

# Investment Returns from Responsible Property Investments: Energy Efficient, Transit-oriented and Urban Regeneration Office Properties in the US from 1998-2007

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*October 10, 2008*

## **Abstract**

Responsible property investing (RPI) includes many facets such as investing in Energy Star labeled properties, investing in properties near transit stations and investing in properties in urban regeneration areas. This paper shows that investors could have purchased a portfolio consisting solely of RPI office properties over the past 10 years and had performance that was as good if not better on a risk-adjusted basis than a portfolio of properties without RPI features. This paper breaks down the way that various RPI factors impact income, property values, capitalization rates, price appreciation and total returns. One of the interesting results is that the impact of proximity to transit differs for the CBD and the suburb. This difference can be attributed to whether or not the value of being close to transit was already reflected in prices as was the case for the CBD but not the suburbs where the value of transit appears to have increased in importance over the past ten years allowing existing investors to earn above average returns. Energy Star rated properties had higher income and income growth over the past ten years. Investors were willing to purchase these properties at lower cap rates producing a premium in value over non Energy Star properties. Although we don't know the cost to developers of making properties qualified for the Energy Star labeled, the higher income from these properties combined with investors being willing to purchase them at lower cap rates suggests that the benefits may have outweighed any additional development costs. Finally, properties in or near urban regeneration zones had higher income and value although they did not outperform other properties because their higher income and value were already reflected in the price that investors paid for them. But developers would have benefited from the higher values if development costs were not greater for these properties. All factors considered, there does not appear to be any reason why investors cannot be socially responsible and still earn an appropriate risk-adjusted return. Since RPI can produce social and environmental benefits and fulfill fiduciary duties, it would be economically irrational in social welfare terms and ethically unjustifiable to not engage in Responsible Property Investing.

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## Introduction

Investors are increasingly interested in corporate social responsibility and socially responsible investing (Hill *et al.* 2007, Schueth 2003). Since the 1970s, socially responsible investing, or efforts to maximize both financial return and social good, has grown into a global movement (Louche and Lydenberg 2006). Over 360 asset owners, investment managers and financial service providers, representing over \$15 trillion in assets under management, have signed the UN Principles for Responsible Investment which “help investors integrate consideration of environmental, social and governance (ESG) issues into investment decision-making and ownership practices” (Principles for Responsible Investment 2008).

The application of responsible investing and corporate social responsibility to the property sector has come to be called Responsible Property Investing (Mansley 2000, McNamara 2000, Newell and Acheampong 2002, Boyd 2005, Lutzkendorf and Lorenz 2005, Newell 2008, Pivo 2005, Pivo and McNamara 2005). Recent surveys have documented its emergence around the world (Pivo 2007, Rapson *et al.* 2007, UNEP FI 2007).

Responsible Property Investing (RPI) has been defined as maximizing the positive effects and minimizing the negative effects of property ownership, management and development on society and the natural environment in ways that are consistent with investor goals and fiduciary responsibilities (Pivo and McNamara 2005). Specific strategies include energy conservation, green power purchasing, fair labor practices, urban regeneration, safety and risk management, and community development, among others (Pivo and UN Environment Programme Finance Initiative Property Working Group 2008). RPI goes beyond compliance with legal requirements to better manage the risks and opportunities associated with social and environmental issues. It encompasses a variety of efforts to address ecological integrity, community development, and human fulfillment in the course of profitable real estate investing. The goal is to reduce risk and pursue financial opportunities while helping to address the challenging public issues facing present and future generations.

Because so many factors contribute to the social and environmental performance of buildings, RPI touches on literally dozens of property location, design, management, and investment strategies. However, a recent effort to prioritize RPI criteria found that experts, giving consideration to both financial materiality and the general public welfare, would emphasize “the creation of less automobile-dependent and more energy-efficient cities where worker well-being and urban revitalization are priorities” (Pivo 2008). Based on this finding, our paper examines 3 types of RPI properties: those close to transit stations, or so called “transit-oriented” properties, energy efficient properties, and properties in areas targeted for urban revitalization. Our general study question was how did these properties perform as investments compared to otherwise similar properties without these attributes?

