

**AN ECONOMETRIC STUDY ON OFFICE RENTAL MARKET IN KUALA
LUMPUR**

**Thesis Submitted to the College of Business
In Fulfillment of the Requirement for the
Degree of Master Science of Finance
Universiti Utara Malaysia**

By

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2011

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ABSTRACT

The intense competition among property investors has been fueled by the limited pool of desired assets. As global markets become more developed and matured, the yield is becoming more compressed, which resulted in property investors to expand their property investment portfolio across the geography borders. As a result, commercial real estate investment has been globalised to a new unprecedented level, due to the diversification strategies by these global property investors. Kuala Lumpur, being the financial and economic capital of Kuala Lumpur is not spared from being in the radar of global property investors.

In addition to Kuala Lumpur, other major urban centres in Malaysia are Penang and Johor Bahru. While the office space market in Kuala Lumpur has an international appeal, the same notion is yet to be confirmed for both Penang and Johor Bahru office space market. The main objective of this study is to explore the economic indicators such as GDP, CPI, unemployment rate and the interest rate to the demand and supply factors that determine the rental value of office space market.

The demand factor is represented by the natural vacancy rate of the office space, while the supply factor is represented by the total office floor space. Next, the study compare whether the changes in economic indicators will change the variation in the office rental market in Kuala Lumpur, Penang and Johor Bahru.

This study covers the office rental values in various business districts in Kuala Lumpur, other urban centres in Klang Valley area and also other major urban centres in

the country, namely Penang and Johor Bahru. The regression analysis on office rental market in Klang Valley, Johor Bahru and Penang suggests that both geographical clusters have different rental rate determinants of office space. The model implies that the office rental market in Kuala Lumpur is very much dictated by supply and demand factors.

As for the office rental market in Johor Bahru and Penang, the model suggests a direct relationship between office space supply and service sector productivity level. Office rental market in Johor Bahru and Penang is very sensitive to the changes of office space supply. In contrast, an increase of service sector output, as evident in GDP service factor, will help to spur demand to occupy office space in Johor Bahru and Penang, thus help to contribute positively on the office space rental rates.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and Most Merciful

All praise to Allah for all his blessing and guidance which provide me strength to face all the tribulations and trails in completing this thesis.

First and foremost, I would like to express my deep and sincere gratitude to my supervisor, Dr. Zahiruddin Ghazali who gives me a support and advice for the completion of this thesis. Most importantly is for his profound knowledge, dedication, strong discipline and his inspiration for work excellence.

The toughest among all the hurdles in the past 2 years is the completion of this project paper, which concluded my life as a MSC Finance student in UUM, City Campus Kuala Lumpur. Special thanks to all lecturers and colleagues who have appeared in my life, rendering advice and inputs unselfishly during my study.

My deepest appreciation also goes to my supportive and beloved family members; my wife AzlawatiFahmi and my three kids BadrulAimanEzqandar, Ivy BatrisyaHumaira and Irina Jasmine for their devotion, constant demonstration of love and most importantly for their innumerable sacrifices and prayers.

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LIST OF ABBREVIATIONS

BLR	Base Lending Rate
CBD	Central Business District
EPF	Employee Provident Fund
GDP	Gross Domestic Product
GNP	Gross National Product
KLCI	Kuala Lumpur Composite Index
LTAT	Lembaga Tabung Angkatan Tentera
LTH	Lembaga Tabung Haji
MSC	Multimedia Super Corridor
NAPIC	National Property Information Centre
psf	Per Square Foot
RM	Ringgit Malaysia
Sq. Ft.	Square feet

CHAPTER ONE

BACKGROUND

1.0 Introduction

Chen *et.al* (2009) has briefly explained that limited pool of desired assets has fueled intense competition among property investors. Yield compression, as a result of most global markets become more developed and matured, has resulted in property investors expanding their property investment portfolio across the geography borders. As a result, commercial real estate investment has been globalised to a new unprecedented level, due to the diversification strategies by these global property investors.

Kuala Lumpur, being the financial and economic capital of Kuala Lumpur is not spared from being in the radar of global property investors. As at 2010, AXIS-REIT reported in its 2010 Annual Report that Klang Valley has an existing office space supply of 79.21 million sq. ft., of which 63.47 million sq.ft. is located in Kuala Lumpur. In the future, there will be another 27.23 million addition office space supply from 73 identified office buildings, of which 12.75 millionsq.ft. is from 41 office buildings are currently under construction. Several international property investors have already made substantial such as Kuwait Finance House, Qatar Investment Authority, Abu Dhabi Mubadalla, CapitaLand, MGPA Asia Developments, and others. Michael Wilkinson, the CEO of MGPA Asia Developments said during in an interview, that it is good time to invest in property in Malaysia, particularly Kuala Lumpur, as it has the strongest market in South East Asia. Under the Greater Kuala Lumpur Plan, which is part of the Economic Transformation Plan ('ETP') the Government of Malaysia has earmarked eight mega projects that will each create their individual commercial enclaves. These eight mega projects will be carried out by both local and foreign developers, such as outlined in the table below :

Table 1 : Mega projects outlined by the Government of Malaysia under the Greater Kuala Lumpur Plan

Location / Site	Project Name	Developer	Land Area (acres)	Estimated GDV	Estimated GFA (sq. ft)	Development period (years)
Sg. Besi Airport	Bandar Malaysia	1MDB – Qatar Investment Authority	495	RM10 bil	60 mil	10 -20
Bukit Bintang East	KLIFD	1MDB – Mudabala Development	85	RM15 bil	20 mil	15 – 20
JalanPekeling Flats	Tamansari	ASIE	55	RM3 bil	10 mil	10 – 12
Kg. Baru	Yet un-named	Kg. Baru Development Corp	233	Not reported	60 mil	As yet, undeterminable
Pudu Jail	Bukit Bintang City Centre	UDA Holdings	20	RM5 bil	5 mil	5-10
Jalan Hang Tuah	WarisanMerdeka	PNB	17.8	RM5 bil	5 mil	5-10
Jalan Duta Govt. Complex	Matrade	Naza TTDI	51.9	RM15 bil	15 mil	15-20
Sg. Buloh	Yet un-named	EPF	3,300	RM10 bil	10 mil	25-40
		TOTAL	4,258	RM60 bil	185 mil	

WTW International, in its property market report, states that 2010 is the year where most property investors and developers in Malaysia take a rebound from the ‘superficial despair’ that was created largely due to global downturn, particularly the subprime houses crisis in the United States of America, as well as the bankruptcy of several European countries such as Greek and Iceland. The full heat of the global crisis did weaken the

fundamentals of the market, but did not manage to push it to cliffhanger. As the world economy mends, the property market, especially in Kuala Lumpur emerges into 2010 with more optimism than the previous year.

1.1 Background of study

The property market in Kuala Lumpur has developed tremendously, especially with regards to the office market segment. Many new office towers were built, especially during the economic boom in the early 90's, but the development took a sudden reversing trend when the Asian Financial Crisis started in 1997.

Notwithstanding of the economic crisis, the first phase of Kuala Lumpur City Centre comprising of Petronas Twin Towers and Suria KLCC was completed. The completion of PetronasTwinTowers has opened a new dimension in office property market in Kuala Lumpur. The KLCC area has become the new sought after office address, and several new corporate towers development took place, and many old corporate towers changed hand and refurbished into new market positioning (WTW, 2011).

The changing landscape of office space market in Kuala Lumpur, especially in the Central Business District area, has also influenced the supply and demand, which also affects the rental rates. Multinational corporations, being savvy corporate entity, are always on the lookout for office space in buildings that contributes positively to their international corporate image (WTW, 2011). The Malaysian government's drive to promote Kuala Lumpur as international financial hub, especially in the field of Islamic finance, has also increase the numbers of financial and services firms, which in turn spurs the demand for office space. As new supply of office space enters the market, older buildings are struggling to keep tenants,

and as occupancy rate keeps on decreasing, discounts on rental rates are inevitable to attract tenants.

In addition to Kuala Lumpur, other major urban centres in Malaysia are Penang and Johor Bahru. While the office space market in Kuala Lumpur has an international appeal, the same notion is yet to be confirmed for both Penang and Johor Bahru office space market. Raine & Horne International Zaki + Partners commented that the office space market in Penang will continue to be soft as the state has about 10,000 pre-war shophouses which are occupied as offices (The Edge, 2009). In addition to that, AXIS-REIT in its 2010 Annual Report stated that the Penang has a total supply of purpose-built office space of 11.60 million sq.ft in year 2010, with the bulk of supply is located in Georgetown. The office space market in Penang is divided into 2 categories; prime office space with MSC-status and those without. Prime office space with MSC-status will command better values for both capital and rental. AXIS-REIT reported that the high grade office buildings in Jalan Sultan Ahmad Shah is fetching rental in the range of RM2.00 psf to RM3.50 psf. However, office buildings with MSC-status are fetching higher rental for RM3.50 psf and the supply is limited.

As for the office space market in Johor Bahru, KGV-Lambert, Smith Hampton stated that the due to the low yields, purpose-built offices are not popular investment choices among investors. Most of the office space in Johor Bahru are owner-occupied rather than bought by investors for rental purposes. AXIS-REIT reported in its 2010 Annual Report that Johor Bahru has a total office space supply of 8.15 million sq.ft. Currently, there are 10 buildings which are under construction that will add another 1.81 million sq. ft. of office space upon completion. In the near future, there will be another 6.31 million of office space from planned and approved buildings. AXIS-REIT also commented that with the relocation of government offices to Nusajaya, with the growth of Johor is concentrated in this zone, it is likely that the investment potential for office space market will be directed to be within the Nusajaya zone.

In summary, there are many factors that drive the demand and supply of office space in Kuala Lumpur, and also in major urban areas outside Klang Valley such as Penang and Johor Bahru. Financiers and investors, both domestic and international need information on economic and other forces that may give impact on the variation of demand, supply, rental rates and prices of properties. This paper attempts to understand the same economic forces that govern the variation of rental market of office space in Kuala Lumpur in particular, and also to understand the same in the office space market in Penang and Johor Bahru.

1.2 Problem Statement

Properties have been favorites investment avenue among individual and institutional investors. Investors, they are looking for some indicators that may affect the cash flows derive from property investments. McGough *et.al.*, (2000) states that property investment decision requires in depth studies and articulate knowledge on forces that drive the movement of rental rates, capital appreciations, yields and property returns.

In developed countries, especially the European countries and the United States of America, various studies have been done on to established the relationship between various economic indicators and the long-term average abnormal return on the office rental market. Factors such as gross domestic products ('GDP'), unemployment rate, interest rate, consumer price index and even stock market indicators have been applied into office rental market determinants studies (Chin, 2003).

