a contradiction in which higher SA increases and also decreases the chance of getting approval. This approval inconsistency needs further study.

Besides SA and GFA, Equation 2 also showed that variable "RC" was significant at the 5% level. RC has a positive coefficient. This means that if the application is made for an R(C) zone, its chances of getting approval will be higher. *This was consistent with the results of aggregate analysis*[62] and Hypotheses 2A. Hence, **Hypothesis 2A was not refuted.**

If the coefficients of SA and GFA are compared with that of RC, it can be found that the coefficient of RC is more than 10,000 times that of

62. See p.61-62.

SA and GFA. Therefore, **the effect of a change in SA or GFA on the chances of an application getting approval is very small**. If an application is not made for an R(C) zone, it has to have a site area (or GFA) that is about 10,000 times greater than that of an application made for an R(C) zone so that they can have the same chance of getting approval.

The optimal equation (Equation 2) did not include variable RB. However, if the independent variables are re-mixed into different combinations, RB may still be significant at the 5% level. The results of it are shown in Table 5.7.

Table 5.7
Probit results with RB being significant [Equation 3]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 100
Excluded observations: 1 after adjusting endpoints
Convergence achieved after 7 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.633920	0.188520	3.362608	0.0008
RB	-1.307595	0.629634	-2.076756	0.0378
GFA	-6.33E-05	4.01E-05	-1.577962	0.1146
PERCENT	-0.000888	0.003188	-0.278489	0.7806

Mean dependent var	0.580000	S.D. dependent var	0.496045
S.E. of regression	0.463949	Akaike info criterion	1.268689
Sum squared resid	20.66383	Schwarz criterion	1.372896
Log likelihood	-59.43447	Hannan-Quinn criter.	1.310864
Restr. log likelihood	-68.02920	Avg. log likelihood	-0.594345
LR statistic (3 df)	17.18947	McFadden R-squared	0.126339
Probability(LR stat)	0.000646		
Obs with Dep=0	42	Total obs	100
Obs with Dep=1	58		

In Equation 3, with three independent variables (RB, GFA, and PERCENT), RB was significant at the 5% level. The McFadden R-squared value of 0.1263 was acceptable. RB had a negative coefficient. This meant that if an application is made for an R(B) zone, its chances of getting approval will be smaller. This was *consistent with the results of aggregate analysis,*[63] and thus contradicted Hypothesis 2B, which stated that applications for a minor relaxation of development restrictions in "R(B)" zones will have a higher chance of getting approval. Hence, **Hypothesis 2B was refuted.**

The types of applied relaxation dummies (RELAX_GFA, RELAX_PR, and RELAX_SC) were all excluded from Equations 1, 2, and 3 because including them with the zoning dummies would cause the

63. See p.61-62.

latter to become insignificant. Standing alone with some of the variables, their results are shown in Table 5.8.

Table 5.8
Probit results of type of applied relaxation dummies [Equation 4]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 100
Excluded observations: 1 after adjusting endpoints
Convergence achieved after 25 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.461312	0.237523	1.942182	0.0521
PERCENT	0.002461	0.003252	0.756720	0.4492
RELAX_SC	0.357183	0.295226	1.209863	0.2263
RELAX_PR	-0.744062	0.367798	-2.023017	0.0431
RELAX_GFA	7.564973	2254689.	3.36E-06	1.0000
GFA	-6.57E-05	3.60E-05	-1.826927	0.0677

Mean dependent var	0.580000	S.D. dependent var	0.496045
S.E. of regression	0.462462	Akaike info criterion	1.281618
Sum squared resid	20.10390	Schwarz criterion	1.437928
Log likelihood	-58.08090	Hannan-Quinn criter.	1.344880
Restr. log likelihood	-68.02920	Avg. log likelihood	-0.580809
LR statistic (5 df)	19.89660	McFadden R-squared	0.146236
Probability(LR stat)	0.001307		
Obs with Dep=0	42	Total obs	100
Obs with Dep=1	58		

The McFadden R-squared value was 0.146426, which is high. Of the five independent variables, only RELAX_PR was significant at the 5% level (GFA was only significant at the 10% level). With a negative

coefficient, RELAX_PR had a negative effect on the probability of an application getting approval. If the application is for a minor relaxation of plot ratio restrictions, it will have a lower chance of getting approval compared to other types of relaxation, with all other factors being equal. *This was consistent with aggregate analysis*[64] and Hypothesis 3C. Hence, **Hypothesis 3C was not refuted**.

