Corporate Real Estate Occupancy Costs and its Correlation to Company Performance

by

Chee San Sandra Choy

Master of Architecture, 2004

Yale University

Bachelor of Science in Architecture, 2001

University of Michigan

and

Bingrui Gong

Bachelor of Civil Engineering Management, 2007

Dalian University of Technology

Submitted to the Program in Real Estate Development in Conjunction with the Center for Real Estate in Partial Fulfillment of the Requirements for the Degree of Master of Science in Real Estate Development

at the

Massachusetts Institute of Technology

February, 2015

Signature of Author_____ Signature redacted
Center for Real Estate
January 9, 2015

Signature of Author_____ Signature redacted
Center for Real Estate
January 9, 2015

Certified by_____ Signature redacted
William C. Wheaton
Professor Emeritus, Department of Economics
Professor, Center for Real Estate
Thesis Supervisor

Accepted by_____ Signature redacted
Professor Albert Saiz
Daniel Rose Associate Professor of Urban Economics and Real Estate, Department of Urban Studies and Center for Real Estate

Corporate Real Estate Occupancy Costs and its Correlation to Company Performance

by

Chee San Sandra Choy

And

Bingrui Gong

Submitted to the Program in Real Estate Development in Conjunction with the Center for Real Estate on January 9, 2015 in Partial Fulfillment of the Requirements for the Degree of Master of Science in Real Estate Development

Abstract

Real estate owned by non-real estate firms represent a substantial portion on most corporate balance sheets, yet they are often being overlooked with a lack of investment strategy and treated as the necessary evil for operating the core businesses. Corporate real estate generally involves activities such as long-term leasing, acquisition, in some cases ground-up developments, management, and disposal of real estate assets. Due to the long-lasting nature of real estate, corporate real estate decisions are non-easily reversible. Different industries approach corporate real estate in ways that best support their operational needs. This paper quantitatively compares the relationship between the share price, occupancy costs per employee, and net income during the period 1999 to 2013 for U.S. Fortune 500 financial and technology companies. The first part of the paper explains our data collection methodology. We collected share prices and extracted data from 10-k filings submitted to the U.S. Securities and Exchange Commission. The extracted data consists of firm gross revenue, net income, total full-time employee number, plant, property & equipment (PPE), real estate PPE, rental expense, and occupancy costs. The derivation of occupancy costs is also explained in this part. The second part studies the relationship between share price, occupancy costs, and net income for the two sectors. Consistent with our expectations, there is positive and significant correlation between share price and net income for both sectors. On the contrary, the market punishes technology firms for higher occupancy costs per employee but not as much for financial firms. The third part of the paper examines the relationship between occupancy costs and net income per employee. Contrary to common belief that occupancy costs per employee would negatively affect the net income generated by each employee, we discover a positive correlation between the two which we believe is a result of reversed causality.

Thesis Supervisor: William C. Wheaton
Title: Professor Emeritus, Department of Economics
Professor, Center for Real Estate

Acknowledgements

First of all, we would like to thank our advisor Professor William C. Wheaton for his encouragement and guidance. This thesis would not exist without his support and insights throughout the process. Coming from architecture and construction background, we embrace this interesting and rewarding opportunity to work on a quantitative research that is beyond our comfort zone. Along the way there are some setbacks and frustration, however, this opportunity really push our limits and we hope that you find our research useful.

We would also like to thank everyone at the Center for Real Estate who help us achieve our goals at MIT, and to our diverse and wonderful group of classmates who share with us their passion in real estate.

Last but not the least, we could not have done it without the continual support from our family and friends. They are the rocks of our lives.

Contents

Chapter 1

Introduction

1.1 Overview

> *"Just as our products always focus on the user, Google offices focus on the Googler. From state-of-the-art green construction projects to maintaining our resident T. Rex skeleton (named Stan), the Real Estate and Workplace Services team builds environments that keep Googlers feeling inspired and energized. We're a team of inquisitive and energetic real estate, construction and facilities operations professionals that are constantly searching for new ways to improve workplace efficiency and make Google a great place to come to work everyday."* Google, Inc.

> *"There is nothing more rewarding than helping the firm establish a business in a new location. Having Goldman Sachs employees enter a new office space and feel like they are "at home" is very rewarding."* Goldman Sachs Group, Inc.

Corporate real estate serves as one of the basic factors of production. It is the real property that is owned or leased by corporation and organization to support its core business activities. The real property includes buildings such as office space, manufacturing plants, and warehouses. Real estate owned by non-real estate firms represent a substantial portion on most corporate balance sheets, yet they are often being overlooked with a lack of investment strategy and treated as the necessary evil for operating the core businesses. At the end of 2008, the Bureau of Economic Analysis (BEA) estimates approximately $11.4 trillion worth of nonresidential buildings excluding the value of the land.

Corporate real estate generally involves activities such as long-term leasing, acquisition, in some cases ground-up developments, management, and disposal of real estate assets. Due to the long-lived nature and duration of these activities, corporate real estate decisions are non-easily reversible. Investment in corporate real estate signals to the market the opportunity cost forgone. Rodriguez and Sirmans (1996) provide a comprehensive summary of the impact of real estate on shareholder value based on flow perspective using event studies. It indicates that investors

generally react positively to real estate divestments and punish the share price of company acquiring additional real estates.

Corporate real estate (CRE) can be categorized into three types: commodity CRE, operational CRE, and strategic CRE (Park and Glascock 2009). Commodity CRE has no preference towards sites and locations, and does not affect firms' ability to achieve competitive advantage. Operational CRE is necessary for firms to execute their businesses and produce competitively advantageous products/ service offerings to their customers. However, operational CRE does not possess all the strategic resource qualities (valuable, rare, imperfectly imitable, and strategically unique), that could be the basis for firms to establish and achieve sustained out-performance. Strategic CRE, on the other hand, contains these propriety resources through long-term accumulation. According to the research, most firms fall under the operational CRE category.

Different industries approach corporate real estate in ways that best support their operational needs. For instance, financial firms tend to locate their corporate headquarters in central business district (CBD). Among the 26 U.S. Fortune 500 financial firms that we have researched, 11 out of the 26 locate their headquarters in Class A office buildings in CBD such as Goldman Sachs in New York City, Wells Fargo in San Francisco, and State Street Financials in Boston, with their supporting offices situated in non-CBD locations. Technology firms, on the other hand, locate their headquarters in campus settings in suburban areas such as Pitney Bowes in Stamford Connecticut, Arrow Electronics in Englewood Colorado, and Intel in Santa Clara California. Apart from offices, the technology firms' corporate real estate holdings include manufacturing facilities, warehouses, and data centers to support their business operations. In addition, all of our sampled technology firms possess developable land bank for future expansion to meet their business needs.

Many previous corporate real estate researches focused on non-financial firms due to the variety of data available. Here we try to examine the effect of corporate real estate strategies for financial and technology firms and to compare their correlation of share price, occupancy costs per employees, and net income. Financial and technology firms approach corporate real estate differently. Most of the financial firms maintain a relatively small in-house team with most of their corporate real estate functions outsourced to real estate consulting companies like CBRE or JLL. On the other hand, technology firms have been experiencing exponential growth during the period 1999 to 2013 and they maintain larger teams of in-house corporate real estate staff in addition to

hiring third party professionals.

Our paper quantitatively compares the two sectors and see if their strategies reflect different correlation pattern between the share price, occupancy costs per employee, and net income. Chapter 1 introduces the research topic and explains the data collection methodology for share prices, net income, plant, property & equipment (PPE), and occupancy costs. Chapter 2 establishes the occupancy costs equations for financial and technology firms. Then we examine the volatility of the derived occupancy costs to exclude firms that indicate abnormal volatility during our study period. Using the adjusted occupancy costs from Chapter 2, Chapter 3 studies the correlation among share price, occupancy costs per employee, and net income using linear regression. We further study the correlation between net income per employee and occupancy costs per employee in Chapter 4. Chapter 5 concludes the findings through our quantitative research.

1.2 Data Collection

Our initial sample consists of U.S. firms with SIC numbers 6141, 6199, 6021, 6022, 6211, 7389 for Fortune 500 financial firms and 3570 - 3572, 3576 - 3579, 3672, 3674, 5065, 7371, 7372 for Fortune 500 technology firms. We extracted data from 10-k filings submitted to the U.S. Securities and Exchange Commission between the fiscal years of 1999 to 2013 for 26 financial firms and 18 technology firms. The extracted data consists of firm gross revenue, net income, total full-time employee number, plant, property & equipment (PPE), real estate PPE, rental expense, and occupancy costs. In addition, we collected share prices from 1999 to 2013 of the above firms based on their respective 10-k filing report dates from Yahoo Finance (www.finance.yahoo.com) and the Center for Research in Security Prices (CRSP) database. 12 out of 26 sampled financial firms provide occupancy costs and none of the sampled technology firms provide such information. Furthermore, only 4 out of the 26 sampled financial firms provide the breakdown of real estate in PPE in their 10-k filings, while all technology firms provide such information.

Chapter 2

Occupancy Costs

According to the CBRE Global Research and Consulting Special Report published in April 2013 on Driving an Aggressive Occupancy Cost Reduction Program, real estate is often the second largest expense on the income statement for most companies – typically right behind labor. Occupancy costs are the life-cycle costs associated with holding or leasing corporate real estate assets. They cover costs such as rent, real estate taxes, insurance on building, depreciation, and amortization expenses. These costs could be incurred on a regular or irregular basis. As mentioned previously, 12 out of 26 sampled financial firms include annual occupancy costs from fiscal year 1999 to 2013 while none of the technology firms provide such information.

PPE includes buildings, leasehold improvements, machinery and equipment, natural resources, land and improvements, and construction in progress. Real estate PPE, in our case, refers to all of the above except machinery and equipment. According to Tuzel (2010), buildings and capitalized leases (mainly leasehold improvements) are the two biggest real-estate-related components of PPE and they account for approximately 16% and 10% of the total PPE respectively during the period of 1984 to 2003. Construction in progress, land and improvements account for 5% of PPE on average during the same period. In total, the average real estate PPE is 31%. In our sampled financial firms, 4 of them provide real estate PPE and the average is 49% as shown below in Table 1. Financial firms in general do not own or lease large amount of machinery and equipment, therefore the real estate PPE is substantially higher than the average real estate PPE mentioned above. On the other hand, technology firms own significantly larger amount of machinery and technology, and the average real estate PPE of the sampled technology firms is 34% as shown below in Table 2, which is closer to the average.

For financial firms, the occupancy costs equation is composed of a percentage of the total PPE, rental cost, and a constant. Using the occupancy costs collected from the financial firms, we set up a regression equation to derive the percentage of the total PPE contributed to the occupancy costs for financial firms. We assume that this derived percentage and constant coefficient apply to all financial firms. We use this regression equation to derive all occupancy costs for financial firms.

Since none of the sampled technology firms provide occupancy costs information, we calculate an annulization factor from the limited data we have from the financial firms. 4 out of 26

sampled financial firms provide real estate PPE. The annulization factor is derived by dividing the derived percentage of the total PPE mentioned above by the average real estate PPE from the four financial firms. For technology firms, the occupancy costs equation is composed of rental cost and an annulization factor multiplied by the real estate PPE.

2.1 Methodology to derive Occupancy Costs

2.1.1 Financial Firms

The method consists of a three-step process that involves calculating the percentage of PPE contributed to the financial firm occupancy costs, deriving a constant factor, and finally deriving the occupancy costs by adding rental cost, constant factor, and the percentage of PPE contributed to the financial firm occupancy costs.

Occupancy costs is composed of a percentage of the total PPE, rental cost, and a constant. Utilizing the raw data of 13 financial firms collected from the Fortune 500 firms, we setup two linear regressions to calculate the percentage of PPE contribute to the occupancy costs. The first linear regression does not contain dummy variables and is as follows:

$$C_{OF} - C_{RF} = \beta_0 + \beta_1 * PPE_{TF} \quad (1)$$

where:

C_{OF} = Occupancy costs collected from 13 financial firms

C_{RF} = Rental costs collected from 13 financial firms

β_0 = Intercept coefficient

β_1 = Percentage of PPE contributed to the total occupancy costs

PPE_{TF} = Total PPE collected from 13 financial firms

Without controlling for firm factor, the first regression indicates that 9.5% of total PPE contribute to the occupancy costs, as shown in Exhibit 1 and Figure 1 below. The constant coefficient is 44.2 with a T-stat value of 2.04, and P-stat value of 0.043. The results indicate that PPE has a strong positive correlation with occupancy cost. All dollar figures are in millions.

Source	SS	df	MS	Number of obs =	173
				F(1, 171) =	605.36
Model	28593904.8	1	28593904.8	Prob > F =	0.0000
Residual	8077079.83	171	47234.385	R-squared =	0.7797
				Adj R-squared =	0.7785
Total	36670984.7	172	213203.399	Root MSE =	217.33

occucostre~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ppe	.0950293	.0038623	24.60	0.000	.0874053	.1026533
_cons	44.21965	21.65843	2.04	0.043	1.467345	86.97195

Exhibit 1: Regression results from equation (1).