While most of the journal entries on office rental market are done based on studies of property market in European countries, USA, Hong Kong, China and even Australia, there are close to none for studies on office rental market in Kuala Lumpur. As such, an empirical study on factors that affecting office rental values in Kuala Lumpur is very much needed as

comparison of how far the Kuala Lumpur office rental market differs from that of in the developed countries. Chin (2003) compared the macroeconomic factors that affecting the office rental by comparing office rental market in Kuala Lumpur, Singapore, Bangkok, Taipei and Hong Kong. The authors uses time-series data from 1988 to 2001, and stated that GDP, unemployment rate, lending rate and consumer price index are significant variables that affecting office rental market in Kuala Lumpur. The study suggests that there are high-demand side drivers in the Kuala Lumpur office market during the period of study. In the conclusion, the author further stated that lending rate is the most significant variable affecting office rental value in Kuala Lumpur during the period. Prime lending rate is the key factor in financing development, and the author commented that during the Asian Financial Crisis, oversupply and easy funding were the two main reasons for the collapse of office market in the region.

In addition, the paper also attempt to understand the factors that affecting office rental values in Penang and Johor Bahru, and to see how far it differs or similar in trends with the office rental market in Kuala Lumpur.

1.3 Research Objective

The main objective of this study is to explore the economic indicators such as GDP, CPI, unemployment rate and the interest rate to the demand and supply factors that determine the rental value of office space market. The demand factor is represented by the natural vacancy rate of the office space, while the supply factor is represented by the total office floor space. Next, the study compare whether the changes in economic indicators will change the variation in the office rental market in Kuala Lumpur, Penang and Johor Bahru.

As such the research objectives can be stated as follows:

To explore what are the macroeconomic factors that affect the office rental values in Kuala Lumpur

To establish whether the reaction of Kuala Lumpur office rental market towards the variation in macroeconomic factor is similar to that of in Penang and Johor Bahru

1.4 Research Questions

In order to achieve the research objectives, the following questions need to be investigated and answered by this study :

Does variation in inflation rate indicator affects the office rental value in Kuala Lumpur?

Does variation in gross domestic product indicator affects the office rental value in Kuala Lumpur?

Does variation in unemployment rate affects the office rental value in Kuala Lumpur?

Does vacancy rate affects the office rental value in Kuala Lumpur?

Does total supply of office space affects the office rental value in Kuala Lumpur?

1.5 Significance of the Study

Empirical studies on Malaysian property market are currently very limited. Academicians, students and event policy makers have been referring to studies done on other developed countries for the purpose of lecturers, assignments, policy drafting or just as general reference.

This study may give significant understanding of the local property market to the following group of people :

Academician – to enrich the literature regarding the Kuala Lumpur office rental market, as well as to support the existing .

Investor – To provide an alternative point of view in investment strategies with the changing economic landscape of the country. This study will be able to help investor to predict the direction of Kuala Lumpur office rental market.

Government agencies / GLC – Many government agencies are such as the EPF, LTH, LTAT and AmanahRaya have their own property investment portfolio for the recurring rental income. This study may be useful for these government agencies to review their investment policy on properties with the changing of economic level of the country.

1.6 Scope of the Study

This study will cover the office rental values in various business districts in Kuala Lumpur, other urban centres in Klang Valley area and also other major urban centres in the country, namely Penang and Johor Bahru. Based on the property market reports produced annually by the National Property Information Centre ('NAPIC'), the office space markets in these geographical areas are divided into :

Golden Triangle, which includes areas such as Jalan Sultan Ismail, Jalan Raja Chulan, Jalan P. Ramlee, Jalan Pinang, Jalan Bukit Bintang and Jalan Conlay

Jalan Ampang

Central Business District ('CBD'), which includes areas such as Jalan Hang Lekiu, Jalan Hang Lekir, Jalan Raja Laut and Jalan Mushi Abdullah

Within city centre, which includes areas such as Jalan Imbi, Jalan Ipoh, Jalan Kampung Attap, Jalan Tun Razak, Jalan Pudu and Jalan Sultan Sulaiman

Suburban area, which includes areas such as Jalan Damansara, Jalan Dungun and Jalan Semantan

Other major urban centre in Klang Valley such as Petaling Jaya, Kelana Jaya, Subang Jaya, Shah Alam and Klang

Georgetown city centre, which includes areas such as Jalan Magazine, Jalan Penang, Lebuhraya, Lebuhraya Farquhar, Lebuhraya China, Lebuhraya Pantai, Jalan Macalister and Lebuhraya Light

Penang island secondary area, which includes areas such as Jalan Burma, Jalan Larut, Jalan Anson, Jalan Argyll, Pengkalan Weld, Lorong Huttan and Jalan Sultan Ahmad Shah

Penang island suburban area, which includes areas such as Pulau Tikus, Tanjung Tokong and Bayan Baru

Johor Bahru primary area, which includes the office buildings in the city centre

Johor Bahru secondary area, which includes the office buildings at the fringe of the city centre such as Jalan Skudai, Jalan Tampoi and Jalan Tebrau

The rental values of these areas from year 2002 to year 2010 were collected to establish the long-term average abnormal returns. Other than that, data regarding the GDP, unemployment rate, inflation rate and BLR over the same period were also collected.

1.7 Limitation of the Study

Some property market reports available for public consumption are not available for free and need to be purchased. The similar setback applies to the data produced by NAPIC, Bank Negara Malaysia and Department of Statistics, where certain charges may apply on data retrieved for this study. In addition to that, data published by NAPIC might differ to the data collected by other real estate consultancy firm, in the essence that the variations might occur due to differences between the asking and achieved rental captured by parties involved. Rental data from NAPIC is used in this study as they are official data released by government agencies without any bias and has always become the official reference by industry practitioners.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

There have been several empirical studies to forecast the variation of office rental market by using econometric model. Most of these researches were done based on the data and market information from USA and Europe, especially the UK market. This chapter provides discussions macroeconomic factors that may affect the rental values of office space.

2.1 GDP and office rental value

GDP has always been the proxy of demand-based factor that affecting the movement of office rental market (Chin, 2003). In a single-equation research, GDP figure has been consistently a significant influence on office rental markets. As such, real GDP has been the most appropriate and widely used demand-side measurement, which by and large, illustrates the level of office activities, in both manufacturing and service sectors. (Barras, 1983).

Gardiner *et.al.* (1988) studied the regional office market in United Kingdom, by using rent as the dependent variable, and identified the lagged as well as current values of GDP as appropriate proxy variables to capture the demand and supply influence. By applying the lagged and current values of GDP, the authors were trying to take into account the partial or slow market adjustment of the real estate market towards the changing of economic environment. The data used cover the period from 1977 to 1984, and the office market is segmentalised in 8 standard regions in UK, each with its own result. In this research, the authors found out that in the current GDP is only significant in one region, while lagged GDP is almost always insignificant. Strong relationship between GDP and rental values of office

space were found in Southeast, Southwest, East Anglia, Yorkshire and Humberside, while weak relationship were found in North, Northwest, East and West Midlands. The authors later developed the habit-persistence theories and adaptive expectations in rent formation to address their failure to explain the rental movements in the more northern region.

McGoughet.*al.*(2000) studied the predictability of office market returns in Helsinki Central Business District ('CBD'), by using econometric variables, both real and financial indicators, namely the GDP, stock returns and long-term interest rates. The results showed that GDP is the main econometric variable that affects the office market return in Helsinki CBD, which is in line with the results of other similar studies on other European office markets by Gardini*et.al.* (1993) and D'Arcy *et.al.* (1997a and b). The author also commented that stock returns also affect the office rental movement in Helsinki CBD, but to a lesser extent compared to GDP.

2.2 Natural vacancy rate and office rental value

American researchers are inclined to use natural vacancy rate as the proxy variable that influence the demand-supply equilibrium of office space. This assumption is derived the very same way with those of natural employment rate in labour studies. Schilling *et al.*(1987) states that property developers and owners are aware of the binding nature and length of office lease, hence the reason for the existence of natural vacancy rate. Most of the office lease terms are in the period of 3 to 5 years, and corporate entity always change their address in tandem with their corporate evolution. If demand for office space is high, and the level of office space vacancy is below the natural vacancy rate, there will be upward pressure on the rents. Inversely, if the natural vacancy rate of office space is higher than the demand, downward pressure is exert on the rent. Wheaton *et al.* (1997) and Hendershottet *al.*(1999)

applied the same idea to examine the London office market. Hendershott *et al.* (2002a) later extend the studies of using natural vacancy rate as proxy variable that influence the rental values trend of Sydney office market. A similar model was later applied in Hendershott *et al.* (2002b) on regional office and retail market in UK. The data in Hendershott *et al.* (2002b) used long run data covering the period from 1970 to 1998, which also covers two major cycles in UK commercial real estate market. Hendershott *et al.* (2002a) reported that the result from London office market is in accord to the priori expectations, and that proxy variables (unemployment rate and vacancy rate) were all correct and significant. The same could also be said in Hendershott *et al.* (2002b), whereby the office demand and supply variables had the expected signs, even though the demand variable for London was statistically insignificant in the long-run.

Employment / Unemployment rate and office rental value

The employment or unemployment rate has always been the proxy variables for economic condition of a region or country. The demand for rental of office space is closely related with the employment rate in the service sector, as most of the economic activities in the service sector take place in office environment, as supported by Gardiner *et al.* (1988), Dobson *et al.* (1992), Giussaniet *al.* (1993a), Giussaniet *al.* (1993b) and D'Arcy *et al.* (1998). With higher employment in service sector, always due to higher demand for services such as financial, legal, business consultancy, corporate management, taxation and audits will influence the demand for office space, which in turn will exert pressures on the rental values. The changes in employment rate in service sector are considered the most dynamic in influencing the demand and rental values for office space (Giussaniet *al.* 1993a, Giussaniet *al.* 1993b, McGoughet *al.* 1998). Jones (1995) uses the data of employment in financial and business

services from 1981 to 1991 and found out that the growth in service sector especially financial and business services creates the long-term growth in the demand for offices.

Interest rate and office rental value

Interest rate has always been the proxy variable for economic condition as it provides the cost of capital. McGough *et al.* (2000) used government bond returns as proxy to the long-term investment rate. The authors stated that long-term interest rate reflects the market expectation on future economy, inflation and spot rates. As such, there will be negative relationship between the variations of long-term interest rate with office rental returns. Chin (2003) stated that interest rate is the indication of cost of capital and its availability, and as such it is considered as predictors of economic conditions. Therefore, an increase in interest rate will increase in the cost of capital, and as such will discourage any development decision. The suppression new office supply into the market will exert pressure in the demand for office space, hence rental value will increase. The author further stated that interest rate also indicates new monetary policy and the dampening effects of high interest rate on economic policy.