As other types of applied relaxation dummies were insignificant, further trials shall be made with different variable combinations.

Table 5.9
Probit results with "RELAX_SC" being significant [Equation 5]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 101 after adjusting endpoints
Convergence achieved after 3 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.108800	0.192871	0.564108	0.5727
RELAX_SC	0.567150	.269180	2.106958	0.0351
PERCENT	-0.003395	0.002553	-1.329997	0.1835

Mean dependent var	0.574257	S.D. dependent var	0.496921
S.E. of regression	0.483868	Akaike info criterion	1.349707
Sum squared resid	22.94458	Schwarz criterion	1.427384
Log likelihood	-65.16020	Hannan-Quinn criter.	1.381153

64. See p.62-63.

Restr. log likelihood	-68.88987	Avg. log likelihood	-0.645151
LR statistic (2 df)	7.459342	McFadden R-squared	0.054140
Probability(LR stat)	0.024001		
Obs with Dep=0	43	Total obs	101
Obs with Dep=1	58		

The McFadden R-squared value (0.0541) was much lower (compared to 0.164 in the optimal equation). The LR statistic was 0.024, which meant that the probability of the coefficients of all variables being equal to zero was 2.4%. This was acceptable, although it was much higher than that in the optimal equation (0.000216). But Equation 5 was the equation with the highest R-squared value among those in which RELAX_SC was significant at the 5% level.

RELAX_SC had a positive coefficient. Hence, if the application is for a minor relaxation of site coverage restriction, the probability of it being approved would be higher compared to other types of relaxation, with all other things being equal. This was *consistent with the results of aggregate analysis*[65] and Hypothesis 3A. Hence, **Hypothesis 3A was not refuted.**

65. See p.62-63.

The variable RELAX_GFA was totally insignificant in all equations. The reason was probably a lack of data. There was only one case of a minor relaxation of GFA, which was approved. Even if the case was rejected (i.e., a 0% approval rate), we still can't say that a relaxation of GFA restrictions results in a higher chance of being *refused* (Hypothesis 3B). Hence, **Hypothesis 3B was not refuted.**

An effort was made to test Hypothesis 4. The independent variable PERCENT was included with different variables in the equation, but it was still not significant at the 5% or 10% levels. In the many trials the author conducted, it is discovered that a lower number of independent variables made it more likely for the independent variables to be significant. So PERCENT was included as the only independent variable in the equation. The results are shown in Table 5.10.

Table 5.10
Probit results of "PERCENT" [Equation 6]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 101 after adjusting endpoints
Convergence achieved after 2 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.344632	0.157698	2.185387	0.0289
PERCENT	-0.004067	0.002527	-1.609650	0.1075

Mean dependent var	0.574257	S.D. dependent var	0.496921
S.E. of regression	0.492589	Akaike info criterion	1.374655
Sum squared resid	24.02178	Schwarz criterion	1.426440
Log likelihood	-67.42008	Hannan-Quinn criter.	1.395619
Restr. log likelihood	-68.88987	Avg. log likelihood	-0.667525
LR statistic (1 df)	2.939595	McFadden R-squared	0.021335
Probability(LR stat)	0.086432		
Obs with Dep=0	43	Total obs	101
Obs with Dep=1	58		

Even if only the variable PERCENT was included, it would not be significant at either the 5% or 10% levels. Although PERCENT had a negative coefficient, we can't conclude that a smaller percentage of relaxation results in a higher chance of approval (Hypothesis 4) because the coefficient was not statistically significant enough. Hence, **Hypothesis 4 was not refuted.**

After testing the hypotheses, the author found that the results of aggregate analysis using percentages and averages and disaggregate analysis using the Probit Model were consistent.

Final Question – How "minor" is minor?

The final target of minor relaxation is a maximization of the monetary worth of a development. Having an application approved at a certain percentage of relaxation may not be the most desirable result. This is because the TPB may accept a higher percentage of relaxation. So the best outcome for the minor relaxation of development restrictions is that the highest range of relaxation that the TPB would accept is reached. That range must be known. The Probit Model is used again to evaluate the planning application statistics.

The percentages of relaxation are classified into different groups in the form of dummy variables as follows:

GR_ZERO_FIVE	=	*1 if 0% < x <= 5%*
		0 if otherwise
GR_FIVE_TEN	=	*1 if 5% < x <= 10%*
		0 if otherwise
GR_TEN_FIFTN	=	*1 if 10% < x <= 15%*
		0 if otherwise
GR_FIFTN_TWNT	=	*1 if 15% < x <= 20%*
		0 if otherwise
GR_TWNT_TWFV	=	*1 if 20% < x <= 25%*
		0 if otherwise

where x = percentage of relaxation (i.e., value of "PERCENT" mentioned above).