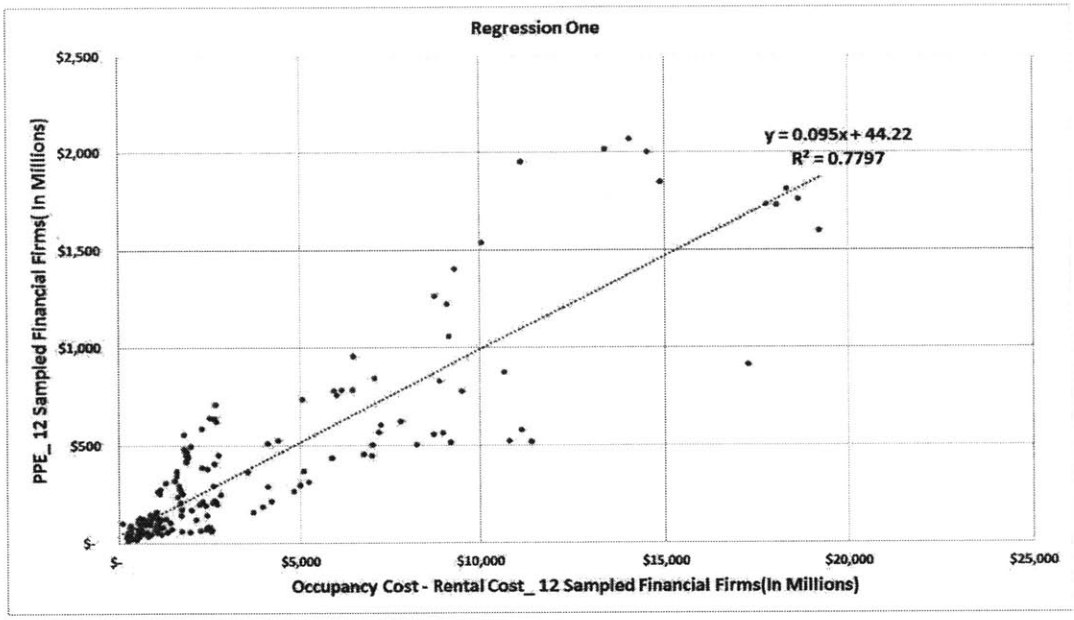

Figure 1: Regression results from equation (1).

The second regression includes the firm as dummy variables and is as follows:

$$C_{OF} - C_{RF} = \beta_0 + \beta_1 * PPE_{TF} + D_F \qquad (2)$$

where:

C_{OF} = Occupancy costs collected from 13 financial firms

C_{RF} = Rental costs collected from 13 financial firms

β_0 = Intercept coefficient

β_1 = Percentage of PPE contributed to the total occupancy costs

PPE_{TF} = Total PPE collected from 13 financial firms

D_F = Dummy Variables for 13 firms

The second regression results indicate that the occupancy costs for financial firms include 9.28% of the total PPE, as shown in Exhibit 2. Taking an average of 9.5% and 9.28%, we calculated the percentage of PPE contributed to the total occupancy costs to be 9.39%.

Source	SS	df	MS	Number of obs =	173
				F(13, 159) =	206.08
Model	34616504.5	13	2662808.04	Prob > F =	0.0000
Residual	2054480.13	159	12921.2587	R-squared =	0.9440
				Adj R-squared =	0.9394
Total	36670984.7	172	213203.399	Root MSE =	113.67

occucostre~t	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ppe	.0928055	.0044204	20.99	0.000	.0840752	.1015358
rf	98.24239	43.44437	2.26	0.025	12.43991	184.0449
usbank	387.4019	43.31503	8.94	0.000	301.8549	472.9489
bbt	238.911	43.63645	5.48	0.000	152.7292	325.0929
ms	271.8933	44.1916	6.15	0.000	184.6151	359.1715
jf	158.3199	44.53025	3.56	0.000	70.37283	246.267
cs	157.6157	44.17982	3.57	0.000	70.36069	244.8707
b	12.67727	43.42217	0.29	0.771	-73.08135	98.43589
boa	173.3814	48.25568	3.59	0.000	78.0766	268.6862
jpm	669.3659	58.51302	11.44	0.000	553.8029	784.9289
gs	-155.4141	51.63129	-3.01	0.003	-257.3857	-53.44251
wellsfargo	10.96223	58.79193	0.19	0.852	-105.1516	127.0761
blackrock	164.9981	50.27296	3.28	0.001	65.70922	264.287
_cons	-113.2718	34.13646	-3.32	0.001	-180.6912	-45.85241

Exhibit 2: Regression results from equation (2).

The intercept coefficient and percentage of PPE contributed to the total occupancy costs are derived from equation (1) and (2). They are applied to the following equation to derive occupancy costs for financial firms:

$$C_{ODF} = \beta_0 + C_{RF} + \beta_1 * PPE_{TF} \quad (3)$$

where:

C_{DOF} = Derived occupancy costs for 13 financial firms

C_{RF} = Rental costs collected from 13 financial firms

β_0 = Intercept coefficient = 44.2

β_1 = PPE contribute to the total occupancy costs = 9.39%

PPE_{TF} = Total PPE collected from 13 financial firms

2.1.2 Technology Firms

Since none of the sampled technology firms provide occupancy costs information, we calculate an annulization factor from the limited data we have from the financial firms. 4 out of the 26 sampled financial firms, including Blackrock, Capital One, MasterCard, and Wells Fargo provide data on real estate break down in PPE. The average of real estate portion in total PPE from year 1999 to 2013 of these four firms is calculated to be 49% of the total PPE as shown in Table 1. Due to the availability of data on PPE breakdown, the average of 49% real estate PPE is applied to all 26 sampled financial firms. Then a constant annualization factor is derived by applying the average of 49% to the following equation:

$$\beta_1 = \gamma_1 * PPE_{REF} \quad (4)$$

where:

β_1 = Percentage of PPE contributed to the total occupancy costs = 9.39%

γ_1 = Annualization factor

PPE_{REF} = Average Percentage of Real estate PPE for financial firms = 49%

	Finance Firms				
	Capital One	Black Rock	Wells Fargo	MasterCard	
Year	**% RE in PPE**	**% RE in PPE**	**% RE in PPE**	**% RE in PPE**	**Annual Average**
1999	33%	24%	56%	N/A	38%
2000	34%	43%	55%	N/A	44%
2001	38%	43%	56%	N/A	46%
2002	37%	55%	58%	32%	46%
2003	43%	40%	58%	36%	44%
2004	41%	37%	59%	35%	43%
2005	44%	40%	61%	34%	45%
2006	52%	40%	60%	49%	50%
2007	54%	38%	57%	49%	49%
2008	53%	41%	67%	49%	52%
2009	55%	48%	65%	59%	57%
2010	55%	45%	62%	59%	55%
2011	56%	48%	60%	57%	55%
2012	51%	47%	61%	57%	54%
2013	51%	47%	60%	57%	54%
Average	47%	43%	60%	48%	49%

Table 1: Real Estate PPE for 4 Sampled Financial Firms.

	Technology Firms																			
	Jabil Circuit	Conigzant TS	Pickney Bowes	Shaw Group	First Data	Broadcom	NCR	WD	Arrow	EMC	Oracle	Cisco	Intel	Dell	IBM	MS	HP	Apple	Micron	
Year	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	% RE in PPE	Annual Ave
1999	26%	19%	29%	33%	21%	14%	42%	18%	34%	34%	38%	20%	37%	41%	29%	43%	44%	61%	32%	32%
2000	32%	26%	28%	27%	21%	29%	40%	17%	39%	35%	37%	26%	43%	42%	28%	36%	42%	56%	29%	33%
2001	35%	29%	28%	31%	20%	18%	38%	19%	37%	35%	42%	46%	37%	43%	28%	34%	41%	54%	28%	34%
2002	40%	52%	25%	25%	21%	17%	36%	17%	37%	38%	45%	44%	38%	26%	27%	32%	44%	59%	30%	34%
2003	35%	42%	26%	26%	21%	17%	38%	16%	37%	37%	46%	45%	37%	26%	28%	35%	43%	60%	28%	34%
2004	35%	36%	27%	25%	23%	16%	34%	13%	35%	35%	51%	42%	38%	44%	27%	47%	46%	61%	26%	35%
2005	32%	30%	24%	23%	23%	19%	33%	17%	32%	32%	50%	40%	38%	40%	26%	50%	45%	63%	25%	34%
2006	33%	42%	24%	23%	25%	27%	35%	16%	30%	30%	49%	38%	37%	39%	24%	49%	42%	67%	26%	35%
2007	36%	36%	23%	28%	47%	28%	35%	21%	27%	29%	53%	38%	45%	37%	24%	50%	40%	63%	24%	36%
2008	33%	41%	22%	29%	41%	32%	34%	18%	20%	29%	58%	38%	40%	35%	25%	52%	41%	57%	25%	35%
2009	30%	47%	23%	38%	36%	31%	31%	18%	16%	31%	61%	40%	41%	34%	25%	55%	38%	56%	28%	36%
2010	27%	47%	22%	43%	29%	28%	25%	24%	16%	30%	59%	39%	40%	36%	25%	54%	39%	48%	26%	35%
2011	30%	43%	22%	44%	27%	30%	29%	27%	15%	29%	58%	36%	41%	35%	26%	51%	37%	40%	24%	34%
2012	31%	45%	22%	38%	24%	25%	30%	24%	15%	28%	54%	36%	41%	37%	26%	48%	36%	27%	23%	32%
2013	34%	41%	17%		23%	23%	28%	24%	13%	28%	52%	36%	45%	37%	26%	47%	37%	26%	24%	31%
Average	33%	38%	24%	31%	27%	24%	34%	19%	27%	32%	50%	38%	40%	37%	26%	45%	41%	53%	26%	**34%**

Table 2: Real Estate PPE for 19 Sampled Technology Firms.

The annualization factor is calculated to be 19.22% and applied to the following equations to derive occupancy costs for technology firms:

$$C_{ODT} = \gamma_1 * PPE_{RET} + C_{RT} \quad (5)$$

where:

C_{ODT} = Derived occupancy costs for technology firms

γ_1 = Annualization factor = 19.22%

PPE_{RET} = Actual Real estate PPE for technology firms

C_{RT} = Rental costs collected from technology firms

2.2 Volatility in derived Occupancy Costs and Net Income

Great volatility is observed on the net income and derived occupancy costs per employee from fiscal years 1999 to 2013 for both financial and technology firms. This is partly due to the dot-com bubble in 2001 and the 2008 financial crisis. Despite the weakened economy post financial crisis, technology firms have gone through a rapidly development phase since 2008. On the other hand, financial industry is affected by major policy changes after the 2008 financial crisis. This changes the market perception of the industry and affects the stock performance as a result of the change.

2.2.1 Financial Firms

To analyze the volatility of occupancy costs per employee, we study the average of each firm across years, the average of each year within firms, and the yearly occupancy costs per employee for each firm.

Among the sampled financial firms, International Finance Corporation shows very volatile employee number and occupancy costs between 1999 and 2013. This is because of the relatively small size of the firm and its exponential growth. Therefore we eliminate all occupancy costs per employee data of International Finance Corporation in the subsequent regressions.

All financial firms exhibit relatively similar occupancy costs per employee at $25,000 with the exception of JP Morgan and International Finance Corporation as shown in Exhibit 3. The occupancy costs per employee for JP Morgan is in the $100,000 range on average, nonetheless, there is little volatility. This is primarily due to its relatively high rental costs, in thousands rather than hundreds. We are not eliminating the substantially higher occupancy costs per employee for JP Morgan because we are concern with volatility here, rather than the level of occupancy costs.

An upward trend across time is observed here in Exhibit 4 by calculating the yearly average of occupancy costs per employee of all financial firms. Prior to the 2008 financial crisis, this number reaches its peak before collapsing. This finding echoes the results from our following study in Chapter 4 on the correlation between net income and occupancy costs per employee. When net income is at high level, financial firms are willing to spend more on their corporate real estate.

When taking an average of each firm's occupancy costs per employee across years, we

observe that 73% of firms' average occupancy costs per employee from 1999 to 2013 are below $20,000. Mastercard, Charles Schwab, Visa, BlackRock, Goldman Sachs and JP Morgan are above $20,000 and they make up the remaining 27% as shown in Exhibit 5.