However, Cowley (2007) stated that it has been a little in success in establishing the relationship between the office rental values with interest rates. The author cited evidence from Giussani *et al.* (1993a) that real interest rates were statistically insignificant as rent determinants in European cities.

Office floor space and office rental value

In more recent property market studies, office floor space has been included into the equation to indicate the supply side. In earlier research, the supply side was left excluded due to data non-availability (Chin, 2003). Gardiner *et al.* (2003) focused on the changes in the total stock of office space, while the volume of new office construction has been included into the equation by Keogh *et al.* (1998) and D'Arcy *et al.*(1998). Chin (2003) cited Hekman (1985), Gardiner *et al.* (1998), RICS (1994), Keogh *et al.* (1998) and D'Arcy *et al.*(1998) by saying that while the supply of office space does have some effects on office rental markets, it exerts less influence compared to demand side variables.

D'Arcy *et.al.*(1998) undertook an econometric study of the office rental market determinants in Dublin, using time-series data from 1970 to 1997. On the supply –side factors, the author used two proxies as, one being the total office stock space, and the second being the flow of newly completed office space. Other variables used by the author were GDP and service sector employment rate. The study found that both GDP and new office space stock were significant to be the rental determinants for office space market in Dublin. A later research by McGrealet.*al.*(2004) which focuses on urban regeneration in Dublin's office areas also found that both GDP and new office space supply to be highly significant to influence the office rental market trends.

2.6 Stock market returns and office rental value

McGoughet.*al.*(2002), in his study of predictability of office market returns in Helsinki stated that the returns from property, including office space, should also be influenced by general investment trends. The author argued that the trends in other

investment markets set the required rate of return from investment in property and also established the opportunity cost of investing in real estate. The property capital values, rental yield and overall returns on property investments will adjust to reflect the changing conditions in required rate of returns in other investment markets, including equity and bond markets. The level of returns from equity investments becomes the benchmark of how the investments in property should perform in order to remain attractive to investors.

McGoughet.*al.*(2002) further reiterates that all stock returns can be indicators of business conditions in the future as the movement of share prices reflect the market expectations of economic activity in the future. The authors also argued that the return on stocks and property are expected to have positive relationship.

In addition to stock market returns, returns from other financial instruments have also been used as rental rate determinants for office space. McGoughet.*al.*(2002) stated that long-term interest rates are proxy to government bonds. The authors further state that a positive relationship between returns from office rental market with government bonds is that the return from office property is to match the yield from the safer long-dated government bonds. However, long-term interest rates reflect the expectations of the market about inflation, economic activity and future spot rates; hence a negative relationship should be expected.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The methodology used in this research is outlined in this chapter. This research is to study the effect of several econometric indicators on the office rental market in Kuala Lumpur, Johor Bahru and Penang from the period of 2002 to 2010.

Only secondary data is used in the research and will be analysing using the Statistical Package for Social Science study (SPSS) software.

3.1 Data Collection Technique

Historical data of identified geographical coverage is collected from the Property Market Report (PMR) published annually by the National Property Information Centre (NAPIC). Archived data from PMR will be from year 2002 to 2010. The geographical coverage will be the rental office market in Klang Valley and outside Klang Valley areas, namely :

Golden Triangle, which includes areas such as Jalan Sultan Ismail, Jalan Raja Chulan, Jalan P. Ramlee, Jalan Pinang, Jalan Bukit Bintang and Jalan Conlay

Jalan Ampang

Central Business District, which includes areas such as Jalan Hang Lekiu, Jalan Hang Lekir, Jalan Raja Laut and Jalan Mushi Abdullah

Within city centre, which includes areas such as Jalan Imbi, Jalan Ipoh, Jalan Kampung Attap, Jalan Tun Razak, Jalan Pudu and Jalan Sultan Sulaiman

Suburban area, which includes areas such as Jalan Damansara, Jalan Dungun and Jalan Semantan

Other major urban centre in Klang Valley such as Petaling Jaya, Kelana Jaya, Subang Jaya, Shah Alam and Klang

Georgetown city centre, which includes areas such as Jalan Magazine, Jalan Penang, Lebu Bishop, Lebu Farquhar, Lebu China, Lebu Pantai, Jalan Macalister and Lebu Light

Penang island secondary area, which includes areas such as Jalan Burma, Jalan Larut, Jalan Anson, Jalan Argyll, Pengkalan Weld, Lorong Huttan and Jalan Sultan Ahmad Shah

Penang island suburban area, which includes areas such as Pulau Tikus, Tanjung Tokong and Bayan Baru

Johor Bahru primary area, which includes the office buildings in the city centre

Johor Bahru secondary area, which includes the office buildings at the fringe of the city centre such as Jalan Skudai, Jalan Tampoi and Jalan Tebrau

The historical data collected is in the form of rental rates of office buildings in the above areas, as well as their occupancy rate and total office floor space in each of the region.

Other data that is collected are various econometric indicators such as GDP, interest rate, inflation rate and unemployment rate from year 2002 to 2010. The archive data of these economic indicators are retrieved from historical key economic indicators published by Department of Statistics and also historical annual reports of Bank Negara Malaysia.

3.2 Theoretical Framework

Chin (2003) stated that there are more than 20 variables have been tested as explanatory variables in existing literatures. Chin (2003) further stated that majority of the single-equation models used macro factors and spatial factors to examine the office rental movements, while multi-equation models tend to use spatial factors and financial factors.

Among macro factors used to examine the office rental movements are :

Gross Domestic Product ('GDP')

Gross National Product ('GNP')

Employment rate or unemployment rate; either total or just service sector

Interest rate; either short-term or long-term

Inflation rate

Income

Population

As for the spatial factors, the variables are as follows :

Office floor space; either total, new supply or changes

Vacancy rate

Absorption rate

The financial factors used as explanatory variables in office rental movement are as follows :

Past rental value

House index

Share price

Bond and T-bill yields

Construction cost

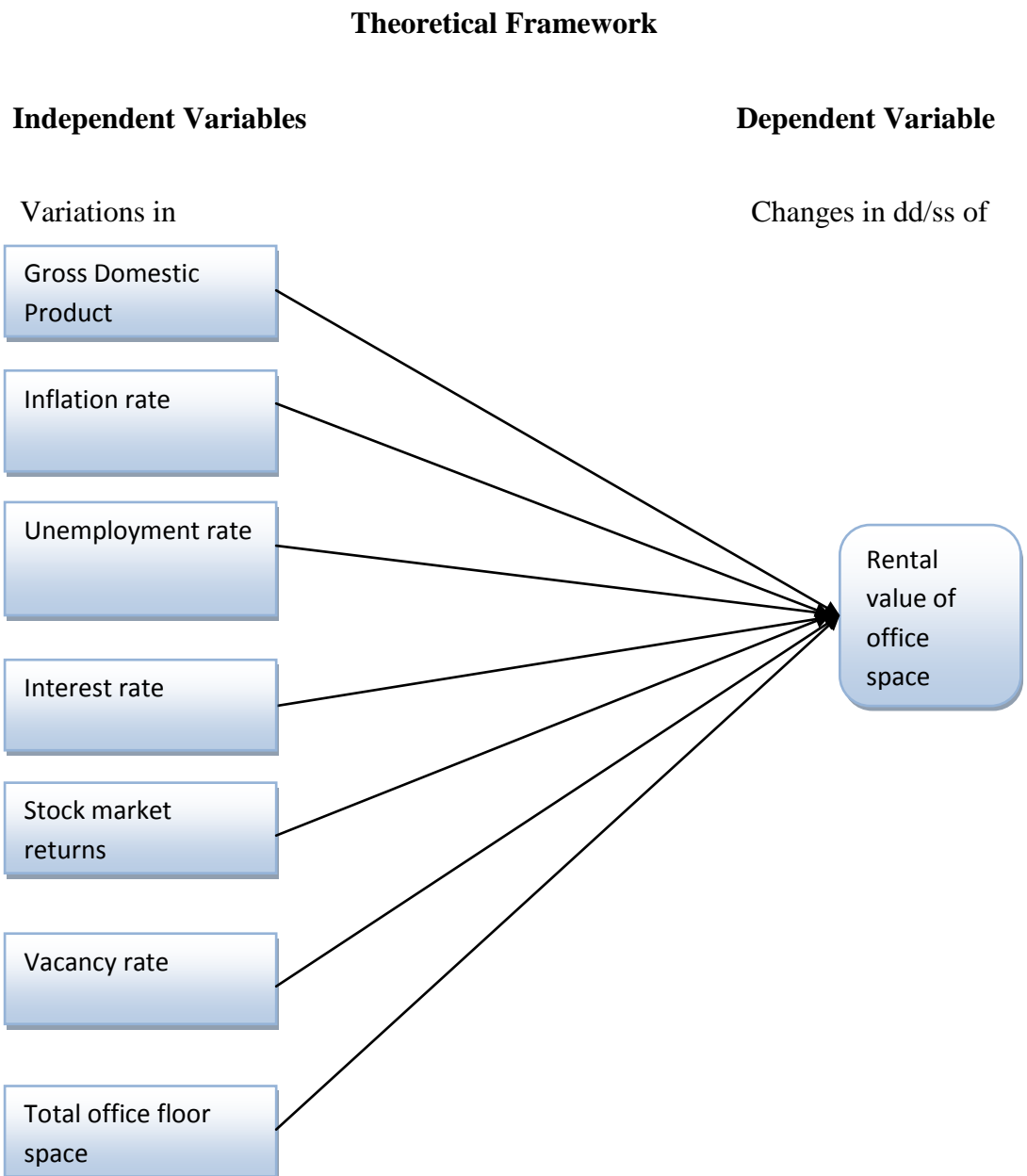
Cost of capital

Operating expenses

Yield / Capital value

Tax

From the explanatory variables listed above, the theoretical framework of this research is as outline in the diagram below :



3.3 Independent and Dependent Variables

The variables used in this research are as follows :

3.3.1 Dependent Variable

The dependent variable in this research is the rental rates of office space in Kuala Lumpur, Penang and Johor Bahru. This research aim to study the effect of various econometric indicators on the movement of rental rates of office space in Kuala Lumpur, Johor Bahru and Penang.

3.3.2 Independent Variables

Independent variables identified in this research are

Gross Domestic Products (GDP)

Inflation rate

Unemployment rate

Interest rates, whereby in this study the Base Lending Rate (BLR) is used

Stock market returns, whereby in this study the Kuala Lumpur Composite Index ('KLCI') is used

Natural Vacancy Rate, which can also be expressed by $1-OCR$, whereby OC is the occupancy rate of office space in Kuala Lumpur, Penang and Johor Bahru

Total office floor space in each of the region

This study analyse the influence of the above independent variables on the demand-supply equilibrium of office rental markets in Kuala Lumpur, Penang and Johor Bahru.