A survey of senior US property investment executives found that concerns over financial performance and fiduciary duty were potential impediments to RPI (Pivo 2007). Still, more than 85 percent of the executives agreed that they probably would increase their allocation to such activities if they met their risk and return criteria. This paper targets these impediments by examining the financial performance of RPI properties in the USA. In particular, it studies how energy efficient properties, properties near transit (“transit-oriented properties”) and properties in areas targeted for urban regeneration (“urban regeneration properties”) have performed financially over the past decade in comparison to those without such features.

If RPI enhances investment returns, there are both business and fiduciary reasons to pursue it. If it has a neutral effect, then it makes economic sense in social welfare terms and moral sense because social or environmental gains can be achieved without harming financial results. But if RPI harms investment returns, it will be difficult for investors to justify or defend absent government requirements or incentives unless they are willing to trade-off lower returns for social or environmental gains. Findings are mixed on whether individual investors will sacrifice financial returns for social responsibility and the degree to which financial returns influence the decision to make socially responsible investments (Rosen *et al.* 2005, Nilsson 2007, Vivyan *et al.* 2007, and Williams 2007). But if RPI harms returns it will likely face legal and economic resistance. Therefore, if RPI is to become more common among institutional investors, it is important to find related approaches that are neutral or positive for financial returns.

Salzmann *et al.* (2005) reviewed the business case for corporate social responsibility (CSR), which they found to be a concern in the literature since the 1960s. Although theorists agree there are non-economic reasons to pursue CSR, considerable theoretical and empirical work has focused on the relationship between financial performance and

environmental/social performance. Theorists have argued whether the links are positive, neutral, or negative while empirical studies have been “largely inconclusive” due to research biases and ambiguities.

## How RPI Could Affect Investment Returns

Just because properties produce more income or are worth more per square foot, does not mean they will automatically generate higher investment returns. This is important to understand for those trying to make the case for RPI investments by simply using evidence of higher incomes and valuation. Assuming the same risk, for actual (*ex post*) returns to be higher for RPI properties than for non-RPI properties, income would have to increase more than was expected when the property was purchased or appraised, due to rents or occupancy rates being higher, or expenses being lower than expected because property values are generally a function of expected earnings, given a certain level of risk. This would produce a higher income return for RPI properties. Another way for RPI properties to achieve higher returns could be for their value to appreciate more than was expected, due to the higher income or the reduction in required return associated with the investment being perceived as less risky than originally perceived. This would produce a higher appreciation return for RPI properties.

There are four pathways by which RPI attributes can affect the income or appreciation of RPI properties relative to other property investments:

1. **Tenant Demand** - Certain RPI attributes could gain or lose favor among tenants, changing their willingness to pay or their demand for properties with those attributes. For example, rising gas prices could cause demand to shift in favor of properties with good transit service, resulting in lower vacancies and higher rents for transit-oriented properties. Over the past several years, rising energy prices and growing traffic congestion should have, if anything, increased interest in energy efficient and transit-oriented properties. Concern about urban crime or terrorism could have harmed demand for urban regeneration properties, but there is no evidence to suggest it did. In fact, urban areas have generally outperformed other locations and seen something of a renaissance in the past decade.
2. **Expenses** - Certain operating expenses, such as utilities, taxes, or security, could change faster for RPI properties than for other properties, again affecting incomes. For example, in the face of rising energy prices, energy efficient buildings could lose net operating income more slowly than less efficient properties. There is no reason to think that the performance of RPI properties has been harmed by spikes in operating expenses relative to non-RPI properties. Rising energy prices and property tax incentives favoring urban regeneration should have favored energy efficient and transit-oriented investments. And while urban regeneration properties could have spent more than other properties on security, urban crime has been at historically low levels, so that seems unlikely.
3. **Perceived Risk** - Certain RPI attributes could come to be viewed by investors as creating more or less risk, changing their willingness to pay for a given income stream and thus the rate of appreciation or depreciation. For example, a spike in urban crime could cause investors to assign more risk to properties in urban regeneration areas, slowing their appreciation rate in relation to other properties. But here again, there is no reason to expect slower appreciation caused by perceptions of greater risk. If anything, investors have been worried that future energy prices and traffic congestion will cause auto-dependent, energy inefficient properties to lose value or gain more slowly.
4. **Capital Improvement and Management Programs** - Certain management actions taken to alter the RPI attributes of properties could improve or impair their ability to produce income, depending on the cost-effectiveness of the programs. For instance, a program to install water conservation features that pay for themselves in just a few months by lowering water bills would in all likelihood improve total returns while measures that take many years to yield dividends would not. Whether or not a property is transit-oriented or promotes urban regeneration is mostly a function of location and not subject to alteration via capital improvement or management programs. But this is not the case for energy efficiency where there are cost-effective strategies available for improving property performance (Urge-Vorsatz *et al.* 2007). Because there are options which are cost-effective, it is unlikely that such activities have been harming returns.