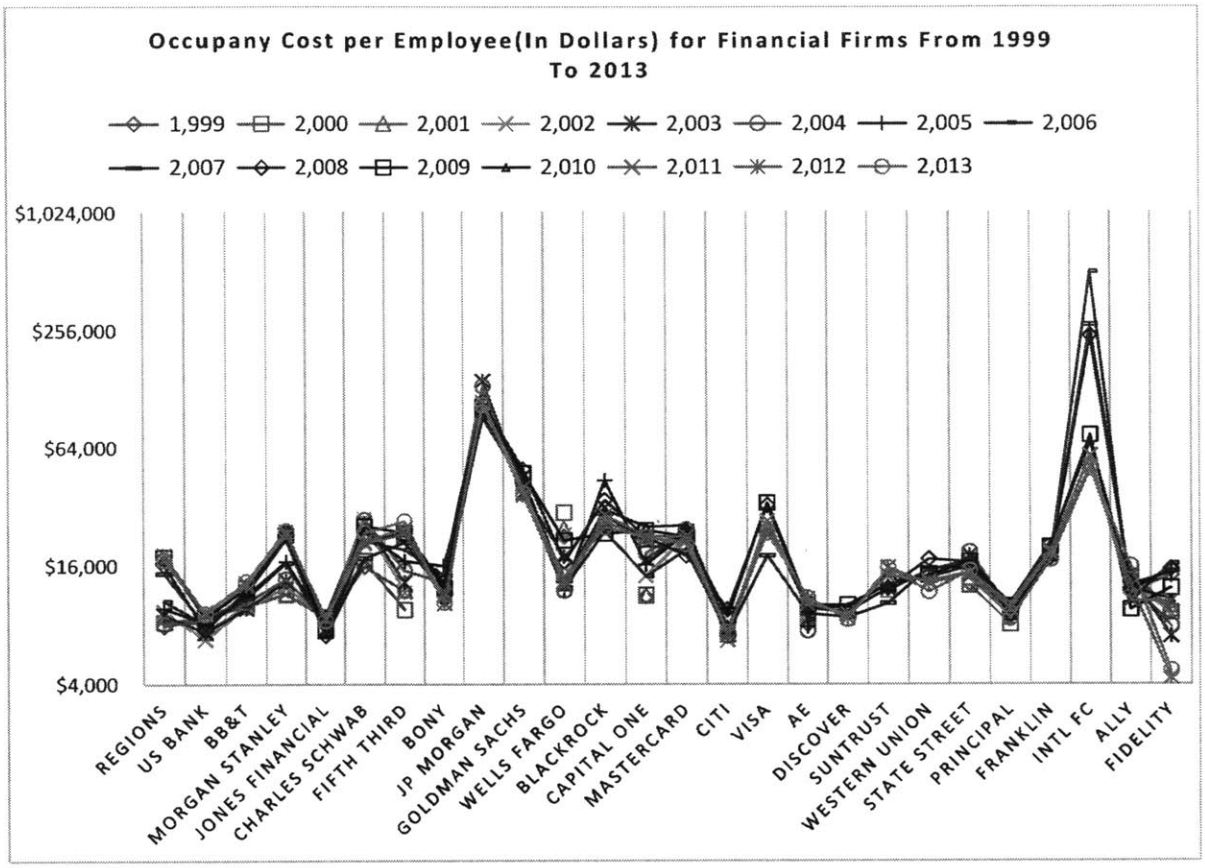

Exhibit 3: Occupancy Cost per Employee for Financial Firms (In Logarithmic Scale, Base 4).

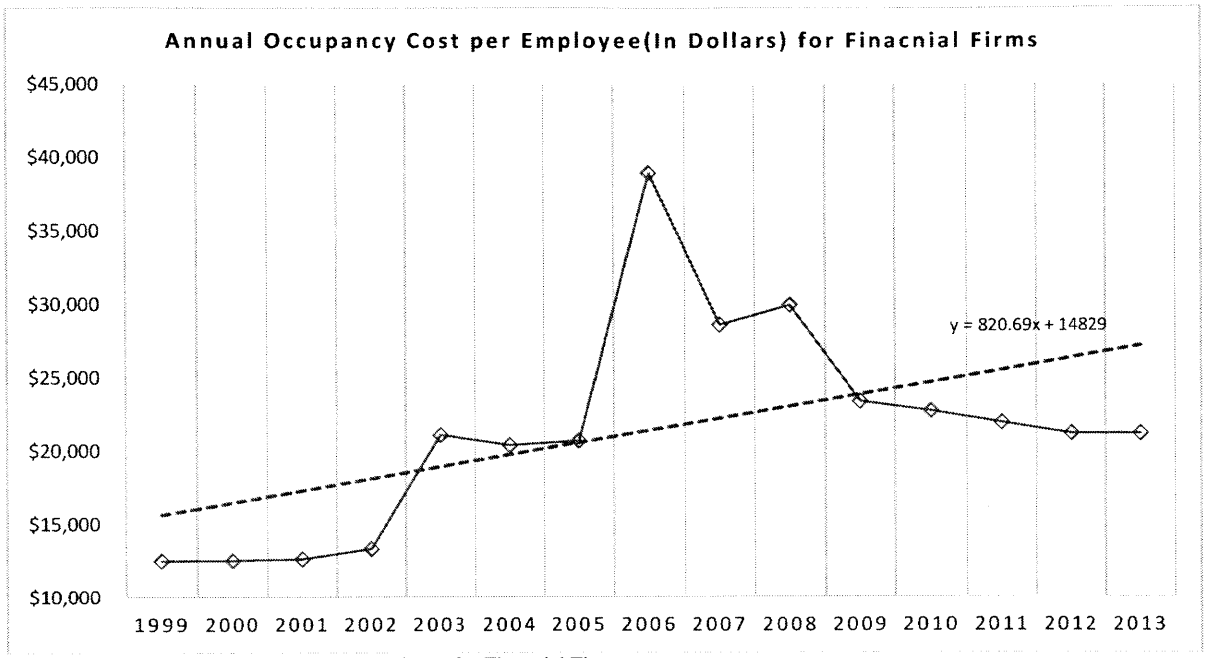

Exhibit 4: Annul Occupancy Cost per Employee for Financial Firms.

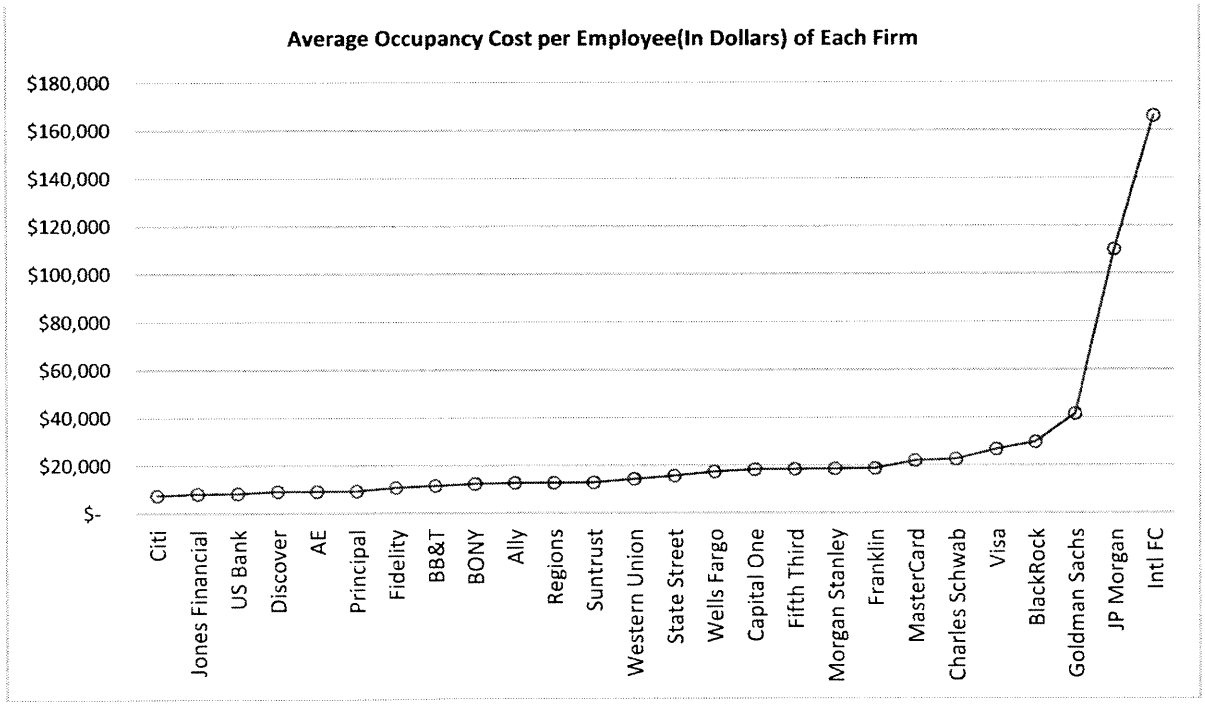

Exhibit 5: Occupancy Cost per Employee of Each Firm.

2.2.2 Technology Firms

Same method examining volatility is applied to the sampled technology firms. To analyze the volatility of occupancy costs per employee, we study the average of each firm from 1999 to 2013, the average of each year within firms, and the yearly occupancy costs per employee for each firm.

Among the technology firms, there is greater variation in occupancy costs among the technology firms than that of the financial firms, as illustrated in Exhibit 6. However, there is no apparent outliers when measuring the volatility of each firm because the yearly change is relatively stable. Therefore, we maintain all the technology firms for our subsequent regressions.

An upward trend across time is observed here in Exhibit 7 by calculating the yearly average of occupancy costs per employee of all technology firms. With two distinct peaks in 2003 and 2009, average occupancy cost per employee of technology sector is clearly not affected as much by the 2008 financial crisis. From 1999 to 2013, the technology sector undergone rapid development phase with further development of the cloud system and its related services.

When taking an average of each firm's occupancy costs per employee from 1999 to 2013, we can observe that 84% of firms' average occupancy cost per employee are under $20,000. On the other hand, Apple, Micron and Intel are above $20,000 and they make up the remaining 16% as shown in Exhibit 8.

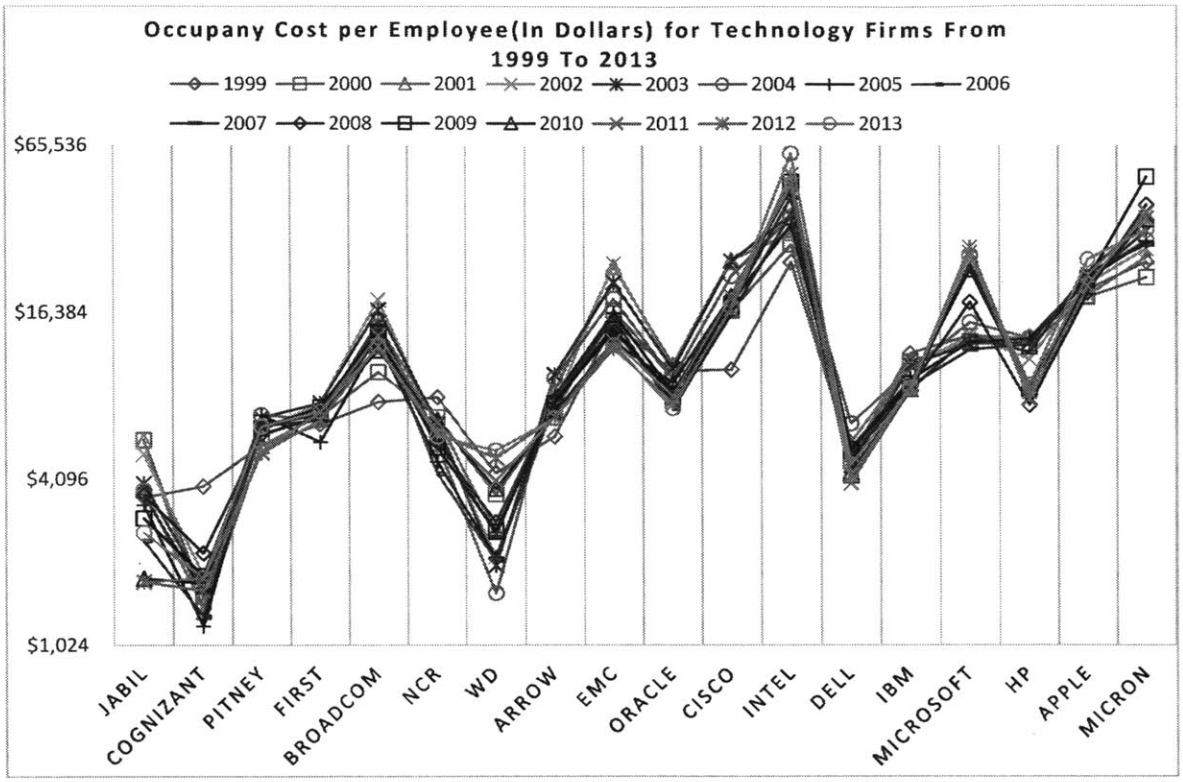

Exhibit 6: Occupancy Cost per Employee for Technology Firms (In Logarithmic Scale, Base 4).

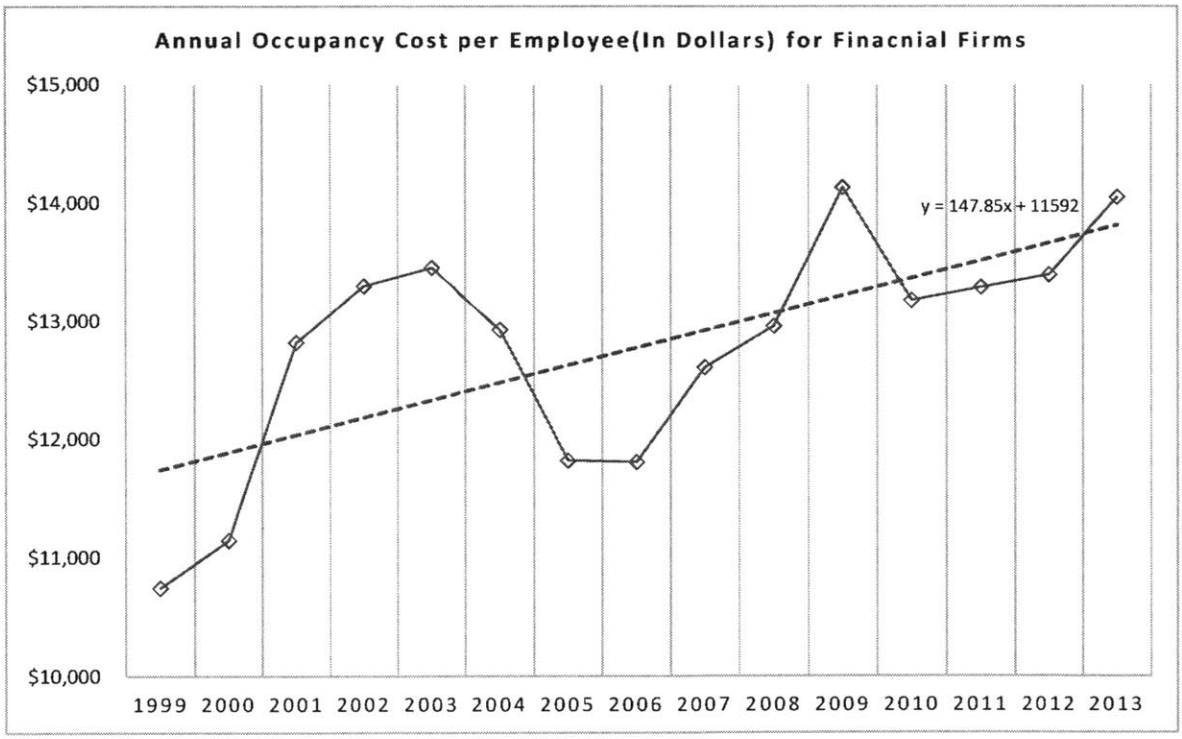

Exhibit 7: Annul Occupancy Cost per Employee for Technology Firms.