Based on the two sets of variables, the following hypothesis need to be tested :

H₁: There is a significant relationship between gross domestic product and rental value of office space

H₂: There is a significant relationship between inflation rate and rental value of office space

H₃: There is a significant relationship between unemployment rate and rental value of office space

H₄: There is a significant relationship between interest rate and rental value of office space

H₅: There is a significant relationship between stock market returns and rental value of office space

H₆: There is a significant relationship between vacancy rate and rental value of office space

H₇: There is a significant relationship between total office floor space and rental value of office space

3.4 Data Analysis

In data analysis, several analytical process will be undertaken as described in the preceding paragraphs.

3.4.1 Descriptive Analysis

This descriptive study reduced the mean, minimum, maximum, and standard deviation for each variable for the sample that is chosen in this study.

3.4.2 Correlation of variables

This study shows how one variable is related to another. The results of this analysis represent the nature, direction and significance of the correlation of the variables used in this study and the correlation between the variables will be analyzed by using the Pearson correlation.

3.3 Model Specification and Multiple Regression

Multiple regression method is used to examine the relationship between the variation of econometric variables with the movement in office rental market in Kuala Lumpur.

The result of regression analysis is an equation that represents the best prediction of a dependent variable from several independent variables. This method is used when the independent variables are correlated with one another and with the dependent variable. Other studies has reported that there are significant relationship between econometric factors with the movement of office rental values; therefore, multiple regression seems to be the most appropriate analysis to examine relationship between these attributes and the movement of office rental value in Kuala Lumpur.

The following regression equation is estimated as follow:

$$\text{AARRV} = \alpha + \beta_1\text{GDP} + \beta_2(1\text{-OCR}) + \beta_3\text{EMPL} + \beta_4\text{ITR} + \beta_5\text{IFL} + \beta_6\text{KLCI} + \beta_7\text{FLR}, \text{where:}$$

AARRV = average abnormal rental return of office space

α = constant

GDP = gross domestic product

1-OCR = vacancy space, equivalent to 100% minus occupancy rate

EMPL = unemployment rate

ITR = interest rate

IFL = inflation rate

KLCI = returns from investment in stock market

FLR = total office floor space

In this model, all independent variables enter the regression equation at once. The aim of this analysis is to determine which of the independent variables are more highly significant to the variation of office rental value.

In running the multiple regression analysis, it involves 3 stages. The first stage involves the time-series data from all geographical areas. This stage of multiple regression analysis gives the overall view of the factors affecting the rental value of office rental markets in Klang Valley, Penang and Johor Bahru in general. Notwithstanding of the results from this stage of multiple regression analysis, there is a need to undertake regression analysis at a more micro view, in the sense that to have separate analysis on Klang Valley

office rental market and also on the combined Penang and Johor Bahru office rental markets. By separating the multiple regression on these two geographical clusters into two separate stages, it is more understandable in determining the degree of similarities or differences of both geographical clusters, and also the rental determinants in both group of office rental markets.

CHAPTER FOUR

ANALYSIS AND FINDINGS

4.0 Introduction

This chapter discusses the analysis and findings of the study. Section 4.2 presents the descriptive analysis of the variables under study which has been divided into 3 groups :

Overall geographical areas which consists of both Klang Valley and outside Klang Valley areas

Klang Valley which covers geographical areas of Kuala Lumpur, Petaling Jaya, Kelana Jaya, Subang Jaya, Shah Alam and Klang

Outside Klang Valley which covers geographical areas of Johor Bahru and Penang

Section 4.3 discusses the regression analysis results for overall geographical areas and also both Klang Valley and outside Klang Valley areas; in order to identify the macroeconomic drivers of office rental values.

4.2 Descriptive Analysis

Table 4.1(a), (b) and (c) presents that descriptive statistics for the time-series data of the variables examined in this study.

Table 4.1 (a): Descriptive Analysis for time-series data of overall geographical areas

	Minimum	Maximum	Mean	Std. Deviation
Rental (RM/sf)	1.35	5.19	2.78	0.7945
Vacancy Rate (%)	1.80	44.10	21.02	8.9662
GDP (RM mil)	383,213.00	765,966.00	577,947.56	131,089.07
GDPservice (RM mil)	107,088.00	199,151.00	146,266.22	31,373.86
Inflation Rate (%)	0.60	5.40	2.29	1.4080
Unemployment Rate (%)	3.20	3.60	3.43	0.1338
Lending Rate (%)	5.10	6.50	6.00	0.5162
KLCI	704.26	1384.39	1008.23	231.67
Floor Space (sq. ft.)	404,188.64	22,555,563.92	6,554,925.77	5,756,954.05

The mean and standard deviation of the office rental rate in the overall geographical areas is RM3.13psf and 0.7945 respectively. There is also a large deviation of total office space supply, as shown by the standard deviation of floor space while the mean is 6.55 million sq.ft. The office space vacancy rate has a mean of 21.02%.

In order to determine the extent of similarity or differences between the office rental market in Klang Valley and outside Klang Valley, separate analysis was done on both geographical areas. The table below shows the descriptive analysis for time-series data for Klang Valley areas

Table 4.1 (b): Descriptive Analysis for time-series data ofKlang Valley areas

	Minimum	Maximum	Mean	Std. Deviation
Rental (RM/sf)	1.91	5.19	3.13	0.7256
Vacancy Rate (%)	1.80	34.80	17.87	8.1131
GDP (RM mil)	383,213.00	765,966.00	577,947.22	131,334.52
GDPservice (RM mil)	107,088.00	199,151.00	146,266.22	31,432.56
Inflation Rate (%)	0.60	5.40	2.29	1.41
Unemployment Rate (%)	3.20	3.60	3.43	0.1341
Lending Rate (%)	5.10	6.50	6.00	0.5171
KLCI	704.26	1384.39	1008.23	231.67
Floor Space (sq. ft.)	768,726.68	22,555,563.92	8,271,170.51	6,078,412.29

The mean of the office rental rate in Klang Valley is RM3.13psf, which is similar to the mean for overall time-series data. The mean of vacancy rate of office space in Klang Valley is 17.87%, which is lower than the mean for overall geographical areas. There is also a

large deviation of total office space supply in Klang Valley area, as shown by the standard deviation of floor space, which is similar to the overall time-series data.

Table 4.1(c) below outlines the descriptive analysis for time-series data for outside Klang Valley areas :

Table 4.1 (c): Descriptive Analysis for time-series data of outside Klang Valley areas

	Minimum	Maximum	Mean	Std. Deviation
Rental (RM/sf)	1.35	2.62	2.07	0.2914
Vacancy Rate (%)	12.45	44.10	27.33	7.1144
GDP (RM mil)	383,213.00	765,966.00	577,948.22	132,078.03
GDPservice (RM mil)	107,088.00	199,151.00	146,266.22	31,610.65
Inflation Rate (%)	0.60	5.40	2.29	1.4186
Unemployment Rate (%)	3.20	3.60	3.4333	0.1348
Lending Rate (%)	5.10	6.50	6.00	0.5201
KLCI	704.26	1384.39	1008.23	231.67
Floor Space (sq. ft.)	404,188.64	7,576,438.80	3,122,436.27	2,850,527.06

The mean and standard deviation of office rental rate outside Klang Valley is RM2.07psf and 0.29 respectively, which is lower than Klang Valley. The deviation of office space supply in areas outside Klang Valley is also much lower compared to Klang Valley itself. However, the mean of vacancy rate for office space outside Klang Valley is 27.33%, which is higher than Klang Valley.

4.2 Correlation Analysis

The subsequent Table 4.2 (a), (b) and (c) below illustrate the correlations among the variables for both geographical clusters.

Table 4.2 (a) : Correlations of variables for overall geographical areas

		Rental (RM)	Vacancy Rate (%)	GDP (RM)	GDPservice (RM)	InflationRate (%)	KLCI	Unemployment Rate (%)	Lending Rate (%)	Floor Space (sf)
Rental (RM)	Pearson Correlation Sig. (2-tailed)	1	-0.479**	0.165	0.180*	0.016	0.135	-0.022	-0.150	0.366**
		0	0	0.056	0.036	0.852	0.118	0.801	0.083	0
Vacancy Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.479**	1	-0.289**	-0.259**	-0.115	-0.276**	0.182*	0.146	-0.101
		0	0	0.001	0.002	0.183	0.001	0.034	0.090	0.243
GDP (RM)	Pearson Correlation Sig. (2-tailed)	0.165	-0.289**	1	0.973**	0.330**	0.914**	-0.483**	-0.605**	0.067
		0.056	0.001	0	0	0	0	0	0	0.443
GDPservice (RM)	Pearson Correlation Sig. (2-tailed)	0.180*	-0.259**	0.973**	1	0.142	0.895**	-0.336**	-0.728**	0.071
		0.036	0.002	0.000	0	0.100	0	0	0	0.416
InflationRate (%)	Pearson Correlation Sig. (2-tailed)	0.016	-0.115	0.330**	0.142	1	0.161	-0.616**	0.350**	-0.002
		0.852	0.183	0	0.100	0.062	0	0	0	0.980
KLCI	Pearson Correlation Sig. (2-tailed)	0.135	-0.276**	0.914**	0.895**	0.161	1	-0.618**	-0.498**	0.055
		.118	0.001	0.000	0.000	0.062	0	0	0	0.528
Unemployment Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.022	0.182*	-0.483**	-0.336**	-0.616**	-0.618**	1	-0.340**	-0.005
		0.801	0.034	0	0	0	0	0	0	0.953
Lending Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.150	0.146	-0.605**	-0.728**	0.350**	-0.498**	-0.340**	1	-0.064
		0.083	0.090	0	0	0	0	0	0	0.463
Floor Space (sf)	Pearson Correlation Sig. (2-tailed)	0.366**	-0.101	0.067	0.071	-0.002	0.055	-0.005	-0.0064	1
		0	0.243	0.443	0.416	0.980	0.528	0.953	0.463	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.2 (b) : Correlations of variables for Klang Valley areas