We can use these four pathways to hypothesize whether it is likely that investing in energy efficient, transit-oriented and urban regeneration properties has had negative, neutral, or positive effects on investment returns in the US over the past ten years. Our assessment of these issues suggests that RPI properties probably have performed at least as well as other property investments without RPI characteristics. The results of our assessment are summarized in Table 1.

**Table 1: Hypothesized Effects of RPI Features on Drivers of Investment Return**

<i>RPI Feature</i>	<i>Tenant Demand</i>	<i>Expenses</i>	<i>Perceived Risk</i>	<i>Capital Improvement &amp; Management Programs</i>	<i>Overall Expected Effect</i>
Energy Efficient	Positive	Neutral or Positive	Positive	Positive	Neutral or Positive
Transit-oriented	Positive	Neutral	Positive	Not applicable	Neutral or Positive
Urban Regeneration	Neutral or Positive	Neutral or Positive	Neutral or Positive	Not applicable	Neutral or Positive

## Previous Studies

There is a substantial literature on the relationship between corporate financial performance and responsibility. However, as mentioned above, Salzmann *et al.* (2005) found the work to be “inconclusive”. Other reviewers, focused on equity investing, found mixed evidence that it pays to screen for ethical issues (Michelson *et al.* 2004). And a recent review of 167 studies on business results and social responsibility found that it neither harms nor improves financial returns (Margolis or Elfenbein 2008). The authors found that “companies can do good *and* do well, even if they don’t do well *by* doing good.”

While systematic attempts have been made to present the business case for more responsible buildings (Roper and Beard 2006), almost no studies have examined the relationship between investment returns and responsibility in the property sector. Two studies have been published which support the expectation that transit-oriented and urban regeneration properties have performed at least as well as other properties. Clower and Weinstein (2002) looked at changes in valuations for properties close to light rail stations in the Dallas area. They found that from 1997-2001, median valuations for office properties around transit stations increased by more than twice the rate of other properties. Meanwhile, McGreal *et al.* (2006) looked at properties in urban renewal locations in the UK and found that investment performance in regeneration areas matched national and local city benchmarks over a 22 year time period. They also found that regeneration properties had a lower level of risk per unit of return. Similar studies have not been published on energy efficient buildings. While recent papers have found a rent and transaction price premium that may compensate for any additional construction costs associated with green and energy efficient buildings (Eichholtz *et al.*, 2008, Fuerst and McAllister 2008), they do not examine investment returns.

## Hypothesis and Methods

### Hypothesis and Methods

The hypothesis to be tested was that energy efficient properties, properties near transit, and properties in urban regeneration areas have performed as well or better than other properties without such characteristics.

Two analytical methods were used to test this hypothesis.

### Portfolio Analysis

We created an “RPI portfolio” that consisted of the office properties in the NCREIF property index that had at least one of the RPI characteristics. Then we created a portfolio that consisted of the office properties in the NCREIF property index that did not have any of the RPI characteristics considered in this study. We then compared the performance of these two portfolios. The question was whether a portfolio of just RPI properties could perform just as well as a portfolio composed of all the other properties in the NCREIF property index.

The number of properties in each portfolio varied over time due to acquisitions and dispositions. For the non-RPI portfolio, the number of properties started at 509 in the first quarter of 1998 and ended with 1,035 properties by the end of the 1<sup>st</sup> quarter of 2008. For the RPI portfolio, the number of properties started at only 137 and ended with 304 over the same time period. Thus there were significantly more non-RPI properties, which might suggest that this portfolio was more diversified.