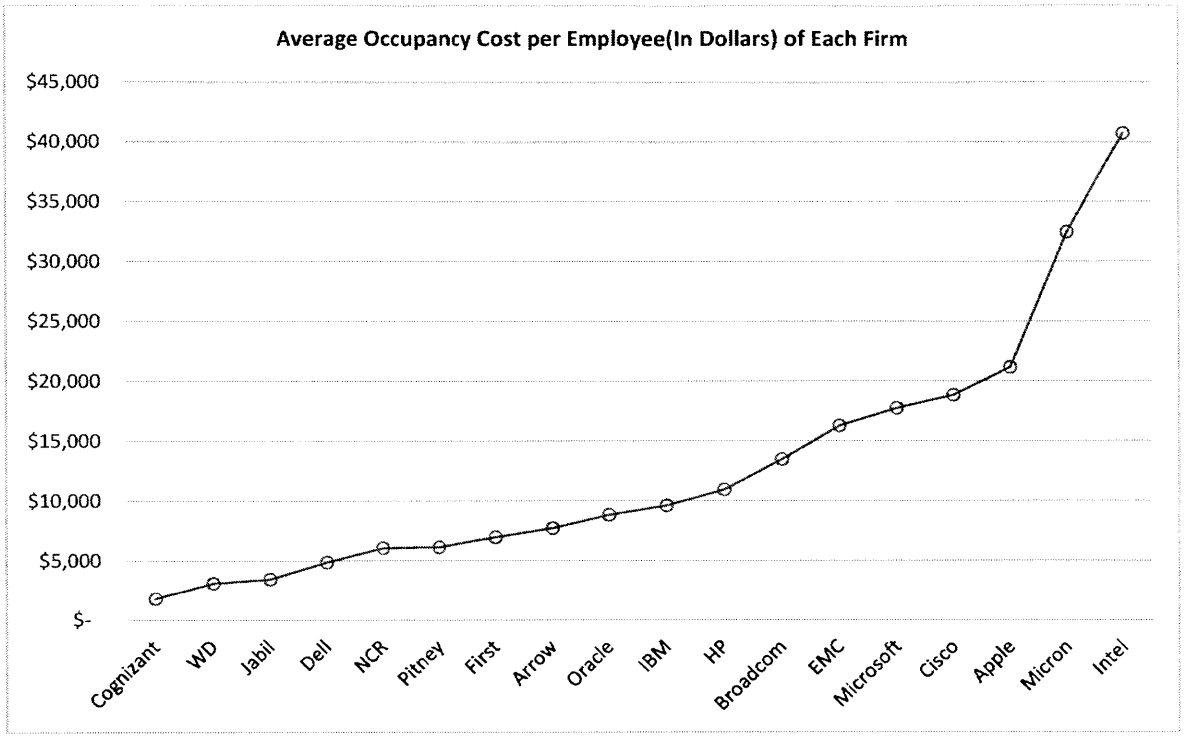

Exhibit 8: Occupancy Cost per Employee of Each Firm.

Chapter 3

Share Price, Occupancy Costs per Employee, and Net Income

Share price is often an indication of the market perception on a company's performance. From 1999 to 2013, the share prices of financial and technology firms are greatly affected by different events, including the 2001 dot-com bubble and 2008 financial crisis. The Dow Jones U.S. Financial Index, as shown in Exhibit 9, illustrates that share prices of financial firms are less affected by the dot-come bubble but plunges during 2008. The financial firms are recovering from the 2008 event, however their share prices are still 40% less than their peaks in 2007. Technology firms, on the other hand, experience deep dive in share prices in 2001 as shown in the Dow Jones U.S. Technology Index in Exhibit 10. Since then, their share prices are growing steadily, although they plummet temporarily in 2008 as a result of the financial crisis.

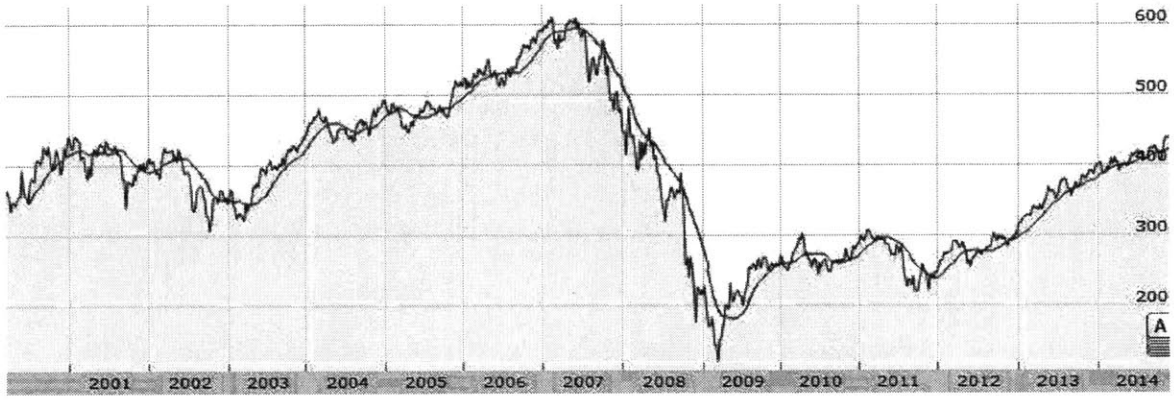

Exhibit 9: Dow Jones U.S. Financial Index 1999 – 2014.

Source: Google Finance.

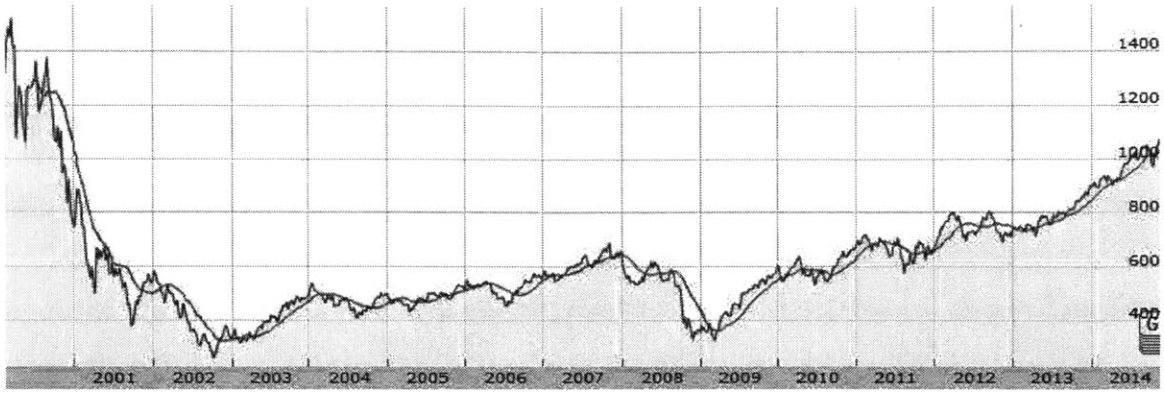

Exhibit 10: Dow Jones U.S. Technology Index 1999 – 2014

Source: Google Finance.

Investors often view the net income of a company as a reflection of its performance. We compare the average share prices and average net income per employee of the sampled firms. Exhibit 11 shows a strongly correlated pattern between the two for 26 sampled Fortune 500 financial firms. In addition, Exhibit 12 shows an overall correlated pattern between the average share prices and average net income for 18 sampled Fortune 500 technology firms. However, the correlation here is not as strong as that of the sampled financial firms. Nonetheless, our analysis indicates that the share prices is affected positively by the net income generated per employee.

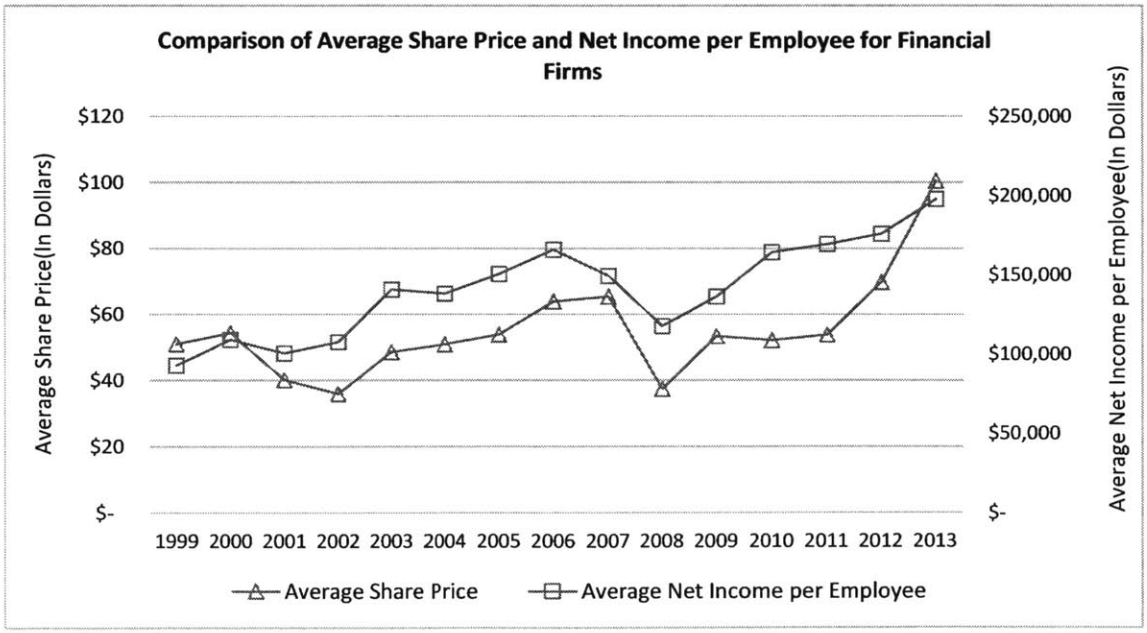

Exhibit 11: Comparison of Average Share Price and Net Income per Employee for 26 sampled Financial Firms, 1999 - 2013

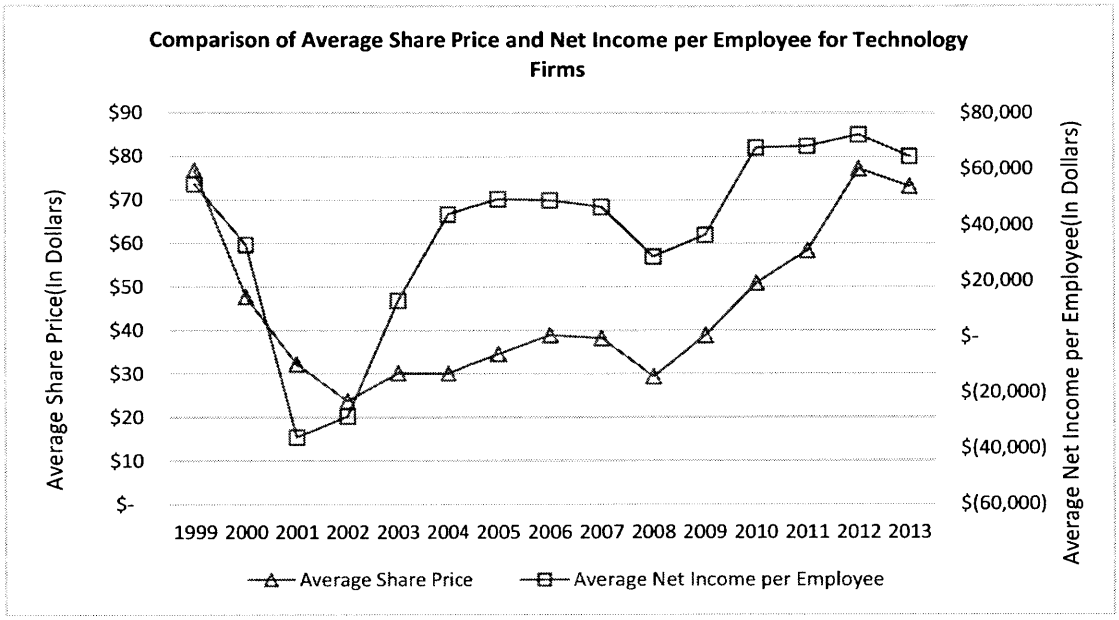

Exhibit 12: Comparison of Average Share Price and Net Income per Employee for 18 sampled Technology Firms, 1999 – 2013

Occupancy costs, as explained in great details in Chapter 2, is an inevitable corporate real estate expense that affects the bottom line of a company. It has huge impact on the net income and potentially the share price of a company. In this chapter, we analyze how share price is affected by occupancy costs per employee and net income. Firstly, linear regression models are set up separately for the sampled financial and technology firms. Then separate regressions are performed by controlling the time and firm factors with the inclusion of dummy variables. Furthermore, we attempt to explain the similarities and differences between the two sectors.