		Rental (RM)	Vacancy Rate (%)	GDP (RM)	GDPservice (RM)	InflationRate (%)	KLCI	Unemployment Rate (%)	Lending Rate (%)	Floor Space (sf)
Rental (RM)	Pearson Correlation Sig. (2-tailed)	1	-0.275** 0.009	0.233* 0.027	0.247* 0.019	0.032 0.765	0.205 0.053	-0.06 0.577	-0.196 0.064	0.183 0.085
Vacancy Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.275** 0.009	1	-0.302** 0.004	-0.262* 0.013	-0.133 0.211	-0.293** 0.005	0.203 0.056	0.138 0.195	0.168 0.113
GDP (RM)	Pearson Correlation Sig. (2-tailed)	0.233* 0.027	-0.302** 0.004	1	0.973** 0	0.330** 0.001	0.914** 0	-0.483** 0	-0.605** 0	0.078 0.465
GDPservice (RM)	Pearson Correlation Sig. (2-tailed)	0.247* 0.019	-0.262* 0.013	0.973** 0	1	0.142 0.181	0.895** 0	-0.336** 0.001	-0.728** 0	0.083 0.437
InflationRate (%)	Pearson Correlation Sig. (2-tailed)	0.032 0.765	-0.133 0.211	0.330** 0.001	0.142 0.181	1	0.161 0.13	-0.616** 0	0.350** 0.001	-0.004 0.971
KLCI	Pearson Correlation Sig. (2-tailed)	0.205 0.053	-0.293** 0.005	0.914** 0	0.895** 0	0.161 0.13	1	-0.618** 0	-0.498** 0	0.067 0.531
Unemployment Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.06 0.577	0.203 0.056	-0.483** 0	-0.336** 0.001	-0.616** 0	-0.618** 0	1	-0.340** 0.001	-0.004 0.968
Lending Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.196 0.064	0.138 0.195	-0.605** 0	-0.728** 0	0.350** 0.001	-0.498** 0	-0.340** 0.001	1	-0.076 0.479
Floor Space (sf)	Pearson Correlation Sig. (2-tailed)	0.183 0.085	0.168 0.113	0.078 0.465	0.083 0.437	-0.004 0.971	0.067 0.531	-0.004 0.968	-0.076 0.479	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 4.2 (c) : Correlations of variables for outside Klang Valley areas

		Rental (RM)	Vacancy Rate (%)	GDP (RM)	GDPservice (RM)	InflationRate (%)	KLCI	Unemployment Rate (%)	Lending Rate (%)	Floor Space (sf)
Rental (RM)	Pearson Correlation Sig. (2-tailed)	1	-0.123 0.42	0.192 0.206	0.249 0.099	-0.027 0.862	0.113 0.459	0.119 0.438	-0.252 0.095	-.314* 0.036
Vacancy Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.123 0.42	1	-0.409** 0.005	-0.386** 0.009	-0.134 0.381	-0.388** 0.008	0.23 0.129	0.242 0.109	0.028 0.856
GDP (RM)	Pearson Correlation Sig. (2-tailed)	0.192 0.206	-0.409** 0.005	1	0.973** 0	0.330* 0.027	0.914** 0	-0.483** 0.001	-0.605** 0	0.072 0.638
GDPservice (RM)	Pearson Correlation Sig. (2-tailed)	0.249 0.099	-0.386** 0.009	0.973** 0	1	0.142 0.351	0.895** 0	-0.336* 0.024	-0.728** 0	0.075 0.625
InflationRate (%)	Pearson Correlation Sig. (2-tailed)	-0.027 0.862	-0.134 0.381	0.330* 0.027	0.142 0.351	1	0.161 0.291	-0.616** 0	0.350* 0.019	0.004 0.982
KLCI	Pearson Correlation Sig. (2-tailed)	0.113 0.459	-0.388** 0.008	0.914** 0	0.895** 0	0.161 0.291	1	-0.618** 0	-0.498** 0.001	0.063 0.682
Unemployment Rate (%)	Pearson Correlation Sig. (2-tailed)	0.119 0.438	0.23 0.129	-0.483** 0.001	-0.336* 0.024	-0.616** 0	-0.618** 0	1	-0.340* 0.022	-0.013 0.934
Lending Rate (%)	Pearson Correlation Sig. (2-tailed)	-0.252 0.095	0.242 0.109	-0.605** 0	-0.728** 0	0.350* 0.019	-0.498** 0.001	-0.340* 0.022	1	-0.064 0.674
Floor Space (sf)	Pearson Correlation Sig. (2-tailed)	-0.314* 0.036	0.028 0.856	0.072 0.638	0.075 0.625	0.004 0.982	0.063 0.682	-0.013 0.934	-0.064 0.674	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

From the table 4.2 (a) above, the office rental rate in overall geographical areas is negatively correlated with vacancy rate, with correlation coefficient of -0.479. This suggests that for every 1% increase in vacancy rate, it will push down the office space rental by RM0.479 psf. In contrast, the office rental rate is positively correlated with total floor space, with correlation coefficient of 0.366. This can be interpreted as for any 1 sq.ft. of new office space supply into the office space market, it will result in an increase of office space rental by RM0.366 psf.

Other than the office rental rate, the vacancy rate has negative correlation with GDP and GDP service sector, but positively correlated with unemployment rate, with correlation coefficient of -0.289, -0.259 and 0.182. Therefore, for any increase in production level in the service sector will reduce the vacancy rate of office space, but for any increase in unemployment rate will increase the vacancy rate of office space.

As for the office rental market in Klang Valley, Table 4.2 (b) above shows that the office rental rate in Klang Valley is negatively correlated with vacancy rate, with correlation coefficient of -0.275. This can be interpreted as for any 1% increase of vacancy rate of office space in Klang Valley will result in RM0.275psf decrease in office rental rate. The office rental rate is significantly correlated with GDP and GDP service in positive manner. On the other hand, vacancy rate has significant negatively correlated with office rental rate, GDP, GDP service and KLCI, with correlation coefficients of -0.275, -0.302, -0.262 and -0.293 respectively. As such, for any upward movements of GDP, GDP service and KLCI will result in reduced vacancy rate of office space in Klang Valley.

In contrast, for outside Klang Valley, Table 4.2 (c) shows that the office rental has significant correlation only with floor space, with negative correlation coefficient of -0.314. As such, for any 1 sq.ft increase of office floor space in Johor Bahru or Penang, will push the

office rental rate downwards by RM0.314. On the demand side, vacancy rate of office space in Johor Bahru and Penang has significant correlations with GDP, GDP service and KLCI, all in negative manner. This is similar to the demand trend of office space in Klang Valley area.

4.3 Regression Analysis

The multiple linear regression analysis was carried out to establish the rental determinants of office space in both overall geographical area as well as geographical clusters. The regression analysis was done simultaneously on the independent variables, with office rental rate being the dependent variable.

4.3.1 Overall office rental market

Table 4.3 below shows the model summary of regression analysis done on office rental market which include both within and outside Klang Valley areas.

Table 4.3 Model summary of regression analysis on overall office rental market

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.479 ^a	0.230	0.224	0.69994	1.356
2	0.576 ^b	0.332	0.322	0.65433	

a. Predictors: (Constant), VacancyRate

b. Predictors: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

The regression analysis shows only both demand and supply factors are the rental rate determinants for the office rental market when the time-series data include all geographical areas within and outside Klang Valley. In the 1st model, only 22.4% of the

variability of office rental value can be explained by the linear relationship between the office rental value and office vacancy rate.

However, in the 2nd model, with the inclusion of total office floor space as independent variable, the percentage of linear relationship between the office rental value with vacancy rate and total floor space increased to 32.2%.

The effect pattern of the linear relationship is shown in Table 4.4 below.

Table 4.4 Coefficients of vacancy rate and floor space with office rental rate within and outside Klang Valley geographical areas

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.669	0.154		23.821	0
	VacancyRate	-0.042	0.007	-0.479	-6.298	0
2	(Constant)	3.318	0.164		20.252	0
	VacancyRate	-.040	0.006	-.447	-6.248	0
	FloorSpace	4.434E-8	0	0.321	4.493	0

a. Dependent Variable: Rental

Table 4.4 shows that the vacancy rate has negative correlation with the office rental market in overall geographical areas, while the total office floor space affect the office rental market in positive manner. The second model suggests that an increase of vacancy rate by 1% will push downward the office rental market by RM0.479 psf. However, new supply of office floor space by 1 sq.ft. will contribute positively to the office rental market by RM0.321 psf.

4.3.2 Klang Valley office rental market

Table 4.5 below shows the model summary of regression analysis done on office rental market in Klang Valley.

Table 4.5 Model summary of regression analysis on Klang Valley office rental market

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		Durbin-Watson
					R Square Change	F Change	
1	.275(a)	0.076	0.065	0.70162	0.076	7.194	1.572
2	.360(b)	0.129	0.109	0.68478	0.054	5.381	

a. Predictors: (Constant), VacancyRate

b. Predictors: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

The regression analysis shows only the demand and supply factors are the rental rate determinants for the office rental market in Klang Valley, which is similar in pattern with the overall geographical areas, but with smaller coefficient of determination. The effect of smaller coefficient of determination is due to the exclusion of rental values from Penang and Johor Bahru office rental markets from the dependent variable. In the 1st model, only 6.5% of the variability of office rental value can be explained by the linear relationship between the office rental value and office vacancy rate.

However, in the 2nd model, with the inclusion of total office floor space as independent variable, the percentage of linear relationship between the office rental value with vacancy rate and total floor space increased to 10.9%.

The effect pattern of the linear relationship is shown in Table 4.6 below.

Table 4.6 Coefficients of vacancy rate and floor space with office rental rate in Klang Valley

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.571	0.18		19.868	0
	VacancyRate	-0.025	0.009	-0.275	-2.682	0.009
2	(Constant)	3.402	0.19		17.906	0
	VacancyRate	-0.028	0.009	-0.314	-3.099	0.003
	FloorSpace	2.81E-08	0	0.235	2.32	0.023

a. Dependent Variable: Rental

From the table above, vacancy rate affect the office rental market in Klang Valley in negative directions, while the floor space affect in positive manner. In the second model, the magnitude of standardized coefficients suggeststhat for every 1% increase in the vacancy rate, it will push downward the office rental market by RM0.314 psf. As for the supply side, the standard coefficients suggest that an increase of 1 sq. ft in office space will contribute inincrease in office rental rate in Klang Valley by RM0.235psf.

4.3.3 Outside Klang Valley (Johor Bahru and Penang) office rental market

Table 4.7 below shows the model summary of regression analysis done on office rental market in Johor Bahru and Penang office rental market.

Table 4.7 Model summary of regression analysis on Johor Bahru and Penang office rental market

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		Durbin-Watson
					R Square Change	F Change	
1	.314a	0.098	0.077	0.27989	0.098	4.69	1.857
2	.416b	0.173	0.134	0.27119	0.075	3.804	
3	.485c	0.235	0.179	0.26396	0.062	3.333	

a. Predictors: (Constant), FloorSpace

b. Predictors: (Constant), FloorSpace, GDPservice

c. Predictors: (Constant), FloorSpace, GDPservice, KLCI

d. Dependent Variable: Rental

The regression analysis shows that the supply side, service outputs and stock market return as the rental rate determinants for the office rental market in Johor Bahru and Penang. The coefficient of determination is higher than Klang Valley office rental market, but still lowerthan overall office rental market. The regression analysis generates 3 model outputs. In

the 1st model, only 7.7% of the variability of office rental value can be explained by the linear relationship between the office rental value and floor space.