### Regression Analysis

We examined the impact of various RPI features on the financial characteristics of the properties such as their market values, income, expenses, price appreciation, cap rates and total returns while controlling for other factors that might impact finances.

Data is cross-sectional and time-series with around 30,000 observations of individual property data but the number of observations in any particular regression depends on the specific variables used because of missing variables (null values) for some data points for some properties. For example, some properties do not have square foot information whereas others (not necessarily the same property) do not have age information or information about whether they have a particular RPI characteristic or not.

When examining returns, the return was based on the compound return over the current and prior 3 quarters (annualized return for each property). The log of 1 + return was used in the regressions as was the log of the market value.

Various models were examined with different dependent variables:

Total Return =  $f$  (RPI variables, office market index, property characteristics, office demand, office supply, location, Core Based Statistical Area (CBSA) characteristics)

Income Return =  $f$  (RPI variables, office market index, property characteristics, office demand, office supply, location, CBSA characteristics)

Capital Return =  $f$  (RPI variables, office market index, property characteristics, office demand, office supply, location, CBSA characteristics)

Market Value =  $f$  (RPI variables, office market index, property characteristics, office demand, office supply, location, CBSA characteristics)

NOI =  $f$  (RPI variables, office market index, property characteristics, office demand, office supply, location, CBSA characteristics)

RPI variables included nearness to transit, whether the property was in or near an urban regeneration zone, and whether the property was Energy Star labeled (see discussion of RPI Variables below). The NCREIF office market index was used to control for changes in the market for all office properties over time. Note that “appraisal smoothing” is not an issue for this study because the office index and the returns for the individual properties are appraisal based (Fisher and Geltner 2000). So it is an “apples to apples” comparison.

## Data

The following is a summary of the variables used in this analysis.

Variable	Obs	Mean	Std. Dev.	Min	Max
incret_yr	30930	1.08096	.037233	.5946289	2.863781
appret_yr	30930	1.031899	.1794218	-.1931961	11.76985
totret_yr	30930	1.114129	.1880395	.1933573	12.35782
cempl23	34880	1.399712	1.863789	-6.827898	7.525513
lmsadens	35227	6.642724	.8152385	3.873869	8.807326
stal23	38722	2.381277	1.52678	.2558814	13.24528
officetotret	39457	.0303841	.0156475	-.0003087	.0582631
age	37213	18.13017	14.15059	-1	128
sqft	39457	284362.9	367837.6	100	7000000
stype	39447	.2132228	.4095889	0	1
regensu	39447	.0373412	.189599	0	1
regencb	39447	.0141709	.1181967	0	1
estar	39447	.0814764	.2735688	0	1
transitsu	28370	.0937963	.2915502	0	1
transitcb	28370	.1389143	.3458632	0	1

incret_yr	-	the income return (cap rate) for the current and prior three quarters
appret_yr	-	the capital return for the current and prior three quarters
totret_yr	-	the total return for the current and prior three quarters
cempl23	-	the employment growth in the CBSA for the past three quarters
lmsadens	-	the population density of the CBSA
stal23	-	the number of office construction starts in the CBSA in the past three quarters
officetotret	-	the quarterly return for all office properties in the NCREIF Property Index
age	-	the age of the property in years
sqft	-	the square feet of the property
stype	-	a dummy variable where 1 = CBD
regensu	-	a dummy variable that is 1 if the property is in an urban regeneration zone in the suburbs
regencb	-	a dummy variable that is 1 if the property is in an urban regeneration zone in the CBD
estar	-	a dummy variable that is 1 if the property is Energy Star labeled
transitsu	-	a dummy variable that is 1 if the property is within ½ mile of a fixed rail transit station in the suburbs
transitcb	-	a dummy variable that is 1 if the property is within ½ mile of a fixed rail transit station in the CBD

## Dependent Variables

Data on property investment returns were provided by the National Council of Real Estate Investment Fiduciaries (NCREIF). NCREIF is a non-partisan source of real estate performance information based on property-level data submitted by its data contributing members, which include institutional investors and investment managers. Properties owned by contributing members are included in the pool, added or removed as they acquire or sell holdings. Quarterly data for all stabilized office buildings in the NCREIF dataset for at least 1 quarter during the 1998-2007 period were collected for this study. Earlier data were not used because 1998 was the earliest year for which energy efficiency data were available (see RPI Variables). Only office properties were examined in order to control for the effect of property type on financial returns. A total of 3,237 properties were included in the final dataset, however because

properties are added to and deleted from the dataset as they are bought and sold by data contributors, from 646 to 1,339 properties were in the database in any single quarter.