If any of the dummy variables is significant, then further analysis is possible. If a significant variable has a positive (negative) coefficient, then that percentage of relaxation would be favoured (not favoured) by the TPB, and applications with that percentage of relaxation will have a higher (lower) chance of approval.

If all the variables are shown to be significant, and if a line is discovered to exist between the variables having positive coefficients and those having negative coefficients, then that line is the "most favoured ceiling" for the factor "percentage of relaxation". It represents the highest percentage of relaxation still favoured by the TPB, but it doesn't mean that the percentage of relaxation beyond that line must be rejected by the TPB because the percentage of relaxation is not the sole material consideration of the TPB. Those percentages are less favoured by the TPB only.

The results of modelling these dummy variables are shown in

Table 5.11.

Table 5.11
The first Probit results of the percentage of relaxation dummies
[Equation 7]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 101 after adjusting endpoints
Convergence achieved after 3 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.087552	0.191395	0.457443	0.6474
GR_ZERO_FIVE	0.052158	0.460877	0.113171	0.9099
GR_FIVE_TEN	0.289840	0.366004	0.791904	0.4284
GR_TEN_FIFTN	-0.087552	0.385787	-0.226944	0.8205
GR_FIFTN_TWNT	0.754069	0.490682	1.536776	0.1243
GR_TWNT_TWFV	-0.087552	0.482682	-0.181387	0.8561

Mean dependent var	0.574257	S.D. dependent var	0.496921
S.E. of regression	0.501600	Akaike info criterion	1.448985
Sum squared resid	23.90225	Schwarz criterion	1.604338
Log likelihood	-67.17373	Hannan-Quinn criter.	1.511876
Restr. log likelihood	-68.88987	Avg. log likelihood	-0.665086
LR statistic (5 df)	3.432283	McFadden R-squared	0.024911
Probability(LR stat)	0.633658		
Obs with Dep=0	43	Total obs	101
Obs with Dep=1	58		

In the Probit results in Table 5.11, none of the variables was significant at the 5% or 10% levels. The McFadden R-squared value was very low (0.0249). The LR Statistics were low too (3.432), and the Probability (LR stat) (i.e., the probability that all coefficients are zero)

was as high as 63.37%. Equation 7 was obviously unsuitable. Further trials were made, and the only useful results are provided in Table 5.12.

Table 5.12
The second Probit results of the percentage of relaxation dummies [Equation 8]

Dependent Variable: DEC
Method: ML - Binary Probit
Sample (adjusted): 1 101
Included observations: 101 after adjusting endpoints
Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.284458	0.206854	1.375167	0.1691
GR_ZERO_FIVE	0.014140	0.487887	0.028983	0.9769
GR_FIVE_TEN	0.092933	0.374319	0.248273	0.8039
GR_TEN_FIFTN	-0.195934	0.401956	-0.487451	0.6259
GR_FIFTN_TWNT	1.125880	0.581821	1.935098	0.0530
GR_TWNT_TWFV	-0.284458	0.489017	-0.581694	0.5608
RB	-1.998217	0.684410	-2.919618	0.0035

Mean dependent var	0.574257	S.D. dependent var	0.496921
S.E. of regression	0.474890	Akaike info criterion	1.335737
Sum squared resid	21.19895	Schwarz criterion	1.516983
Log likelihood	-60.45472	Hannan-Quinn criter.	1.409111
Restr. log likelihood	-68.88987	Avg. log likelihood	-0.598562
LR statistic (6 df)	16.87031	McFadden R-squared	0.122444
Probability(LR stat)	0.009772		
Obs with Dep=0	43	Total obs	101
Obs with Dep=1	58		

The McFadden R-squared value (0.1224) and Probability (LR stat) (0.977%) were much improved in Equation 8. The variable GR_FIFTN_TWNT, representing the group of percentage relaxation

"15% < x <= 20%," was significant at the 10% level. Although a 5% significance level was the one employed in this dissertation, a 10% level is still an acceptable alternative. **The coefficient of GR_FIFTN_TWNT was positive. This meant that the percentage relaxation of this group (15% < x <= 20%) was favoured by the TPB**.