However, in the 2nd model, with the inclusion of service sector output as independent variable, the percentage of linear relationship between the office rental value with total floor space and service sector increased to 13.4%.

In the 3rd model, with the inclusion of stock market return as independent variable, the coefficient of determination improves to 17.9%.

The effect pattern of the linear relationship is shown in Table 4.8 below.

Table 4.8 Coefficients of floor space, GDP service and KLCI with office rental rate in Johor Bahru and Penang

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.167	0.062		34.803	0
	FloorSpace	-3.21E-08	0	-0.314	-2.166	0.036
2	(Constant)	1.804	0.196		9.209	0
	FloorSpace	-3.42E-08	0	-0.334	-2.375	0.022
	GDPservice	2.53E-06	0	0.274	1.95	0.058
3	(Constant)	1.834	0.191		9.582	0
	FloorSpace	-3.44E-08	0	-0.337	-2.457	0.018
	GDPservice	7.14E-06	0	0.774	2.529	0.015
	KLCI	-0.001	0	-0.558	-1.826	0.075

a. Dependent Variable: Rental

From the table above, both floor space and KLCI affect the office rental market in Johor Bahru and Penang in negative directions, while the GDP service affect in positive manner. The third model suggests that for every 1 sq.ft increase in floor space will push down the office rental Johor Bahru and Penang by RM0.337 psf. It also suggests that an increase of

1 point in KLCI will result in the office rental in Johor Bahru and Penang to decrease by RM0.558 psf.

In addition to that, the model also suggests that the office rental market in Johor Bahru and Penang is highly dependable on the output by the service sectors. An increase of RM1 in the GDP service will contribute in an increase of RM0.774 psf in office rental in Johor Bahru and Penang.

4.4 Summary of findings

The regression analysis on office rental market in Klang Valley, Johor Bahru and Penang suggests that both geographical clusters have different rental rate determinants on the office space. The model implies that the office rental market in Kuala Lumpur is very much dictated by supply and demand factors. CH William Talhar and Wong reported that as at 2010, there is about 80.44 million square feet of office space supply in Klang Valley. As such, the concern of oversupply of office space in Klang Valley has become so imminent, and this is evident by the model that vacancy rate in office space market will have negative effect on the office rental market in Klang Valley.

The very same sentiment is shared by other property consultants as well, saying the entry of more office space was making the oversupply situation worse. Brian Koh, executive director of DTZ Debenham Tie Leung commented in an article in The Star newspaper that the downward pressure of office rental yields are due to glut situation, but the effect is also much localised. As such, office spaces located in prime areas is still commanding good demand and has less chance of coming under yield pressure.

Elvin Fernandez, the Managing Director of Khong&Jaafar also commented in the same article that the oversupply of office space in Klang Valley is not a serious situation, and

can be offset when the demand returns. He also commented that the current prevalent trend among the corporates are to move their bases away from the city centre into newer office buildings within other established suburbs such as Petaling Jaya and Klang. The trend arose as there are many of the workers who lived in these suburbs.

However, the model also suggest that vacancy rate only affects negatively existing office building in Klang Valley, but any new supply of office space will put upward pressure on office rental market in Klang Valley. CH William Talhar and Wong commented in its 2011 Property Market Report that the latest trend of Green Mark certified office building by developers appears to be a popular marketing strategy to differentiate new Grade A office buildings from existing ones. These newer buildings have established a new higher class of Grade A buildings in Klang Valley, which is more aligned to international standards and definitions. As such, new office supply caused by buildings of higher standard and grade will put upward pressure on the office rental market in Klang Valley.

The situation above commands the need to have studies at a more micro level to assess the attributes and characteristics of individual buildings on office space rental value. Mills (1992) examined a sample of the asking rents of 543 buildings in Chicago and used regression analysis to estimate their determinants. The author assessed the present values of the rental rates on the basis of 15-years term lease to derive a consistent unit for the analysis. The variable factors taken into account were building age, size, facilities and locations within the 11 Chicago sub-markets. The study found that locational coefficients are found to have good significance levels as compared to amenity coefficients which have modest significance level.

Another similar study by Dunseet.*al.* (2002) considered the variations in office space rent brought by attributes such as building age, size, age and physical status, which includes

the building capacity, internal accessibility, internal services and structure. The study used asking rents from 430 office buildings in the city of Glasgow. The independent variables include of 27 office building attributes. The study found that property age to be the most significant explanatory variable in determining rents, picking up the influence of obsolescence and depreciation. The location measure is also found to be a significant variable.

As for the office rental market outside Klang Valley, particularly in Johor Bahru and Penang, the model suggests a direct relationship between office space supply and service sector productivity level. Office rental markets in Johor Bahru and Penang are very sensitive to the changes of office space supply, hence any increase of office space in these two cities will result in downward pressure of the office rental rates. In contrast, an increase of service sector output, as evident in GDP service factor, will help to spur demand to occupy office space in Johor Bahru and Penang, thus help to contribute positively on the office space rental rates.

McGough *et al.* (2002) stated that the returns from property investments shall have a positive relationship with the returns from stock market. This is because the level of returns from stock market represents a benchmark that the direct property investments need to perform in order to remain attractive to investors. As for the office space market in Johor Bahru and Penang, KGV-Lambert, Smith Hampton stated that due to the low yields, purpose-built offices are not popular investment choices among investors. Most of the office space in Johor Bahru are owner-occupied rather than bought by investors for rental purposes.

Due to this factor, from the regression analysis, the office rental markets in Penang and Johor Bahru has negative relationship with the stock market performance. The property investors in Penang and Johor Bahru do not see the yield from office rental market in these regions to be

attractive enough for them to forgo the opportunity to invest in the stock market. As such, when the market expectation is that the stock market is to move in the positive direction, the pool of funds from investors in Penang and Johor Bahru will be into the stock market rather than the office rental market, hence pushing the rental value downwards.

CHAPTER 5

DISCUSSIONS AND SUGGESTIONS

5.1 Introduction

This chapter concludes the thesis write-up by presenting discussion on the research findings and suggestions for practitioners and future research.

5.2 Discussion and Suggestions

The study tested the rental determinants in Klang Valley, Penang and Johor Bahru office rental market by using explanatory variables such as GDP, interest rate, inflation rate, unemployment rate, stock market returns, vacancy rate and total office space. The study found the office rental market in Klang Valley has different characteristics, investment value and occupational profiles from the office rental market outside Klang Valley, particularly Penang and Johor Bahru. Due to these differences, the study found out that both particular office rental markets have different rental determinants.

As a major and the largest urban conurbanisation in Malaysia, Klang Valley has about the highest total supply of office space in Malaysia with 79.21 million sq.ft as at 2010 (AXIS-REIT). Kuala Lumpur alone, as the major financial and services centre in the country, has total supply of office space of 63.47 million sq.ft. This figure does not include 22.4 million sq.ft of office space which is currently under construction, and another 25 million sq.ft. which has been approved for construction (The Star, 28 November 2011). More supply of office space will enter the Kuala Lumpur office market in the next 5 to 20 years, under

various projects which have been outlined by the Government of Malaysia under the Greater Kuala Lumpur plan.

Due to the quantum of office space supply in Kuala Lumpur alone, it commands the need to have its own office rental market research at a more microscopic view. By dividing the Kuala Lumpur office rental market into several sub-markets, the study will be able to identify the various property market cycles in the Kuala Lumpur office space sub-markets, and also identify the future property market cycle. Several similar studies has been conducted in major European and American cities, such as Glasgow (Dunse *et.al.*,2002) and Chicago (Mills, 1992)

Another current prevalent trend among the corporates in Malaysia is to base their headquarters away from the city centre to established suburban areas such as Petaling Jaya, Kelana Jaya, Subang Jaya, Shah Alam and Klang (Khong&Jaafar, 2011). This particular corporate move entails the study of office rental market in these suburban areas and their office space rental value trends. Several infrastructure traits such as MSC-status, highways, sea ports, mass-rapid transit connections and also residential market boom in these suburban areas in Klang Valley can be analysed to ascertain its impact on the office rental market. Such study will open up the ability to identify the next property hot spots other than Kuala Lumpur city centre itself.

When the study conducted by Chin (2003), Kuala Lumpur was considered as an emergent market, post Asian Financial Crisis aftermath, alongside with Bangkok. The Greater Kuala Lumpur plan is aiming to uplift the Kuala Lumpur city centre to be the major financial and services centre in the region, on par with Hong Kong and Singapore. At this current moment, many Grade A and Green Mark certified buildings has already entered the office space market in Kuala Lumpur. CH William Talhar and Wong commented in its 2011 Property Market Report that the latest trend of Green Mark certified office building by

developers appears to be a popular marketing strategy to differentiate new Grade A office buildings from existing ones. Such cycle in the office space market in Kuala Lumpur affects the old existing buildings in city centre, as tenants are moving away to the new and better facilitated office buildings. Another study can be conducted on such moves by corporate sectors to evaluate its effects on the older buildings in the prime city centre areas. Such study may provide insights in mitigating urban decay and also facilitate urban regeneration in the older part of city centre.

5.3 Implications of Study

The knowledge of the rental determinants of office rental market will result in better appraisals of property developments' masterplan as well as urban zoning strategies by the policy makers and approving authorities, especially the local government such as DewanBandaraya Kuala Lumpur ('DBKL'), Town and Rural Development Department ('JPBD') and also the various Economic Planning Units. This will help to avoid certain sections of urban centre to decay due to uneven property development spreads, as well as avoiding new office buildings to remain unoccupied after completion caused by oversupply scenarios.

Property investors may use information from such study to establish the entry and exit timing into the office rental market by analysing various market expectations and indicators established by various rental determinants. A more elaborate study will also be able to emit information to property investors on the next hot spots in the office rental markets.

Information established by studies on rental determinants may also give good market indicators to bankers in order for them to formulate strategies in the credit evaluation

processes with regards to their property financing portfolio. The financiers of such property development may use rent determinants as indicators for them to be more prudent in awarding financing facilities to property developers, hence reducing the credit default risks.

For Malaysian property market, with office space market in particular, study of this nature will result in better development strategies by property developers. The property developers may establish the right time to venture into the development of office buildings with the clear understanding of office rental market trends by analysing the rental determinants, hence might formulate the right marketing strategies to attract investors and buyers, leading to successful project completion.