## RPI Variables

NCREIF does not maintain information on energy efficiency, transit or urban regeneration areas in its database. Therefore, building level data on these topics were collected from three additional sources.

Whether or not a property was Energy Star labeled was used to define whether or not it was energy efficient. Data on whether or not a property was Energy Star labeled was collected from the US EPA Energy Star Program online database of labeled properties. To be labeled under the Energy Star program, a building must have earned 75 points on a 100 point scale in the Energy Star rating system. Buildings are labeled on a yearly basis, but only if a property owner applies. Therefore, buildings could be labeled for none, one, or more than one of the ten years studied. It was assumed that a building is energy efficient for the purposes of this study if it was labeled in any year between 1998 and 2007. However, since labeling is discretionary for owners, it is possible that unlabeled buildings in the study would have been labeled if the owner had applied. This would not influence any effects produced by the labeling itself, but it could confound observations of effects tied directly to energy efficiency, such as operating expenses. This problem could be eliminated by using Energy Star rating data instead of Energy Star labels to define energy efficient buildings; however those data are proprietary information and were not available for this study.

Data on whether properties were transit-oriented was collected from the U.S. Bureau of Transportation Statistics National Transportation Atlas Database. Property addresses available from NCREIF were used to find the latitude and longitude for each property. This was possible for 71% of the properties. Incomplete addresses made geo-coding infeasible for the other properties. The geographic data were then used to measure the straight line distance from each property location to the nearest rail transit station using GIS software. Properties that were equal to or less than ½ mile from a station were categorized as transit-oriented properties for this study.

Data on urban regeneration came from the US Department of Housing and Urban Development (HUD). Urban regeneration properties were defined as those located in or near an Empowerment Zone, Renewal Community, or Enterprise Community as defined by the RC/EZ/EC Address Locator available online from HUD. Buildings designated by HUD as “in or near” one of these areas was classified as an urban regeneration property for this study.

## Controls

Employment growth was used as a measure of office demand and construction starts was used as a measure of office supply. Density of the CBSA was used as a measure of how congested the CBSA was. Dummy variables were used to control for regional location, as well as whether the property was in the CBD or suburbs. We also used CBSA dummy variables instead of regional dummy variables but the results were the same for the other variables in the regressions. Size and age were used as measures of individual property characteristics.

Following are the correlations between the property specific variables and the various RPI variables:

	age	sqft	stype	regensu	regenb	estar	transitsu	transitcb
age	1.0000							
sqft	0.0993	1.0000						
stype	0.3552	0.2593	1.0000					
regensu	0.2163	0.0483	0.3687	1.0000				
regenb	0.0308	0.0065	-0.0637	-0.0235	1.0000			
estar	-0.0552	0.1012	0.1317	0.1640	-0.0268	1.0000		
transitsu	0.0002	0.0067	-0.1717	-0.0633	0.1920	-0.0188	1.0000	
transitcb	0.2462	0.1538	0.7461	0.4872	-0.0475	0.1476	-0.1281	1.0000

## Interpretation of RPI Dummy Variables

As indicated above, for two of the RPI characteristics (near transit and in or near urban regeneration zones), we used separate dummy variables to indicate whether the property has these characteristics and is in the CBD or if the property has these characteristics and is in a suburb. For example, *transitcb* would be one if the property were near transit in the CBD and zero otherwise (meaning that it is not near transit in either the CBD or a suburb or near transit in a suburb). Similarly *transitsu* would be one if it is near transit in a suburb and a zero otherwise. There is also a dummy variable indicating whether the property is in a CBD or suburb (*stype*) regardless of whether it has an RPI characteristic or not. If *stype* is one, the property is in a CBD and if it is zero, it is in a suburb.