3.1 Correlation between Share Price, Occupancy Costs per Employee and Net Income

A series of linear regressions are performed separately for both financial and technology firms. The first regression includes both years and firms as dummy variables to study the relationship between share price, occupancy cost per employee and net income while controlling for years and firms factor. The second regression includes the firm factor as the dummy variable to study the above relationship across time. Finally, the third regression controls the year factor to study the correlation across firms.

3.1.1 Financial Firms

23 U.S. Fortune 500 financial firms are included in our data sample. After adjusting for volatility of occupancy cost per employee, International Financial Corporation is excluded from subsequent calculation. In addition, due to data unavailability, 289 observations from 22 financial firms are used in our linear regressions. As previously mentioned, the first regression includes fiscal years and firms as dummy variables as shown in equation below:

$$P_{SF} = \alpha + \frac{C_{ODF}}{E_F} + I_F + D_F + D_Y \qquad (6)$$

where:

P_{SF} = Share prices of financial firms

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_F = Dummy for firms

D_Y = Dummy for years

The regression results is indicated below in Exhibit 13. Between share price and net income, when controlling for firm and year influence, the intercept coefficient is positive. The T-stat value is 2.18 and P-stat value is 0.03, indicating a significant positive correlation. In contrast, a negative and insignificant correlation between share price and occupancy costs per employee can be observed from the regression results, with a P-stat value of 0.481.

Source	SS	df	MS
Model	412857.841	37	11158.32
Residual	127664.261	251	508.622553
Total	540522.102	288	1876.81286

Number of obs	= 289
F(37, 251)	= 21.94
Prob > F	= 0.0000
R-squared	= 0.7638
Adj R-squared	= 0.7290
Root MSE	= 22.553

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	9.01e-10	4.14e-10	2.18	0.030	8.57e-11	1.72e-09
occupancyperemployee	-.0000285	.0000404	-0.71	0.481	-.0001082	.0000511
capitalone	29.09106	7.743721	3.76	0.000	13.84012	44.34201
regionsfinancial	-4.229956	7.775376	-0.54	0.587	-19.54325	11.08334
usbank	-.6015392	7.94689	-0.08	0.940	-16.25262	15.04955
jpmorgan	8.681837	9.978509	0.87	0.385	-10.97044	28.33411
bbt	4.450075	7.93168	0.56	0.575	-11.17105	20.0712
morganstanley	-4.556962	13.41274	-0.34	0.734	-30.97282	21.85889
charlesschwab	-7.539998	7.684438	-0.98	0.327	-22.67419	7.594197
fifththirdbancorp	4.351156	8.224205	0.53	0.597	-11.84609	20.5484
bony	6.558674	8.857499	0.74	0.460	-10.88582	24.00317
goldmansachs	110.6066	8.762452	12.62	0.000	93.34934	127.8639
wellsfargo	7.780982	8.580049	0.91	0.365	-9.117083	24.67905
blackrock	165.3364	9.032097	18.31	0.000	147.5481	183.1248
citi	1.504053	9.072812	0.17	0.868	-16.36449	19.37259
visa	93.29815	10.56324	8.83	0.000	72.49427	114.102
ae	28.4003	7.915452	3.59	0.000	12.81113	43.98947
discover	2.664666	10.0586	0.26	0.791	-17.14535	22.47468
suntrust	24.7084	7.944321	3.11	0.002	9.062373	40.35442
westernunion	-5.254065	9.539642	-0.55	0.582	-24.04201	13.53388
statestreet	32.32565	7.752012	4.17	0.000	17.05837	47.59293
principal	12.63762	8.159036	1.55	0.123	-3.431273	28.70652
franklin	48.36883	7.724762	6.26	0.000	33.15522	63.58244
y1999	-2.080861	8.529244	-0.24	0.807	-18.87887	14.71715
y2000	-.2764854	8.031578	-0.03	0.973	-16.09436	15.54139
y2001	-13.90007	7.670023	-1.81	0.071	-29.00588	1.205734
y2002	-18.26435	7.660629	-2.38	0.018	-33.35165	-3.177042
y2003	-11.53382	7.365945	-1.57	0.119	-26.04076	2.973115
y2004	-8.680744	7.222858	-1.20	0.231	-22.90588	5.544386
y2005	-14.21461	7.057026	-2.01	0.045	-28.11314	-.3160763
y2006	-3.035426	6.883774	-0.44	0.660	-16.59275	10.52189
y2007	-5.115992	6.78428	-0.75	0.451	-18.47736	8.245378
y2008	-30.96668	6.967317	-4.44	0.000	-44.68853	-17.24482
y2009	-21.51684	6.741715	-3.19	0.002	-34.79438	-8.239303
y2010	-22.75548	6.670767	-3.41	0.001	-35.89328	-9.617666
y2011	-27.83788	6.658533	-4.18	0.000	-40.9516	-14.72416
y2012	-16.45221	6.657302	-2.47	0.014	-29.5635	-3.340921
_cons	39.23207	7.032406	5.58	0.000	25.38202	53.08211

Exhibit 13: Regression results from equation (6).

Controlling for firm factor, the second regression studies the correlation of share price, net income, and occupancy costs per employee across time. The regression equation is set up as follows:

$$P_{SF} = \alpha + \frac{C_{ODF}}{E_F} + I_F + D_F \quad (7)$$

where:

P_{SF} = Share prices of financial firms

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_F = Dummy for firms

The regression results is displayed below in Exhibit 14. Controlling for firm factor, the results indicate that within firms across time share price is positively correlated to net income. The T-stat value is 3.1 and the P-stat value is 0.002. Occupancy costs per employee has insignificant correlation with share price.

Source	SS	df	MS
Model	385967.065	23	16781.1767
Residual	154555.037	265	583.226556
Total	540522.102	288	1876.81286

Number of obs	= 289
F(23, 265)	= 28.77
Prob > F	= 0.0000
R-squared	= 0.7141
Adj R-squared	= 0.6892
Root MSE	= 24.15

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	1.27e-09	4.09e-10	3.10	0.002	4.61e-10	2.07e-09
occupancyperemployee	-.0000259	.0000426	-0.61	0.543	-.0001097	.0000579
capitalone	29.68471	8.27213	3.59	0.000	13.39725	45.97217
regionsfinancial	-3.07051	8.314803	-0.37	0.712	-19.44199	13.30097
usbank	-.6821867	8.466956	-0.08	0.936	-17.35325	15.98888
jpmorgan	3.29242	10.46928	0.31	0.753	-17.32114	23.90598
bbt	4.271376	8.446978	0.51	0.614	-12.36036	20.90311
morganstanley	-13.82538	13.61239	-1.02	0.311	-40.62757	12.97682
charlesschwab	-6.638103	8.215119	-0.81	0.420	-22.81331	9.537106
fifththirdbancorp	2.976301	8.694354	0.34	0.732	-14.1425	20.0951
bony	5.159225	9.433213	0.55	0.585	-13.41436	23.73281
goldmansachs	107.6062	9.305859	11.56	0.000	89.28335	125.929
wellsfargo	5.628062	9.018441	0.62	0.533	-12.12885	23.38498
blackrock	163.3298	9.621656	16.98	0.000	144.3851	182.2744
citi	-2.719588	9.553283	-0.28	0.776	-21.52959	16.09041
visa	86.63949	11.22513	7.72	0.000	64.53769	108.7413
ae	28.43225	8.437763	3.37	0.001	11.81866	45.04584
discover	-1.353673	10.69842	-0.13	0.899	-22.4184	19.71105
suntrust	24.72547	8.483322	2.91	0.004	8.022179	41.42876
westernunion	-7.226052	10.14418	-0.71	0.477	-27.19949	12.74739
statestreet	33.1712	8.285963	4.00	0.000	16.8565	49.4859
principal	11.77983	8.704864	1.35	0.177	-5.35967	28.91932
franklin	49.15841	8.256063	5.95	0.000	32.90258	65.41424
_cons	24.86669	5.741761	4.33	0.000	13.56141	36.17196

Exhibit 14: Regression results from equation (7).

Finally, the third linear regression is performed by including only year dummy variable from 1999 to 2013:

$$P_{SF} = \alpha + \frac{C_{ODF}}{E_F} + I_F + D_Y \qquad (8)$$

where:

P_{SF} = Share prices of financial firms

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_Y = Dummy for years

The regression results are shown in Exhibit 15 below. The P-stat values of net income and occupancy costs per employee are 0.684 and 0.962 respectively, indicating that their impact on share price is insignificant when controlling for the time factor when compared across firms. This is due to the fact that there are too many variables when comparing the occupancy costs per employee and net income across firms, since these firms differ in scale, organization structure, and corporate real estate strategies. In addition, the impact of occupancy costs per employee to share price is insignificant across all three regressions results of equations (6) to (8).

Source	SS	df	MS
Model	28433.0228	16	1777.06392
Residual	512089.08	272	1882.68044
Total	540522.102	288	1876.81286

Number of obs	= 289
F(16, 272)	= 0.94
Prob > F	= 0.5193
R-squared	= 0.0526
Adj R-squared	= -0.0031
Root MSE	= 43.39

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	1.52e-10	3.74e-10	0.41	0.684	-5.85e-10	8.89e-10
occupancyperemployee	3.09e-06	.0000644	0.05	0.962	-.0001237	.0001299
y1999	-16.82015	16.01958	-1.05	0.295	-48.35828	14.71798
y2000	-13.79613	15.09857	-0.91	0.362	-43.52104	15.92878
y2001	-28.02586	14.44209	-1.94	0.053	-56.45836	.4066321
y2002	-32.29619	14.43826	-2.24	0.026	-60.72114	-3.871236
y2003	-19.72234	13.89353	-1.42	0.157	-47.07486	7.630175
y2004	-17.38569	13.66888	-1.27	0.204	-44.29594	9.524561
y2005	-14.49451	13.45521	-1.08	0.282	-40.98411	11.99509
y2006	-6.276185	13.16631	-0.48	0.634	-32.19701	19.64464
y2007	-9.763807	12.96905	-0.75	0.452	-35.29628	15.76867
y2008	-34.99827	12.95004	-2.70	0.007	-60.49332	-9.503212
y2009	-23.59998	12.83573	-1.84	0.067	-48.86998	1.670017
y2010	-23.7471	12.80423	-1.85	0.065	-48.95509	1.460883
y2011	-28.46163	12.79863	-2.22	0.027	-53.6586	-3.264658
y2012	-17.00324	12.79791	-1.33	0.185	-42.19879	8.192312
_cons	67.53236	9.437317	7.16	0.000	48.95288	86.11183

Exhibit 15: Regression results from equation (8).

3.1.2 Technology Firms

Same steps mentioned above are applied to the technology firms to study the correlation among firm's share price, net income, and occupancy costs per employee. 255 observations from 18 technology firms are included in our linear regressions. As mentioned, the first regression includes years 1999 to 2013 and firms as dummy variables. The equation shown below:

$$P_{ST} = \alpha + \frac{C_{ODT}}{E_T} + I_T + D_F + D_Y \quad (9)$$

where:

P_{ST} = Share prices of technology firms

α = Coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_F = Dummy for firms

D_Y = Dummy for years

The regression results in Exhibit 16 indicate a significant positive correlation between share price and net income, with P-stat value 0.000. This aligns with the results with that of the financial firms. Contrary to the financial firms, the regression results for the technology firms display a significant negative correlation between share price and occupancy costs per employee, with P-stat value 0.001.

Source	SS	df	MS
Model	868545.577	32	27142.0493
Residual	232266.473	222	1046.24537
Total	1100812.05	254	4333.90571

Number of obs	= 255
F(32, 222)	= 25.94
Prob > F	= 0.0000
R-squared	= 0.7890
Adj R-squared	= 0.7586
Root MSE	= 32.346

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	.0106434	.0005555	19.16	0.000	.0095486	.0117382
occupancyperemployee	-.0019933	.0005868	-3.40	0.001	-.0031497	-.000837
jabil	-59.24989	20.74912	-2.86	0.005	-100.1403	-18.35946
cognizant	-30.89467	21.56219	-1.43	0.153	-73.38743	11.59809
pitney	-46.92086	19.49261	-2.41	0.017	-85.33509	-8.506643
broadcom	-4.184023	16.24861	-0.26	0.797	-36.20527	27.83723
ncr	-47.99286	19.51151	-2.46	0.015	-86.44434	-9.541384
wd	-60.65739	20.93232	-2.90	0.004	-101.9089	-19.40591
arrow	-43.36625	18.73711	-2.31	0.022	-80.29162	-6.44088
emc	-43.87166	15.23601	-2.88	0.004	-73.89738	-13.84594
oracle	-105.5589	18.71733	-5.64	0.000	-142.4453	-68.67252
cisco	-86.4658	14.7764	-5.85	0.000	-115.5858	-57.34584
intel	-57.71376	13.29962	-4.34	0.000	-83.92342	-31.50411
dell	-78.15842	20.20841	-3.87	0.000	-117.9833	-38.33355
ibm	-61.93345	19.22123	-3.22	0.001	-99.81287	-24.05402
microsoft	-162.0464	16.89165	-9.59	0.000	-195.3349	-128.7579
hp	-69.92422	17.55158	-3.98	0.000	-104.5132	-35.33519
apple	29.32017	14.76865	1.99	0.048	.2154768	58.42486
y1999	47.30611	11.5437	4.10	0.000	24.55685	70.05538
y2000	19.03659	11.50858	1.65	0.100	-3.643462	41.71663
y2001	19.33095	11.57462	1.67	0.096	-3.479235	42.14113
y2002	13.29634	11.59015	1.15	0.253	-9.544446	36.13713
y2003	9.586457	11.44342	0.84	0.403	-12.96517	32.13809
y2004	4.371838	11.40063	0.38	0.702	-18.09548	26.83915
y2005	2.28756	11.39815	0.20	0.841	-20.17487	24.74999
y2006	2.37869	11.36391	0.21	0.834	-20.01625	24.77363
y2007	-1.663272	11.27657	-0.15	0.883	-23.88609	20.55954
y2008	-10.89453	11.25578	-0.97	0.334	-33.07638	11.28732
y2009	-.4335284	11.23385	-0.04	0.969	-22.57217	21.70511
y2010	-9.168118	11.13177	-0.82	0.411	-31.10557	12.76933
y2011	-7.814567	11.11181	-0.70	0.483	-29.71269	14.08355
y2012	9.377976	11.10576	0.84	0.399	-12.50822	31.26417
_cons	81.35684	22.75654	3.58	0.000	36.51036	126.2033

Exhibit 16: Regression results from equation (9).