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APPENDIX A

OUTPUT FROM SPSS

OVERALL TIME-SERIES DATA (Klang Valley, Penang & Johor Bahru)

```
DESCRIPTIVES VARIABLES=Rental VacancyRate GDP GDPserviceInflationRate KLCI  
UnemployRateLendingRateFloorSpace  
/STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

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Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Rental	135	1.35	5.19	2.7766	.79451
VacancyRate	135	1.80	44.10	21.0237	8.96617
GDP	135	383213.00	765966.00	577947.5556	131089.06739
GDPservice	135	107088.00	199151.00	146266.2222	31373.86420
InflationRate	135	.60	5.40	2.2889	1.40796
KLCI	135	704.26	1384.39	1008.2278	231.67537
UnemployRate	135	3.20	3.60	3.4333	.13383
LendingRate	135	5.10	6.50	6.0000	.51616
FloorSpace	135	404188.64	22555563.92	6554925.7662	5756954.05302
Valid N (listwise)	135				

CORRELATIONS

/VARIABLES=Rental VacancyRate GDP GDPserviceInflationRate KLCI UnemployRateLendingRateFloorSpace
 /PRINT=TWOTAIL NOSIG
 /MISSING=PAIRWISE.

Correlations

[DataSet1] D:\badrul\Badrul Thesis\Data.251111.sav

Correlations

		Rental	VacancyRate	GDP	GDPservice	InflationRate	KLCI	UnemployRate	LendingRate	FloorSpace
Rental	Pearson	1	-.479**	.165	.180*	.016	.135	-.022	-.150	.366**
	Correlation									
	Sig. (2-tailed)		.000	.056	.036	.852	.118	.801	.083	.000
	N	135	135	135	135	135	135	135	135	135
VacancyRate	Pearson	-.479**	1	-.289**	-.259**	-.115	-.276**	.182*	.146	-.101
	Correlation									
	Sig. (2-tailed)	.000		.001	.002	.183	.001	.034	.090	.243
	N	135	135	135	135	135	135	135	135	135
GDP	Pearson	.165	-.289**	1	.973**	.330**	.914**	-.483**	-.605**	.067
	Correlation									
	Sig. (2-tailed)	.056	.001		.000	.000	.000	.000	.000	.443
	N	135	135	135	135	135	135	135	135	135
GDPservice	Pearson	.180*	-.259**	.973**	1	.142	.895**	-.336**	-.728**	.071
	Correlation									
	Sig. (2-tailed)	.036	.002	.000		.100	.000	.000	.000	.416
	N	135	135	135	135	135	135	135	135	135
InflationRate	Pearson	.016	-.115	.330**	.142	1	.161	-.616**	.350**	-.002
	Correlation									

	Sig. (2-tailed)	.852	.183	.000	.100		.062	.000	.000	.980
	N	135	135	135	135	135	135	135	135	135
KLCI	Pearson	.135	-.276**	.914**	.895**	.161	1	-.618**	-.498**	.055
	Correlation									
	Sig. (2-tailed)	.118	.001	.000	.000	.062		.000	.000	.528
	N	135	135	135	135	135	135	135	135	135
UnemployRate	Pearson	-.022	.182*	-.483**	-.336**	-.616**	-.618**	1	-.340**	-.005
	Correlation									
	Sig. (2-tailed)	.801	.034	.000	.000	.000	.000		.000	.953
	N	135	135	135	135	135	135	135	135	135
LendingRate	Pearson	-.150	.146	-.605**	-.728**	.350**	-.498**	-.340**	1	-.064
	Correlation									
	Sig. (2-tailed)	.083	.090	.000	.000	.000	.000	.000	.000	.463
	N	135	135	135	135	135	135	135	135	135
FloorSpace	Pearson	.366**	-.101	.067	.071	-.002	.055	-.005	-.064	1
	Correlation									
	Sig. (2-tailed)	.000	.243	.443	.416	.980	.528	.953	.463	
	N	135	135	135	135	135	135	135	135	135

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

```

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.1) POUT(.125)
  /NOORIGIN
  /DEPENDENT Rental
  /METHOD=STEPWISE VacancyRate GDP GDPserviceInflationRate KLCI
UnemployRateLendingRateFloorSpace
  /RESIDUALS DURBIN.

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Regression

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Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	VacancyRate		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).
2	FloorSpace		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).

a. Dependent Variable: Rental

Model Summary^c

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.479 ^a	.230	.224	.69994	
2	.576 ^b	.332	.322	.65433	1.356

a. Predictors: (Constant), VacancyRate

b. Predictors: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.429	1	19.429	39.659	.000 ^a
	Residual	65.158	133	.490		
	Total	84.587	134			
2	Regression	28.072	2	14.036	32.783	.000 ^b
	Residual	56.515	132	.428		
	Total	84.587	134			

a. Predictors: (Constant), VacancyRate

b. Predictors: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.669	.154		23.821	.000
	VacancyRate	-.042	.007	-.479	-6.298	.000
2	(Constant)	3.318	.164		20.252	.000
	VacancyRate	-.040	.006	-.447	-6.248	.000
	FloorSpace	4.434E-8	.000	.321	4.493	.000

a. Dependent Variable: Rental

Excluded Variables^c

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	GDP	.028 ^a	.355	.723	.031	.916
	GDPservice	.060 ^a	.763	.447	.066	.933
	InflationRate	-.040 ^a	-.515	.607	-.045	.987
	KLCI	.003 ^a	.042	.967	.004	.924
	UnemployRate	.068 ^a	.875	.383	.076	.967
	LendingRate	-.081 ^a	-1.057	.292	-.092	.979
	FloorSpace	.321 ^a	4.493	.000	.364	.990
2	GDP	.015 ^b	.204	.838	.018	.915
	GDPservice	.045 ^b	.610	.543	.053	.931
	InflationRate	-.035 ^b	-.489	.626	-.043	.987
	KLCI	-.006 ^b	-.081	.935	-.007	.923
	UnemployRate	.063 ^b	.875	.383	.076	.967
	LendingRate	-.065 ^b	-.908	.366	-.079	.976

a. Predictors in the Model: (Constant), VacancyRate

b. Predictors in the Model: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.5904	3.5560	2.7766	.45770	135
Residual	-1.05844	1.92227	.00000	.64943	135
Std. Predicted Value	-2.592	1.703	.000	1.000	135
Std. Residual	-1.618	2.938	.000	.993	135

a. Dependent Variable: Rental

KLANG VALLEY TIME-SERIES DATA (Kuala Lumpur, Petaling Jaya, Kelana Jaya, Subang Jaya, Shah Alam and Klang)

Descriptives

[DataSet1] D:\badrul\Badrul Thesis\Data.KlangValley.251111.sav

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Rental	90	1.91	5.19	3.1314	.72563
VacancyRate	90	1.80	34.80	17.8689	8.11313
GDP	90	383213.00	765966.00	577947.2222	131334.52127
GDPservice	90	107088.00	199151.00	146266.2222	31432.56185
InflationRate	90	.60	5.40	2.2889	1.41059
KLCI	90	704.26	1379.39	1007.4500	231.86738
UnemployRate	90	3.20	3.60	3.4333	.13408
LendingRate	90	5.10	6.50	6.0000	.51712
FloorSpace	90	768726.68	22555563.92	8271170.5142	6078412.29492
Valid N (listwise)	90				

CORRELATIONS

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/VARIABLES=Rental VacancyRate GDP GDPserviceInflationRate KLCI UnemployRateLendingRateFloorSpace
/PRINT=TWOTAIL NOSIG
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Correlations

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Correlations

		Rental	VacancyRate	GDP	GDPservice	InflationRate	KLCI	UnemployRate	LendingRate	FloorSpace
Rental	Pearson	1	-.275**	.233*	.247*	.032	.205	-.060	-.196	.183
	Correlation									
	Sig. (2-tailed)		.009	.027	.019	.765	.053	.577	.064	.085
	N	90	90	90	90	90	90	90	90	90
VacancyRate	Pearson	-.275**	1	-.302**	-.262*	-.133	-.293**	.203	.138	.168
	Correlation									
	Sig. (2-tailed)	.009		.004	.013	.211	.005	.056	.195	.113
	N	90	90	90	90	90	90	90	90	90
GDP	Pearson	.233*	-.302**	1	.973**	.330**	.914**	-.483**	-.605**	.078
	Correlation									
	Sig. (2-tailed)	.027	.004		.000	.001	.000	.000	.000	.465
	N	90	90	90	90	90	90	90	90	90
GDPservice	Pearson	.247*	-.262*	.973**	1	.142	.895**	-.336**	-.728**	.083
	Correlation									
	Sig. (2-tailed)	.019	.013	.000		.181	.000	.001	.000	.437
	N	90	90	90	90	90	90	90	90	90

InflationRate	Pearson	.032	-.133	.330**	.142	1	.161	-.616**	.350**	-.004
	Correlation									
	Sig. (2-tailed)	.765	.211	.001	.181		.130	.000	.001	.971
	N	90	90	90	90	90	90	90	90	90
KLCI	Pearson	.205	-.293**	.914**	.895**	.161	1	-.618**	-.498**	.067
	Correlation									
	Sig. (2-tailed)	.053	.005	.000	.000	.130		.000	.000	.531
	N	90	90	90	90	90	90	90	90	90
UnemployRate	Pearson	-.060	.203	-.483**	-.336**	-.616**	-.618**	1	-.340**	-.004
	Correlation									
	Sig. (2-tailed)	.577	.056	.000	.001	.000	.000		.001	.968
	N	90	90	90	90	90	90	90	90	90
LendingRate	Pearson	-.196	.138	-.605**	-.728**	.350**	-.498**	-.340**	1	-.076
	Correlation									
	Sig. (2-tailed)	.064	.195	.000	.000	.001	.000	.001		.479
	N	90	90	90	90	90	90	90	90	90
FloorSpace	Pearson	.183	.168	.078	.083	-.004	.067	-.004	-.076	1
	Correlation									
	Sig. (2-tailed)	.085	.113	.465	.437	.971	.531	.968	.479	
	N	90	90	90	90	90	90	90	90	90

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

```

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.1) POUT(.125)
  /NOORIGIN
  /DEPENDENT Rental
  /METHOD=STEPWISE VacancyRate GDP GDPserviceInflationRate KLCI
UnemployRateLendingRateFloorSpace
  /RESIDUALS DURBIN
  /CASEWISE PLOT(ZRESID) OUTLIERS(3) .