With this structure of dummy variables, what the *stype* variable will capture is the difference that being in the CBD versus the suburb has on Energy Star and non-RPI properties because the relative impact of the transit and urban regeneration RPI variables caused by their being in a CBD or suburb is already captured in the dummy variables already included for each of these characteristic. For example, if the only RPI variables were *transitcb* and *transitsu*, in a regression with the market value as the dependent variable, then *stype* would capture the difference in market value for the non-transit property in the CBD compared to the non-transit property in the suburb. The *transitcb* variable will capture the marginal impact on market value of being near transit in the CBD relative to not being near transit in just the CBD. Likewise, the *transitsu* variable will capture the marginal impact on market value of being near transit in the suburb versus not being near transit in the suburb.

This setup for the dummy variables allows us to capture the impact of each RPI variable in the CBD relative to those properties that do not have this RPI characteristic in the CBD and similarly in the suburb. As we will see, the impact of some of the RPI characteristics is different in the CBD than in the suburb.

Although *stype* could be omitted and a dummy variable added to indicate if the property did not have one of the RPI characteristics in say the CBD (with not having the RPI characteristic in the suburb being the omitted dummy variable), this causes dependency problems among the independent variables when there is more than one RPI characteristic because the dummies for each set of RPI variables define whether the property is in the CBD or not.

## Analysis and Results

### Portfolio Analysis

The RPI portfolio slightly out-performed the non-RPI portfolio over the 1997-2007 time period. The geometric mean return for the RPI portfolio was 12.95% versus 12.85% for the non-RPI portfolio. Although not a significant difference, the RPI portfolio at least did as well as a portfolio of non-RPI properties and would have beat the NCREIF office index benchmark (which would consist of both RPI and non-RPI properties) over this time period.

The next question is whether investors were subject to more risk by investing in the RPI portfolio because they were somewhat constrained on location (near transit lines or in or near an urban regeneration zone unless the property was Energy Star) and the size of the portfolio was smaller. The results showed that the standard deviation of returns of the RPI portfolio was slightly less (1.60% on a quarterly basis) than the non-RPI portfolio (1.61%). Again the difference is not significant. But we can conclude that on a risk-adjusted basis the RPI portfolio did as well (slightly higher return at slightly lower risk) than the non-RPI portfolio.

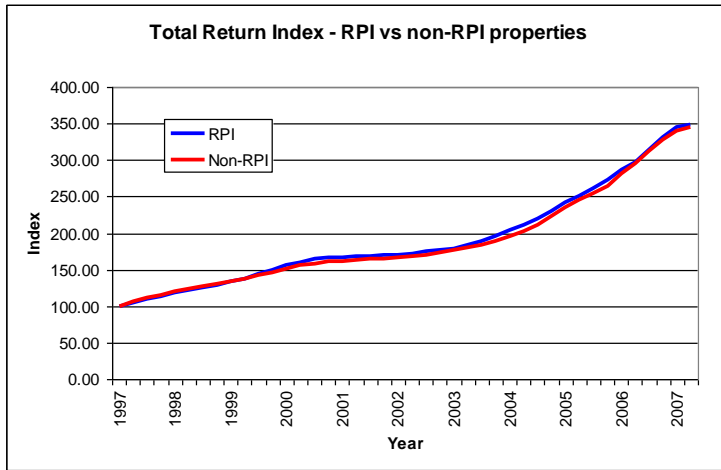
The following graph compares an index starting at 100 in the 4<sup>th</sup> quarter of 1997 based on the total return for the two portfolios. We can see that the two portfolios behaved almost identically with the RPI index being slightly above the non-RPI index.

What is interesting is that the source of the total return for the two portfolios was somewhat different. The average income return or implied cap rate for the RPI portfolio was 7.20% versus 7.65% for the non-RPI portfolio. This suggests that RPI properties were purchased at lower cap rates which would suggest that investors in these properties expected more income and price appreciation assuming they were seeking the same total return. And since they actually did earn the same (or slightly higher) total return they actually did get more appreciation in income



and value over this time period. So it appears that investors in RPI properties expected (*ex ante*) and received (*ex post*) more price appreciation.

The more formal statistical analysis that follows will elaborate on the source of these differences based on the different RPI characteristics.