Second regression is performed by controlling for the firm factor to study the correlation of share price, net income, and occupancy costs per employee across time:

$$P_{ST} = \alpha + \frac{C_{ODT}}{E_T} + I_T + D_F \qquad (10)$$

where:

P_{ST} = Share prices of technology firms

α = Intercept coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_F = Dummy for firms

The results of regression equation (10) in Exhibit 17 below shows similar results as those of regression equation (9). There is strong correlation between share price, net income, and occupancy costs per employee, with a P-stat values of 0.000. The result suggests that within firms across time, occupancy cost per employee reduces share prices by 0.0025 per dollar of cost per employee.

Source	SS	df	MS
Model	821313.694	18	45628.5386
Residual	279498.356	236	1184.31507
Total	1100812.05	254	4333.90571

Number of obs	= 255
F(18, 236)	= 38.53
Prob > F	= 0.0000
R-squared	= 0.7461
Adj R-squared	= 0.7267
Root MSE	= 34.414

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	.0098963	.0005292	18.70	0.000	.0088538	.0109388
occupancyperemployee	-.0025337	.000603	-4.20	0.000	-.0037216	-.0013458
jabil	-74.75787	21.57353	-3.47	0.001	-117.2592	-32.25657
cognizant	-47.07297	22.4045	-2.10	0.037	-91.21132	-2.934609
pitney	-60.74499	20.30254	-2.99	0.003	-100.7424	-20.74763
broadcom	-14.43947	17.01222	-0.85	0.397	-47.95468	19.07574
ncr	-62.00666	20.31867	-3.05	0.003	-102.0358	-21.97752
wd	-75.97395	21.7672	-3.49	0.001	-118.8568	-33.09111
arrow	-56.50133	19.5329	-2.89	0.004	-94.98245	-18.0202
emc	-51.49567	16.00699	-3.22	0.001	-83.03052	-19.96082
oracle	-114.0333	19.553	-5.83	0.000	-152.5541	-75.5126
cisco	-89.50998	15.54128	-5.76	0.000	-120.1273	-58.89263
intel	-47.63038	13.90251	-3.43	0.001	-75.01927	-20.2415
dell	-91.18693	21.05354	-4.33	0.000	-132.6638	-49.71005
ibm	-66.25789	20.03403	-3.31	0.001	-105.7263	-26.78952
microsoft	-159.6486	17.54993	-9.10	0.000	-194.2232	-125.0741
hp	-78.81434	18.363	-4.29	0.000	-114.9907	-42.63799
apple	30.37922	15.46975	1.96	0.051	-.097221	60.85567
_cons	105.2566	21.51498	4.89	0.000	62.87069	147.6426

Exhibit 17: Regression results from equation (10).

Finally we control the time factor and studied the correlation of share price, net income, and occupancy costs per employee across firms. The third regression is set up as follows:

$$P_{ST} = \alpha + \frac{C_{ODT}}{E_T} + I_T + D_T \qquad (11)$$

where:

P_{ST} = Share prices of technology firms

α = Intercept coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_T = Dummy for years

The regression results indicate that the correlation we observed above is still significant across firms when controlling for the time factor. The result suggests that between firms, occupancy cost per employee reduces share prices by approximately 0.001 per dollar of cost per employee.

Source	SS	df	MS
Model	504762.698	16	31547.6686
Residual	596049.352	238	2504.40904
Total	1100812.05	254	4333.90571

Number of obs	= 255
F(16, 238)	= 12.60
Prob > F	= 0.0000
R-squared	= 0.4585
Adj R-squared	= 0.4221
Root MSE	= 50.044

shareprice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netincome	.0075875	.0005814	13.05	0.000	.0064421	.0087328
occupancyperemployee	-.0009788	.000299	-3.27	0.001	-.0015678	-.0003899
y1999	36.27294	17.37141	2.09	0.038	2.051581	70.49431
y2000	7.622004	17.36936	0.44	0.661	-26.59531	41.83932
y2001	2.60976	17.48757	0.15	0.881	-31.84044	37.05996
y2002	-4.350413	17.50949	-0.25	0.804	-38.84378	30.14295
y2003	-5.204984	17.4071	-0.30	0.765	-39.49665	29.08668
y2004	-8.721667	17.36675	-0.50	0.616	-42.93385	25.49051
y2005	-8.444474	17.32934	-0.49	0.626	-42.58296	25.69401
y2006	-7.091578	17.30154	-0.41	0.682	-41.17529	26.99213
y2007	-10.5763	17.27076	-0.61	0.541	-44.59938	23.44677
y2008	-19.85286	17.26517	-1.15	0.251	-53.86493	14.15921
y2009	-10.18707	17.26416	-0.59	0.556	-44.19714	23.82301
y2010	-12.53014	17.18299	-0.73	0.467	-46.38031	21.32002
y2011	-9.462479	17.17121	-0.55	0.582	-43.28945	24.36449
y2012	8.125622	17.16885	0.47	0.636	-25.69669	41.94794
_cons	33.63629	13.15381	2.56	0.011	7.723516	59.54905

Exhibit 18: Regression results from equation (11).

3.2 Explanation of similarities and differences between two sectors

The regression results above confirmed that share price and net income are positively correlated and the correlation is significant for both financial and technology firms. Investors for both sectors regard net income as key indicator to firm performances. Therefore when the net income increases, the market generally recognizes the firm performance by valuing the share price higher. This aligns with our initial observation at the beginning of the Chapter when we compare the pattern of average share price with average net income per employee for the sampled firms from 1999 to 2013, as shown in Exhibit 11 and 12.

On the other hand, the share price and occupancy costs per employee are negatively correlated for both sectors. This aligns with the research by Rodriguez and Sirmans (1996), indicating that investors generally react positively to real estate divestments and punish the stocks of company acquiring additional real estates, especially the nature and duration of corporate real estate render decisions non-easily reversible. Investment in corporate real estate signals to the market that alternative investment opportunities with potential higher returns are forgone. As previously mentioned, most CRE falls under the operational category thereby supporting firms to achieve normal, or temporary above-normal profit. The CRE strategy of our sampled financial and technology firms also fall under the operational category instead of the strategic CRE category where firms could create market inefficiency or asymmetry to deter other firms within the same industry from competition (Park and Glascock 2009).

All of the sampled financial firms are well established in the industry and their performances and innovation in financial products are not highly dependent on their corporate real estate strategies. Although the location of the firm headquarter, in metropolises like New York City or San Francisco, may have a prestigious effect on the company image. However, there is no quantitative evidence that indicates the quality of the workplace, area, design and its environment have any impact on the overall performance of employees.

The key difference between the regression results of financial and technology firms is that the correlation between share price and occupancy costs per employee is insignificant for financial firms but very significant for technology firms. The share price of a company is made up of the Present Values (PV) of estimated dividends and Present Value Growth Opportunities (PVGO). Financial firms have a smaller PVGO when compared to that of technology firms and

investors do not consider the occupancy costs per employee having much of an impact on the firms' future performance. Therefore the occupancy costs per employee for financial firms do not affect the share price significantly.

In contrast, the regression results suggest that investors of technology firms consider the occupancy costs per employee having a greater impact on their share prices. There is a substantial proportion of PVGO within the share price of technology firms. PVGO in this case is highly dependent on continual innovation of existing products and the ability to provide new services. In order for innovation to happen, technology companies need to promote conducive working environment for ongoing research and development (R&D), manufacturing, product testing. By doing so, they achieve normal or temporary above-normal profits. However, our sampled technology firms do not implement strategic CRE to create market asymmetry to deter competitors from making profit. Their investment in real estate is speculative rather than strategic.

According to an article Frothy.com published on December 20, 2014 on *The Economist*, "Together, Apple, Amazon, Facebook, Google and Twitter invested $66 billion in the past 12 months. This figure includes capital spending, research and development, fixed assets acquired with leases and cash used for acquisitions." "Google says it is determined to keep "investing ahead of the curve." "Big firms are also making speculative bets, to add new products and insure themselves against technological change." These technology firms are making huge "speculative bets", and consequently, for technology firms, the corporate real estate strategies and occupancy costs per employee are significantly and negatively correlated to the share price.

The regression results also suggest that between technology firms, occupancy cost per employee reduces share prices by approximately 0.001 per dollar of cost per employee. In contrast, within firms across time, occupancy cost per employee reduces share prices by 0.0025 per dollar of cost per employee.

Chapter 4

Occupancy Costs per Employee and Net Income per Employee

4.1 Correlation between Net Income per Employee and Occupancy Costs per Employee

As mentioned in previous chapters, occupancy costs is often the second largest expense on the income statement. It reduces the net income for a company significantly. Normally the investors perceive an increase in corporate real estate expense as a direct reduction to desirable investment opportunity. In order to gain an overall understanding of the relationship between net income and occupancy costs per employee, we take the industry averages and compare the sampled net income and occupancy costs data from year 1999 to 2013.

For the sampled financial firms, there is clearly a positive relationship between the average net income and occupancy costs per employee from 1999 to 2006 as shown in Exhibit 19. This leads us to believe that financial firms spend more on occupancy costs when their net income increase. There is a sharp increase in occupancy costs per employee in 2005 from 2006 and this coincides with the peak before the 2008 financial crisis. From 2006 to 2009, both net income and occupancy costs per employee decrease significantly. Although the net income of the sampled financial firms has been increasing since 2008, the occupancy costs per employee decreases gradually.

Similarly, we take the industry averages and compare the sampled net income and occupancy costs per employee for technology firms from 1999 to 2013. The results in Exhibit 20 shows a negative relationship between the two. Generally the average occupancy costs per employee reveals a more stable trend than that of the average net income per employee. The net income per employee plummet from 2000 to 2001, however, the occupancy costs per employee increase during the same period. The negative relationship leads us to believe that technology firms have a different corporate real estate strategy than that of the financial firms.

After gaining an overall understanding from above discussions, we factor in the number of employees as a common denominator to study the relationship between occupancy cost and net income for financial and technology firms. This approach eliminates the potential influences

due to the disparity in firm size. By adopting this method, we examine how much each employee generate for the company versus how much corporate real estate resource is allocated to each employee, and whether there is any correlation.