```

Regression

[DataSet1] D:\badrul\Badrul Thesis\Data.KlangValley.251111.sav

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	VacancyRate		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).
2	FloorSpace		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).

a. Dependent Variable: Rental

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.275 ^a	.076	.065	.70162	
2	.360 ^b	.129	.109	.68478	1.572

ANOVA^c

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.541	1	3.541	7.194	.009 ^a
	Residual	43.320	88	.492		
	Total	46.862	89			
2	Regression	6.065	2	3.033	6.467	.002 ^b
	Residual	40.797	87	.469		
	Total	46.862	89			

a. Predictors: (Constant), VacancyRate

b. Predictors: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.571	.180		19.868	.000
	VacancyRate	-.025	.009	-.275	-2.682	.009
2	(Constant)	3.402	.190		17.906	.000
	VacancyRate	-.028	.009	-.314	-3.099	.003
	FloorSpace	2.810E-8	.000	.235	2.320	.023

a. Dependent Variable: Rental

Excluded Variables^c

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	GDP	.165 ^a	1.542	.127	.163	.909
	GDPservice	.188 ^a	1.791	.077	.189	.931
	InflationRate	-.005 ^a	-.045	.964	-.005	.982
	KLCI	.136 ^a	1.270	.208	.135	.914
	UnemployRate	-.004 ^a	-.039	.969	-.004	.959
	LendingRate	-.161 ^a	-1.571	.120	-.166	.981
	FloorSpace	.235 ^a	2.320	.023	.241	.972
2	GDP	.134 ^b	1.266	.209	.135	.891
	GDPservice	.159 ^b	1.528	.130	.163	.915
	InflationRate	-.009 ^b	-.090	.928	-.010	.982
	KLCI	.107 ^b	1.018	.311	.109	.900
	UnemployRate	.005 ^b	.052	.959	.006	.957
	LendingRate	-.139 ^b	-1.376	.172	-.147	.971

a. Predictors in the Model: (Constant), VacancyRate

b. Predictors in the Model: (Constant), VacancyRate, FloorSpace

c. Dependent Variable: Rental

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.4444	3.5386	3.1314	.26105	90
Residual	-.98592	1.82815	.00000	.67705	90
Std. Predicted Value	-2.632	1.560	.000	1.000	90
Std. Residual	-1.440	2.670	.000	.989	90

a. Dependent Variable: Rental

KLANG VALLEY TIME-SERIES DATA (Penang & Johor Bahru)

```
DESCRIPTIVES VARIABLES=Rental VacancyRate GDP GDPserviceInflationRate KLCI
UnemployRateLendingRateFloorSpace
/STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

[DataSet2] D:\badrul\Badrul Thesis\Data.JBPenang251111.sav

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Rental	45	1.35	2.62	2.0670	.29139
VacancyRate	45	12.45	44.10	27.3333	7.11439
GDP	45	383213.00	765966.00	577948.2222	132078.03431
GDPservice	45	107088.00	199151.00	146266.2222	31610.65144
InflationRate	45	.60	5.40	2.2889	1.41858
KLCI	45	704.26	1379.39	1007.4500	233.18109
UnemployRate	45	3.20	3.60	3.4333	.13484
LendingRate	45	5.10	6.50	6.0000	.52005
FloorSpace	45	404188.64	7576438.80	3122436.2702	2850527.06419
Valid N (listwise)	45				

CORRELATIONS

/VARIABLES=Rental VacancyRate GDP GDPserviceInflationRate KLCI UnemployRateLendingRateFloorSpace
 /PRINT=TWOTAIL NOSIG
 /MISSING=PAIRWISE.

Correlations

[DataSet2] D:\badrul\Badrul Thesis\Data.JBPenang251111.sav

Correlations

		Rental	VacancyRate	GDP	GDPservice	InflationRate	KLCI	UnemployRate	LendingRate	FloorSpace
Rental	Pearson	1	-.123	.192	.249	-.027	.113	.119	-.252	-.314*
	Correlation									
	Sig. (2-tailed)		.420	.206	.099	.862	.459	.438	.095	.036
	N	45	45	45	45	45	45	45	45	45
VacancyRate	Pearson	-.123	1	-.409**	-.386**	-.134	-.388**	.230	.242	.028
	Correlation									
	Sig. (2-tailed)	.420		.005	.009	.381	.008	.129	.109	.856
	N	45	45	45	45	45	45	45	45	45
GDP	Pearson	.192	-.409**	1	.973**	.330*	.914**	-.483**	-.605**	.072
	Correlation									
	Sig. (2-tailed)	.206	.005		.000	.027	.000	.001	.000	.638
	N	45	45	45	45	45	45	45	45	45
GDPservice	Pearson	.249	-.386**	.973**	1	.142	.895**	-.336*	-.728**	.075
	Correlation									
	Sig. (2-tailed)	.099	.009	.000		.351	.000	.024	.000	.625
	N	45	45	45	45	45	45	45	45	45
InflationRate	Pearson	-.027	-.134	.330*	.142	1	.161	-.616**	.350*	.004
	Correlation									

	Sig. (2-tailed)	.862	.381	.027	.351		.291	.000	.019	.982
	N	45	45	45	45	45	45	45	45	45
KLCI	Pearson	.113	-.388**	.914**	.895**	.161	1	-.618**	-.498**	.063
	Correlation									
	Sig. (2-tailed)	.459	.008	.000	.000	.291		.000	.001	.682
	N	45	45	45	45	45	45	45	45	45
UnemployRate	Pearson	.119	.230	-.483**	-.336*	-.616**	-.618**	1	-.340*	-.013
	Correlation									
	Sig. (2-tailed)	.438	.129	.001	.024	.000	.000		.022	.934
	N	45	45	45	45	45	45	45	45	45
LendingRate	Pearson	-.252	.242	-.605**	-.728**	.350*	-.498**	-.340*	1	-.064
	Correlation									
	Sig. (2-tailed)	.095	.109	.000	.000	.019	.001	.022		.674
	N	45	45	45	45	45	45	45	45	45
FloorSpace	Pearson	-.314*	.028	.072	.075	.004	.063	-.013	-.064	1
	Correlation									
	Sig. (2-tailed)	.036	.856	.638	.625	.982	.682	.934	.674	
	N	45	45	45	45	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

```

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA CHANGE
  /CRITERIA=PIN(.1) POUT(.125)
  /NOORIGIN
  /DEPENDENT Rental
  /METHOD=STEPWISE VacancyRate GDP GDPserviceInflationRate KLCI
  UnemployRateLendingRateFloorSpace
  /RESIDUALS DURBIN
  /CASEWISE PLOT(ZRESID) OUTLIERS(3) .

```

Regression

[DataSet2] D:\badrul\Badrul Thesis\Data.JBPenang251111.sav

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	FloorSpace		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).
2	GDPservice		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).
3	KLCI		. Stepwise (Criteria: Probability-of-F-to-enter <= .100, Probability-of-F-to-remove >= .125).

a. Dependent Variable: Rental

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.314 ^a	.098	.077	.27989	
2	.416 ^b	.173	.134	.27119	
3	.485 ^c	.235	.179	.26396	1.857

ANOVA^d

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.367	1	.367	4.690	.036 ^a
	Residual	3.369	43	.078		
	Total	3.736	44			
2	Regression	.647	2	.324	4.399	.018 ^b
	Residual	3.089	42	.074		
	Total	3.736	44			
3	Regression	.879	3	.293	4.207	.011 ^c
	Residual	2.857	41	.070		
	Total	3.736	44			

a. Predictors: (Constant), FloorSpace

b. Predictors: (Constant), FloorSpace, GDPservice

c. Predictors: (Constant), FloorSpace, GDPservice, KLCI

d. Dependent Variable: Rental

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.167	.062		34.803	.000
	FloorSpace	-3.206E-8	.000	-.314	-2.166	.036
2	(Constant)	1.804	.196		9.209	.000
	FloorSpace	-3.416E-8	.000	-.334	-2.375	.022
	GDPservice	2.530E-6	.000	.274	1.950	.058
3	(Constant)	1.834	.191		9.582	.000
	FloorSpace	-3.440E-8	.000	-.337	-2.457	.018
	GDPservice	7.137E-6	.000	.774	2.529	.015
	KLCI	-.001	.000	-.558	-1.826	.075

a. Dependent Variable: Rental

Excluded Variables^d

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	VacancyRate	-.115 ^a	-.787	.436	-.121	.999
	GDP	.216 ^a	1.509	.139	.227	.995
	GDPservice	.274 ^a	1.950	.058	.288	.994
	InflationRate	-.025 ^a	-.174	.863	-.027	1.000
	KLCI	.133 ^a	.918	.364	.140	.996
	UnemployRate	.115 ^a	.788	.435	.121	1.000
	LendingRate	-.273 ^a	-1.944	.059	-.287	.996
2	VacancyRate	-.009 ^b	-.061	.952	-.009	.848
	GDP	-.967 ^b	-1.610	.115	-.244	.053
	InflationRate	-.066 ^b	-.460	.648	-.072	.980
	KLCI	-.558 ^b	-1.826	.075	-.274	.199
	UnemployRate	.233 ^b	1.592	.119	.241	.887
	LendingRate	-.157 ^b	-.764	.449	-.118	.470
3	VacancyRate	-.038 ^c	-.249	.805	-.039	.839
	GDP	-.618 ^c	-.940	.353	-.147	.043
	InflationRate	-.047 ^c	-.336	.739	-.053	.974
	UnemployRate	.077 ^c	.346	.731	.055	.382
	LendingRate	.033 ^c	.143	.887	.023	.352

Excluded Variables^d

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	VacancyRate	-.115 ^a	-.787	.436	-.121	.999
	GDP	.216 ^a	1.509	.139	.227	.995
	GDPservice	.274 ^a	1.950	.058	.288	.994
	InflationRate	-.025 ^a	-.174	.863	-.027	1.000
	KLCI	.133 ^a	.918	.364	.140	.996
	UnemployRate	.115 ^a	.788	.435	.121	1.000
	LendingRate	-.273 ^a	-1.944	.059	-.287	.996
2	VacancyRate	-.009 ^b	-.061	.952	-.009	.848
	GDP	-.967 ^b	-1.610	.115	-.244	.053
	InflationRate	-.066 ^b	-.460	.648	-.072	.980
	KLCI	-.558 ^b	-1.826	.075	-.274	.199
	UnemployRate	.233 ^b	1.592	.119	.241	.887
	LendingRate	-.157 ^b	-.764	.449	-.118	.470
3	VacancyRate	-.038 ^c	-.249	.805	-.039	.839
	GDP	-.618 ^c	-.940	.353	-.147	.043
	InflationRate	-.047 ^c	-.336	.739	-.053	.974
	UnemployRate	.077 ^c	.346	.731	.055	.382
	LendingRate	.033 ^c	.143	.887	.023	.352

a. Predictors in the Model: (Constant), FloorSpace

b. Predictors in the Model: (Constant), FloorSpace, GDPservice

c. Predictors in the Model: (Constant), FloorSpace, GDPservice, KLCI

d. Dependent Variable: Rental

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.7760	2.3530	2.0670	.14137	45
Residual	-.57586	.34866	.00000	.25480	45
Std. Predicted Value	-2.058	2.023	.000	1.000	45
Std. Residual	-2.182	1.321	.000	.965	45

a. Dependent Variable: Rental