### Regression Analysis

In this section, we look more close to see if RPI features affected financial returns. In all the regressions, the office market index, regional dummy variables, and the property size and age were significant and of the expected sign. In most cases the supply and demand variables were also significant. Since the NPI office index is included in the regressions to control for changes in the market over time, the supply and demand variables will only capture differences across CBSAs. The  $R^2$  varies depending on the regression. Our focus is on the significance of the RPI variables and not the total explanatory value of the regression.

### Income and Market Value

If RPI features are desirable qualities in the marketplace, they should be associated with higher incomes and/or higher property values. If they are a detriment, the opposite should be true. In the following two models we see that RPI features are associated with higher incomes and values, except in the case of properties near CBD transit stations where the opposite effect was observed.

### NOI per Square Foot

Source	SS	df	MS	Number of obs =	22103
Model	33980.8261	15	2265.38841	F( 15, 22087) =	434.21
Residual	115234.392	22087	5.2172949	Prob > F =	0.0000
Total	149215.219	22102	6.75120887	R-squared =	0.2277
				Adj R-squared =	0.2272
				Root MSE =	2.2841

NOISF	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
cemp123	.0425552	.0093228	4.56	0.000	.0242818 .0608286
lmsadens	.6807583	.0226864	30.01	0.000	.6362913 .7252254
sta123	.0231461	.0127369	1.82	0.069	-.0018191 .0481113
_Iregion_2	-1.969199	.0540751	-36.42	0.000	-2.07519 -1.863208
_Iregion_3	-1.77343	.0521087	-34.03	0.000	-1.875567 -1.671294
_Iregion_4	-.7836442	.040801	-19.21	0.000	-.863617 -.7036714

officetotret		1.870103	1.127169	1.66	0.097	-.3392293	4.079435
age		-.0158127	.001189	-13.30	0.000	-.0181432	-.0134822
sqft		-1.97e-07	2.36e-08	-8.36	0.000	-2.43e-07	-1.51e-07
stype		1.19585	.0513569	23.29	0.000	1.095187	1.296513
regencb		.2172674	.0696763	3.12	0.002	.0806969	.3538379
regensu		.1695648	.1213487	1.40	0.162	-.0682873	.4074168
transitcb		-.6968802	.0564735	-12.34	0.000	-.8075723	-.5861882
transitsu		.6522329	.0553702	11.78	0.000	.5437033	.7607624
estar		.3065729	.0444195	6.90	0.000	.2195075	.3936383
_cons		.1975944	.1920535	1.03	0.304	-.1788442	.5740329

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Regeneration had higher NOI per square foot than non-regeneration properties in the CBDs and suburbs, although in the suburbs the difference was insignificant. Energy Star properties also had higher NOI per square foot than non Energy Star properties. For properties near transit, the findings differed depending on whether the stations were CBD or suburban. NOI was higher for property near suburban transit stations relative to other suburban properties, but lower for properties near transit in the CBDs, relative to other CBD properties.

The higher NOI could be the results of higher rents, higher occupancy and/or lower operating expenses. To get more insight into this we examined whether the various RPI factors affected rents, occupancy and expenses (each of these as dependent variables in separate regressions). Results are in the appendix.

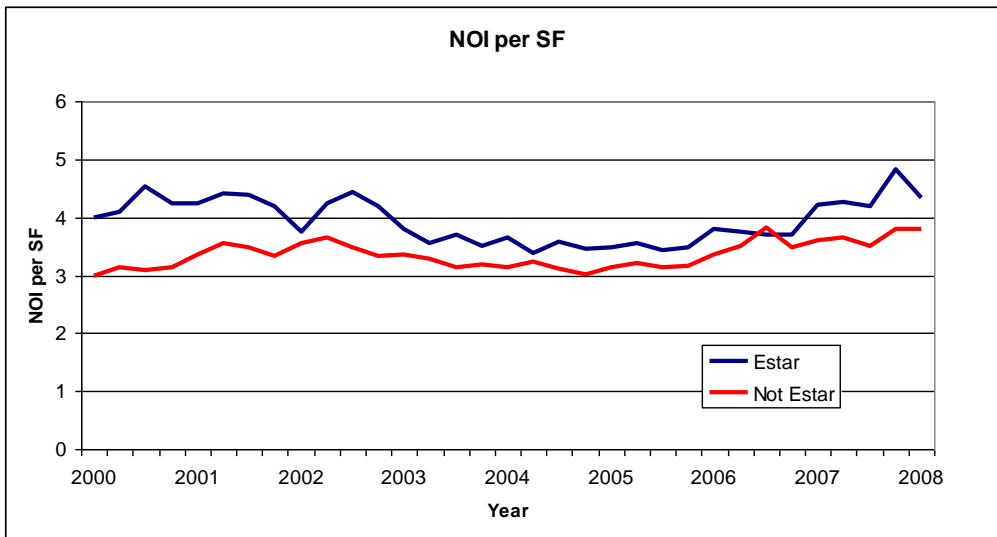
We found that rents were significantly higher near transit in the suburbs (relative to non-transit in the suburbs) but significantly lower in the CBDs. Occupancy was also higher in the suburbs (relative to non transit in the suburbs) but we find no significant difference in the CBDs. Expenses were higher for properties near transit in the CBDs but lower for the suburbs. These findings suggest that the higher NOI near transit in the suburbs can be explained by higher rents, higher occupancy and lower expenses relative to non-transit in the suburbs, while the lower NOI near transit in the CBDs can be explained by lower rents and higher expenses relative to non-transit in the CBDs.