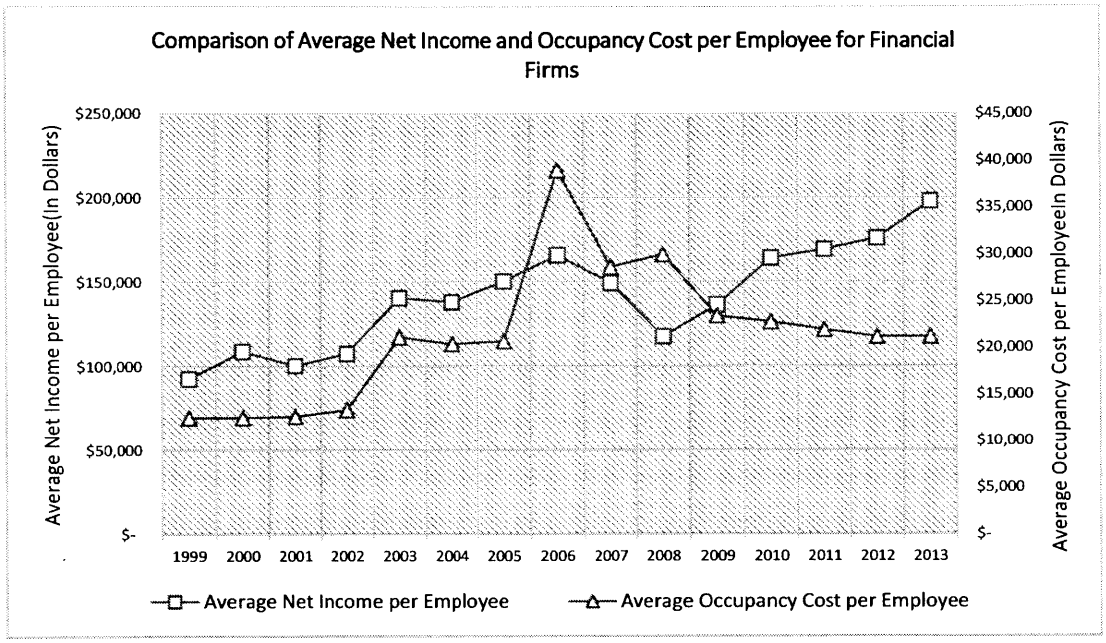

Exhibit 19: Comparison of Average Net Income and Occupancy Cost per Employee for 26 sampled Financial Firms, 1999 – 2013

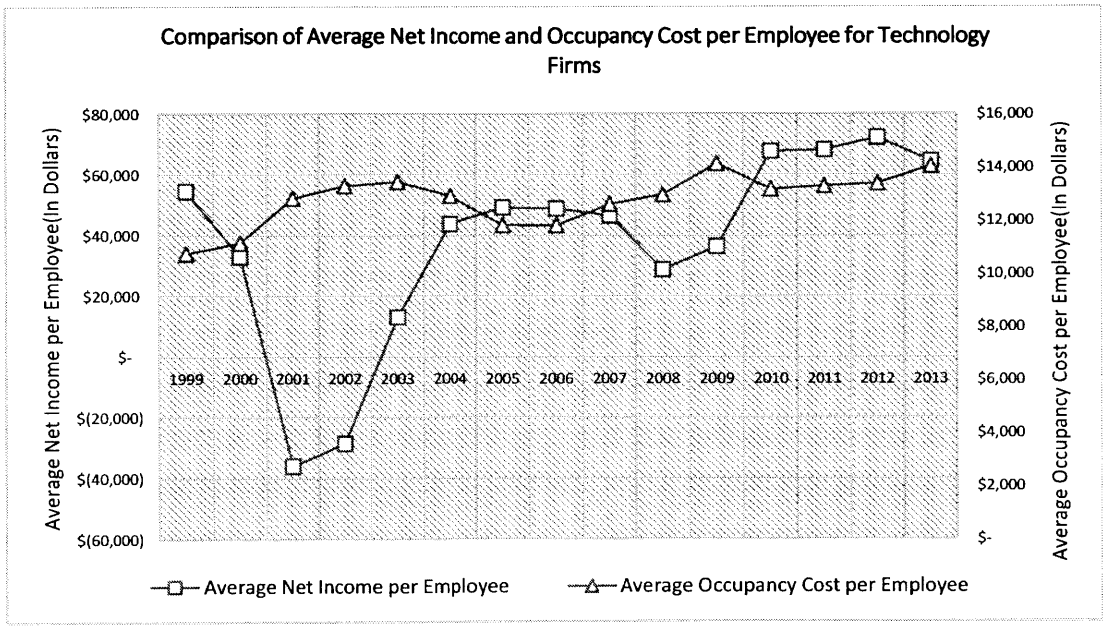

Exhibit 20: Comparison of Average Net Income and Occupancy Cost per Employee for 18 sampled Technology Firms, 1999 – 2013

4.1.1 Financial Firms

26 U.S. Fortune 500 financial firms are sampled. After adjusting for volatility, 325 observations from 25 financial firms are included in our linear regressions. The first regression includes fiscal years 1999 to 2013 and firms as dummy variables as shown below:

$$\frac{I_F}{E_F} = \alpha + \frac{C_{ODF}}{E_F} + D_F + D_Y \qquad (12)$$

where:

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_F = Dummy for firms

D_Y = Dummy for years

The results reveal that there is insignificant correlation between net income and occupancy costs for financial firms when factoring in the employee number. This is in contrast to the common belief that net income and real estate cost are negatively correlated. Details are specified below in Exhibit 21.

Second regression is performed by controlling for the firm factor to study the correlation of occupancy costs per employee and net income per employee across time:

$$\frac{I_F}{E_F} = \alpha + \frac{C_{ODF}}{E_F} + D_F \qquad (13)$$

where:

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_F = Dummy for firms

Second regression results in Exhibit 22 indicate that within firms across time the occupancy cost per employee has insignificant correlation with net income per employee.

Source	SS	df	MS
Model	7.4057e+12	39	1.8989e+11
Residual	1.5125e+12	285	5.3070e+09
Total	8.9182e+12	324	2.7525e+10

Number of obs	= 325
F(39, 285)	= 35.78
Prob > F	= 0.0000
R-squared	= 0.8304
Adj R-squared	= 0.8072
Root MSE	= 72849

netincomeperemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyperemployee	1.157776	1.067589	1.08	0.279	-.943583	3.259136
regionsfinancial	-6250.045	26732.86	-0.23	0.815	-58868.94	46368.85
usbank	52723.99	26614.95	1.98	0.049	337.1791	105110.8
bbt	120163.2	26647.92	4.51	0.000	67711.49	172614.9
morganstanley	445376.1	28875.22	15.42	0.000	388540.3	502211.8
jonesfinancial	86936.13	26641.32	3.26	0.001	34497.43	139374.8
charlesschwab	27402.96	29220.39	0.94	0.349	-30112.19	84918.11
fifththirdbancorp	327978	27923.99	11.75	0.000	273014.6	382941.4
bony	23183.53	30014.72	0.77	0.441	-35895.13	82262.19
jpmorgan	401170.6	109970.4	3.65	0.000	184713.3	617627.9
goldmansachs	176908.1	44090.85	4.01	0.000	90123.08	263693.1
wellsfargo	47693.05	28134.52	1.70	0.091	-7684.771	103070.9
blackrock	125369.4	34085.68	3.68	0.000	58277.77	192461
capitalone	36155.44	27971.87	1.29	0.197	-18902.22	91213.1
mastercard	128812.7	28737.22	4.48	0.000	72248.56	185376.8
citi	17840.43	27701.75	0.64	0.520	-36685.55	72366.4
visa	251370.5	35596.87	7.06	0.000	181304.4	321436.7
ae	30694.95	26603.46	1.15	0.250	-21669.24	83059.14
discover	98427.36	33892.32	2.90	0.004	31716.35	165138.4
suntrust	18775.91	27283.6	0.69	0.492	-34927.02	72478.84
westernunion	100578.4	32164.86	3.13	0.002	37267.57	163889.2
statestreet	18592.17	27239.51	0.68	0.495	-35023.97	72208.31
principal	30377.85	27199.41	1.12	0.265	-23159.36	83915.06
franklin	121246.3	27051.68	4.48	0.000	67999.84	174492.7
ally	418861	26701.12	15.69	0.000	366304.6	471417.5
y1999	-77576.43	25527.29	-3.04	0.003	-127822.4	-27330.49
y2000	-74669.2	23738.23	-3.15	0.002	-121393.7	-27944.7
y2001	-78067.31	23222.05	-3.36	0.001	-123775.8	-32358.82
y2002	-72456.96	22801.55	-3.18	0.002	-117337.8	-27576.16
y2003	-66499.18	22003.76	-3.02	0.003	-109809.7	-23188.68
y2004	-63643.55	21689.84	-2.93	0.004	-106336.2	-20950.94
y2005	-50907.59	21417.74	-2.38	0.018	-93064.61	-8750.58
y2006	-27187.73	21256.9	-1.28	0.202	-69028.17	14652.71
y2007	-46977.19	20683.56	-2.27	0.024	-87689.11	-6265.272
y2008	-89685.07	20633.71	-4.35	0.000	-130298.9	-49071.26
y2009	-66200.15	20628	-3.21	0.001	-106802.7	-25597.59
y2010	-35260.19	20613.07	-1.71	0.088	-75833.37	5312.986
y2011	-30997.58	20607.74	-1.50	0.134	-71560.27	9565.111
y2012	-22501.55	20605.04	-1.09	0.276	-63058.91	18055.81
_cons	60585.3	25507.88	2.38	0.018	10377.57	110793

Exhibit 21: Regression results from equation (12).

Source	SS	df	MS
Model	7.2065e+12	25	2.8826e+11
Residual	1.7117e+12	299	5.7248e+09
Total	8.9182e+12	324	2.7525e+10

Number of obs	= 325
F(25, 299)	= 50.35
Prob > F	= 0.0000
R-squared	= 0.8081
Adj R-squared	= 0.7920
Root MSE	= 75662

netincomeperemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyperemployee	1.373594	1.054254	1.30	0.194	-.701103	3.448292
regionsfinancial	-6786.471	27751.95	-0.24	0.807	-61400.36	47827.41
usbank	52899.19	27641.21	1.91	0.057	-1496.774	107295.2
bbt	119843.1	27672.17	4.33	0.000	65386.21	174300
morganstanley	445044.1	29848.86	14.91	0.000	386303.6	503784.6
jonesfinancial	87232.92	27665.97	3.15	0.002	32788.23	141677.6
charlesschwab	24958.42	30098.18	0.83	0.408	-34272.68	84189.53
fifththirdbancorp	326261	28873.13	11.30	0.000	269440.7	383081.3
bony	32740.05	31035.25	1.05	0.292	-28335.15	93815.24
jpmorgan	387672.5	109541.1	3.54	0.000	172103.3	603241.7
goldmansachs	178147.1	44883.74	3.97	0.000	89819.04	266475.1
wellsfargo	45840.86	29071.76	1.58	0.116	-11370.32	103052
blackrock	134776.6	35151.56	3.83	0.000	65600.77	203952.4
capitalone	34406.82	28918.29	1.19	0.235	-22502.34	91315.99
mastercard	133541.1	29781.26	4.48	0.000	74933.64	192148.5
citi	21502.5	28684.82	0.75	0.454	-34947.2	77952.21
visa	260659.8	36820.58	7.08	0.000	188199.5	333120.1
ae	30619.42	27630.42	1.11	0.269	-23755.31	84994.15
discover	110870.9	34755.28	3.19	0.002	42474.94	179266.8
suntrust	19829.39	28304.38	0.70	0.484	-35871.64	75530.43
westernunion	114271.7	33125.22	3.45	0.001	49083.56	179459.8
statestreet	17406.74	28228.3	0.62	0.538	-38144.56	72958.05
principal	32508.35	28188.71	1.15	0.250	-22965.05	87981.74
franklin	120252	28051.61	4.29	0.000	65048.45	175455.6
ally	418393.7	27722.13	15.09	0.000	363838.5	472948.9
_cons	5297.075	21382.76	0.25	0.805	-36782.69	47376.84

Exhibit 22: Regression results from equation (13).

Finally we control the time factor and study the correlation of net income per employee and occupancy costs per employee across firms. The results are shown in Exhibit 23. Third regression includes only dummy variable of years from 1999 to 2013 and is set up as follows:

$$\frac{I_F}{E_F} = \alpha + \frac{C_{ODF}}{E_F} + D_Y \qquad (14)$$

where:

α = Intercept coefficient

C_{ODF} = Derived occupancy costs for financial firms

E_F = Full-time employees of financial firms

I_F = Net Income of financial firms

D_Y = Dummy for years

When controlling for time, the occupancy costs per employee across firms have a positive impact on net income per employee. The regression results also indicate a significant positive correlation. Contrary to the common belief that net income and real estate cost are negatively correlated, this finding also raises the question whether or not the market should punish financial firms that allocate more of their resources to corporate real estate. After careful examination, we believe the results are due to reverse causality, which will be explained in detail later in this chapter.

Source	SS	df	MS
Model	2.4751e+12	15	1.6501e+11
Residual	6.4431e+12	309	2.0851e+10
Total	8.9182e+12	324	2.7525e+10

Number of obs	= 325
F(15, 309)	= 7.91
Prob > F	= 0.0000
R-squared	= 0.2775
Adj R-squared	= 0.2425
Root MSE	= 1.4e+05

netincomeperemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyperemployee	4.379484	.4305403	10.17	0.000	3.532322	5.226646
y1999	-76465.42	49503.03	-1.54	0.123	-173871.1	20940.26
y2000	-63729.06	46340.92	-1.38	0.170	-154912.7	27454.62
y2001	-73711.97	45496.17	-1.62	0.106	-163233.5	15809.52
y2002	-67438.05	44735.39	-1.51	0.133	-155462.6	20586.47
y2003	-68235.04	43321.67	-1.58	0.116	-153477.8	17007.76
y2004	-68288.21	42743.36	-1.60	0.111	-152393.1	15816.66
y2005	-53962.84	42212.01	-1.28	0.202	-137022.2	29096.49
y2006	-25527.69	41728.91	-0.61	0.541	-107636.4	56581.07
y2007	-41539.41	40849.01	-1.02	0.310	-121916.8	38838
y2008	-92973.46	40844.91	-2.28	0.024	-173342.8	-12604.11
y2009	-69144.17	40844.45	-1.69	0.091	-149512.6	11224.26
y2010	-37009.53	40843.22	-0.91	0.366	-117375.5	43356.48
y2011	-32027.14	40842.78	-0.78	0.434	-112392.3	48338.01
y2012	-22293.13	40842.56	-0.55	0.586	-102657.8	58071.58
_cons	127440.6	29873.19	4.27	0.000	68659.96	186221.2

Exhibit 23: Regression results from equation (14).

4.1.2 Technology Firms

The same steps mentioned above are applied to the technology firms to study the correlation between net income per employee and occupancy costs per employee. After adjusting for volatility, 270 observations from 15 technology firms are included in the linear regressions. As mentioned, the first regression includes fiscal years 1999 to 2013 and firms as dummy variables:

$$\frac{I_T}{E_T} = \alpha + \frac{C_{ODT}}{E_T} + D_F + D_Y \qquad (15)$$

where:

α = Intercept coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_F = Dummy for firms

D_Y = Dummy for years

Per results shown below in exhibit 24, there is insignificant correlation between net income per employee and occupancy cost per employee.