However, other percentage relaxation dummy variables were highly insignificant. The lower percentage group GR_TEN_FIFTN had a negative coefficient, but the even lower percentage groups GR_FIVE_TEN and GR_ZERO_FIVE had positive coefficients again. This would suggest that the considerations of the TPB on percentage relaxation is chaotic (i.e., "most favoured ceiling" was absent). Nevertheless, a conclusion cannot be drawn on this issue because these variables were statistically insignificant.

CHAPTER 6

CONCLUSION

Conclusion

This dissertation is a pioneer study on the minor relaxation of development restrictions. It first reviewed the background of a minor relaxation of development restrictions on Hong Kong Island, and then evaluated the development control data, so as to reveal the factors considered by the TPB when it decides cases. The development control data used in this dissertation was planning application statistics for the minor relaxation of development restrictions, which are available from the TPB and the Planning Department. A total of 121 planning application cases were identified from 1986 to September 2005. The method employed by the dissertation is firstly, traditional aggregate analysis and secondly, disaggregate analysis using a Probit Model. The factors under examination included site area (SA), gross floor area (GFA), zoning, type of relaxation, and percentage of relaxation. Trials were also conducted to find the maximum percentage of relaxation favoured by the TPB.

The author found that the TPB favours applications on sites with a larger SA. This is consistent with its assertion that the "amalgamation of sites" is favoured. However, he also found that applications with a larger proposed GFA are less favoured by the TPB. This contradicts the TPB's statement that a "comprehensive development/redevelopment" is favoured. Given that it favours applications on sites with a larger SA, the results of the test on GFA also contradicted the logical consequence of the equation that GFA is the mathematical product of SA and plot ratio (PR). GFA will go the same way as SA, as long as PR is unchanged. This problem was not resolved in this dissertation, so it requires further study.

Besides, applications made for R(C) zones will have a higher chance of getting approval. On the other hand, applications made for R(B) zones will have a higher chance of being *refused*. This issue is not mentioned by the TPB in any of its publications.

For the analysis of the types of relaxation (not the extent of the types), it was uncertain whether the TPB especially favours or is biased against a minor relaxation of gross floor area (GFA) restrictions due to

the lack of data for analysis. But it favours a minor relaxation of site coverage (SC) restrictions. Planning applications for such a relaxation will have a higher chance of getting approval. In contrast, the TPB does not favour a minor relaxation of plot ratio (PR) restrictions, and so planning applications for a relaxation of this restriction will have a higher chance of being *refused*.

It is hypothesized that applications with a smaller percentage of relaxation have a higher chance of getting approval. Owing to the result of modelling being not statistically significant enough, a concrete answer cannot be provided in this dissertation.

A line cannot be drawn between the percentages of relaxation having a positive effect on the chances of approval and those having a negative effect. However, planning applications for minor relaxations with a percentage of relaxation greater than 15%, but less than or equal to 20%, were shown to have a higher chance of approval.

Limitations and Further Studies

Only HK Island was Investigated

Due to time constraints, the author only studied the data from Hong Kong Island. Chapter 2 contains various sub-parts. Some parts, such as the power to impose development restrictions, the purpose of minor relaxations, and the uncertainty of applications for minor relaxations, are generally applicable to all of Hong Kong. However, the history of development restrictions and a minor relaxation of these restrictions in OZPs are limited only to Hong Kong Island. It is uncertain whether the content of minor relaxation clauses is the same in Kowloon and the New Territories. The planning application data was restricted to Hong Kong Island too. Studies on the rest of Hong Kong, as well as a more comprehensive one on all of Hong Kong, are needed.

Little Data on Planning Applications for Minor Relaxation

The amount of planning application data on the minor relaxation of development restrictions was quite small. Since the introduction of the minor relaxation clause on Hong Kong Island in 1986, there have been only 121 cases involving it up to September 2005. This is due to two

reasons. First, the data was limited to Hong Kong Island only. Second, the minor relaxation of development restrictions is a less conspicuous area of application compared to other applications relating to changes in the use of land. This lack of data may make some statistical analysis, especially aggregate analysis, less accurate.

Different Types of Relaxation were not Analysed Separately

The consequence of working with a small amount of data is that different types of relaxation can't be analysed separately. The total number of usable planning application cases was just 101 in this dissertation. There is obviously not enough data for statistical modelling purposes (a minimum of 100 for running the Maximum Likelihood Test) for each type of relaxation. Indeed, different types of relaxation should be separated so that a more thorough picture can be revealed and comparisons can be made.

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