Second regression is performed by controlling for the firm factor to study the correlation of occupancy costs per employee and net income per employee across time:

$$\frac{I_T}{E_T} = \alpha + \frac{C_{ODT}}{E_T} + D_F \qquad (16)$$

where:

α = Intercept coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_F = Dummy for firms

Second regression results in Exhibit 25 indicate that within firms across time the

occupancy costs per employee has insignificant correlation with net income per employee.

Source	SS	df	MS
Model	1.5556e+12	32	4.8612e+10
Residual	2.1889e+12	237	9.2360e+09
Total	3.7445e+12	269	1.3920e+10

Number of obs	= 270
F(32, 237)	= 5.26
Prob > F	= 0.0000
R-squared	= 0.4154
Adj R-squared	= 0.3365
Root MSE	= 96104

netincomeemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyemployee	-1.861755	1.734129	-1.07	0.284	-5.278031	1.55452
jabil	-41394.76	61396.71	-0.67	0.501	-162347.7	79558.22
cognizant	-39985.51	63755.68	-0.63	0.531	-165585.7	85614.71
pitney	-24872.79	57648.97	-0.43	0.667	-138442.6	88697.06
first	-30518.15	56484.74	-0.54	0.590	-141794.4	80758.14
broadcom	-146536.9	48153.93	-3.04	0.003	-241401.3	-51672.51
ncr	-30897.24	57732.94	-0.54	0.593	-144632.5	82838.04
wd	-34298.69	61868.28	-0.55	0.580	-156180.7	87583.3
arrow	-22455.82	55454.35	-0.40	0.686	-131702.2	86790.58
emc	15996.45	44968.29	0.36	0.722	-72592.17	104585.1
oracle	39919.91	53997.39	0.74	0.460	-66456.25	146296.1
cisco	85090.24	42317.88	2.01	0.045	1723.011	168457.5
intel	108977.4	37884.98	2.88	0.004	34343.12	183611.8
dell	-305.0656	59394.65	-0.01	0.996	-117313.9	116703.8
ibm	-3680.469	52973.73	-0.07	0.945	-108040	100679.1
microsoft	169074.6	43420.66	3.89	0.000	83534.85	254614.3
hp	-9420.765	51262.9	-0.18	0.854	-110409.9	91568.39
apple	174440.1	40202.09	4.34	0.000	95241.05	253639.2
y1999	-16209.83	32543.3	-0.50	0.619	-80320.92	47901.26
y2000	-37056.2	32427.97	-1.14	0.254	-100940.1	26827.69
y2001	-102803.7	32105.56	-3.20	0.002	-166052.4	-39554.95
y2002	-94454.28	32061.17	-2.95	0.004	-157615.6	-31293.01
y2003	-52699.63	32051.48	-1.64	0.101	-115841.8	10442.55
y2004	-22790.19	32093.72	-0.71	0.478	-86015.59	40435.22
y2005	-19410.69	32267	-0.60	0.548	-82977.46	44156.07
y2006	-19868.88	32269.59	-0.62	0.539	-83440.76	43703
y2007	-20746.01	32131.72	-0.65	0.519	-84046.26	42554.25
y2008	-37838.24	32090.15	-1.18	0.240	-101056.6	25380.13
y2009	-27982.59	32035.09	-0.87	0.383	-91092.48	35127.3
y2010	1533.701	32070.25	0.05	0.962	-61645.46	64712.86
y2011	2251.57	32061.7	0.07	0.944	-60910.75	65413.89
y2012	6526.112	32054.85	0.20	0.839	-56622.72	69674.94
_cons	79069.84	67232.24	1.18	0.241	-53379.29	211519

Exhibit 24: Regression results from equation (15).

Source	SS	df	MS
Model	1.2875e+12	18	7.1530e+10
Residual	2.4570e+12	251	9.7888e+09
Total	3.7445e+12	269	1.3920e+10

Number of obs	= 270
F(18, 251)	= 7.31
Prob > F	= 0.0000
R-squared	= 0.3438
Adj R-squared	= 0.2968
Root MSE	= 98938

netincomeemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyemployee	-1.84949	1.71755	-1.08	0.283	-5.232136	1.533156
jabil	-41038.44	61603.26	-0.67	0.506	-162363.6	80286.73
cognizant	-39609.03	63910.68	-0.62	0.536	-165478.6	86260.51
pitney	-24549.3	57942.21	-0.42	0.672	-138664.2	89565.58
first	-30205.1	56806.25	-0.53	0.595	-142082.7	81672.55
broadcom	-146303.7	48701.27	-3.00	0.003	-242218.9	-50388.47
ncr	-30573	58024.17	-0.53	0.599	-144849.3	83703.3
wd	-33938.31	62064.35	-0.55	0.585	-156171.6	88294.96
arrow	-22152.12	55801.47	-0.40	0.692	-132050.9	87746.65
emc	16195.33	45615.84	0.36	0.723	-73643.26	106033.9
oracle	40210.17	54381.73	0.74	0.460	-66892.47	147312.8
cisco	85257.52	43056.51	1.98	0.049	459.4407	170055.6
intel	108876.5	38795.58	2.81	0.005	32470.11	185282.8
dell	33.85951	59646.73	0.00	1.000	-117438	117505.7
ibm	-3399.797	53384.96	-0.06	0.949	-108539.4	101739.8
microsoft	169255.5	44120.46	3.84	0.000	82361.97	256148.9
hp	-9156.463	51720.56	-0.18	0.860	-111018.1	92705.13
apple	174578.9	41019.39	4.26	0.000	93792.81	255364.9
_cons	49234.91	61352.96	0.80	0.423	-71597.3	170067.1

Exhibit 25: Regression results from equation (16).

Finally we control the time factor and study the correlation of net income per employee and occupancy costs per employee across firms. Third regression includes only dummy variable of years from 1999 to 2013 and is set up as follows:

$$\frac{I_T}{E_T} = \alpha + \frac{C_{ODT}}{E_T} + D_Y \qquad (17)$$

where:

α = Intercept coefficient

C_{ODT} = Derived occupancy costs for technology firms

E_T = Full-time employees of technology firms

I_T = Net Income of technology firms

D_Y = Dummy for years

When controlling for time, technology firms display the same pattern as the financial firms in which the occupancy costs per employee across firms have a positive impact on the net income per employee. This is in contrast to the observation from Exhibit 20. Again, we believe the results are due to reverse causality, which will be explained in detail later in this chapter.

Source	SS	df	MS
Model	3.6716e+11	15	2.4477e+10
Residual	3.3774e+12	254	1.3297e+10
Total	3.7445e+12	269	1.3920e+10

Number of obs	= 270
F(15, 254)	= 1.84
Prob > F	= 0.0298
R-squared	= 0.0981
Adj R-squared	= 0.0448
Root MSE	= 1.2e+05

netincomeemployee	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
occupancyemployee	1.78405	.6558094	2.72	0.007	.4925337	3.075567
y1999	-4161.845	38498.23	-0.11	0.914	-79978.24	71654.55
y2000	-26471.62	38484.31	-0.69	0.492	-102260.6	49317.35
y2001	-98323.92	38445.63	-2.56	0.011	-174036.7	-22611.12
y2002	-91719.56	38440.33	-2.39	0.018	-167421.9	-16017.19
y2003	-50524.29	38439.17	-1.31	0.190	-126224.4	25175.8
y2004	-18702.38	38444.21	-0.49	0.627	-94412.4	57007.63
y2005	-11286.46	38464.95	-0.29	0.769	-87037.32	64464.4
y2006	-11699.24	38465.26	-0.30	0.761	-87450.71	64052.23
y2007	-15502.42	38448.75	-0.40	0.687	-91221.37	60216.53
y2008	-33876.32	38443.79	-0.88	0.379	-109585.5	41832.86
y2009	-28281.49	38437.22	-0.74	0.463	-103977.7	47414.75
y2010	4704.169	38441.41	0.12	0.903	-71000.33	80408.67
y2011	5013.671	38440.39	0.13	0.896	-70688.82	80716.16
y2012	8911.274	38439.57	0.23	0.817	-66789.61	84612.16
_cons	39472.06	28698.16	1.38	0.170	-17044.59	95988.7

Exhibit 26: Regression results from equation (17).

4.2 Explanation of similarities and differences between two sectors

Within firms over time, no correlation can be observed between occupancy costs per employee and net income per employee in both financial and technology firms. However, there is strong positive correlation between the firms when controlling for the year factor. At first glance, this appears to indicate that when firms spend more on occupancy, they generate more net income. After careful examination, we believe the results can be explained by reverse causality. When there is high net income, both financial and technology firms spend more on occupancy costs.

Both sectors show positive correlation between net income per employee and occupancy costs per employee between firms. Only when its average net income per employee reaches $118,570, financial firms will dedicate resources to corporate real estate, with a coefficient of 4.333. Due to reverse causality, this means that financial firms will spend $1 extra on corporate real estate for every $4.333 more net income per employee generated. For technology companies, when its average net income per employee reaches $39,472, they will allocate resources to corporate real estate, with a coefficient of 1.784. Similarly, this means that technology firms will spend $1 extra on corporate real estate for every $1.784 more net income per employee generated. This aligns with our early discussion that the spending behaviors of financial and technology firms are highly linked to their profitability.

On top of that, financial and technology firms have different market cycles. Since the 2008 financial crisis, the financial firms have undergone restructuring due to tightening policies. In contrast, the technology firms have been experiencing exponential growth since the dot-come bubble as discussed earlier. Their respective market cycles explain the differences in their strategies and magnitude in corporate real estate investments.

Chapter 5

Conclusion

Corporate real estate of non-real estate firms represent a large proportion of U.S. real estate asset. However, this asset class receives little attention in the past. Our paper researches quantitatively on corporate real estate occupancy costs and its correlation to company performance. To study the impact of corporate real estate holdings, we use occupancy costs per employee as a measurement of corporate real estate spending. We collect a comprehensive pool of sample data that includes rental expense, PPE, real estate percentage within total PPE, net income, and share prices from fiscal years 1999 to 2013. Chapters 1 and 2 explain our data collection and occupancy costs derivation methodologies.

In Chapter 3, after adjusting for volatility in the occupancy costs per employee, the regression results indicate negative correlation between share prices and occupancy costs per employee for both technology and financial sectors during the fiscal years 1999 to 2013. For financial firms, the negative correlation is not significant. On the other hand, such negative correlation is significant for technology firms. The coefficient of occupancy costs per employee for technology firms is both high and significant, whereas the coefficient of occupancy costs per employee for financial firms is insignificant. These findings are also valid when controlling for year and firm factors respectively. The negative correlation also confirms that the market punishes technology firms for spending more on corporate real estate, but not as much for financial firms. In other words, the market tends to reward technology firms for not over-spending on corporate real estate. This is consistent with the previous researches on relationship between corporate real estate investment and stock performance of non-real estate and non-financial firms.

Chapter 4 examines the correlation between occupancy costs per employee and net income per employee, where a strong positive correlation suggests a reverse causality for both financial and technology firms when the year dummy variable is introduced. Instead of a higher level in spending on corporate real estate leading to a higher level in net income, a reverse relationship is found. For both sectors, when the net income level is high indicating a successful year, firms are willing to spend more on corporate real estate. Furthermore, the coefficient for financial firms is much larger when compared to technology firms. Because of reverse causality, we conclude that financial firms tend to be more conservative on corporate real estate spending than technology

firms after its net income per employee reaches certain level as explained earlier. In addition, our findings in occupancy costs for technology firms having a greater impact to their share prices suggest that corporate real estate consulting firms could increase their focus on technology firms.

Currently corporate real estate consulting firms are heavily involved in the financial sector more so than the technology sector when it comes to corporate real estate related services. We question if this is a sustainable approach. Our findings suggest that consulting firms should shift their focus from the financial firms to the technology firms. We believe that the effort put into corporate real estate consulting in technology firms can yield more effective results on the share price of technology companies, given that the share price is highly correlated with corporate real estate spending as indicated by our regression models. The broader question remains whether real estate brokerage and consulting firms should focus on companies that spend more on corporate real estate (in absolute dollar value), or companies that do not necessarily spend as much but can really utilize brokerage and consulting services to improve on company performances. We believe there is plenty of opportunities for further exploration of other industries to address the above question and our research on corporate real estate occupancy costs and its correlation to company performance for financial and technology sectors provides a useful framework for future development.

References

Park, Abraham, and John L. Glascock. "Corporate Real Estate and Sustainable Competitive Advantage." Journal of Real Estate Literature 18, no. 1 (2010): 3–19.

Rodriguez, Mauricio, and C. Sirmans. "Managing Corporate Real Estate: Evidence from the Capital Markets." *Journal of Real Estate Literature* 4, no. 1 (January 1, 1996): 13–33.

Tuzel, Selale. "Corporate Real Estate Holdings and the Cross-Section of Stock Returns." *Review of Financial Studies* 23, no. 6 (June 2010): 2268–2302.

CB Richard Ellis, Inc. (2009, January). *Driving an Aggressive Occupancy Cost Reduction Program: A White Paper for Corporate Real Estate.* Retrieved from http://www.cbre.us/services/research/AssetLibrary/DrivinganAgressiveWHITEPAPER_ReducingOccupanyCosts[1].pdf

"Frothy.com." The Economist, December 20, 2014. http://www.economist.com/news/business/21636754-new-tech-bubble-seems-be-inflating-when-it-pops-it-should-cause-less-damage.