For properties in urban regeneration zones the rent was higher in the CBDs and suburbs, although only significantly so in the CBDs. Occupancy had a negative sign but was not significant.

Energy Star properties had higher rents and higher occupancy than non Energy Star properties, but only the higher rents were significant. They did not have lower total operating expenses, as might be expected due to lower energy outlays. To search further for expense related differences in the Energy Star properties, we did a regression of just the utility expenses per square foot against the Energy Star dummy variable and other control variables such as the size, age, etc., assuming that energy efficiency would more likely affect utility expenses than total expenses. Because utility costs can change over time and vary across CBSAs, dummy variables were used for the year and quarter as well as the CBSA. Even after controlling for the CBSA, utility expenses can vary regardless of whether the property is Energy Star or not due to different utility costs within a CBSA or CBD depending on the utility service provider. We used rent per square foot as a proxy for capturing differences in utility costs with the idea that areas with higher utility costs could charge higher rents. The results of this regression are shown in the appendix.

We found that utility expenses per square foot are lower for Energy Star properties and the results are significant. Control variables such as the age and size of the property are of the expected sign, e.g., utility costs increase for older properties and decrease for larger properties. However, controlling for size, utility costs increase for properties with more floors because they are less efficient, e.g., more space dedicated to elevators. Utility savings on Energy Star properties average about 23 cents per square foot per year (or 10.6 percent). This finding compares to an estimated saving of 50 cents per square foot per year for energy bills alone published by the Energy Star program (Kats and Perlman 2006), however that figure is estimated from observed energy savings of 40 percent in Energy Star labeled office buildings rather than observations of actual energy expenditures.

The following is a comparison of the NOI per square foot for Energy Star and non Energy Star over time since the year 2000. It does not control for all the factors included in the regression, but it is consistent with and illustrates the results.



### Market Value per SF

Because value is theoretically related to income, then higher (or lower) incomes should be reflected in higher (or lower) property values so long as the differences are recognized by buyers or appraisers and the differences are not due to differences in risk. That is in fact what we found, which suggests that the effects that RPI may be having on incomes are being priced into the market.

### Market Value per Square foot

Source	SS	df	MS	Number of obs =
Model	3157.8639	15	210.52426	23111
Residual	4071.06279	23095	.176274639	F( 15, 23095) = 1194.30
Total	7228.92669	23110	.312805136	Prob > F = 0.0000
				R-squared = 0.4368
				Adj R-squared = 0.4365
				Root MSE = .41985

logmvsf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
cemp123	-.0135263	.0019114	-7.08	0.000	-.0172728 -.0097797
sta123	.0338132	.0030961	10.92	0.000	.0277445 .0398818
lmsadens	.2289248	.0042084	54.40	0.000	.2206759 .2371736
_Iregion_2	-.4799785	.0096108	-49.94	0.000	-.4988162 -.4611408
_Iregion_3	-.3911138	.0093172	-41.98	0.000	-.4093762 -.3728514
_Iregion_4	-.0562207	.0073239	-7.68	0.000	-.0705761 -.0418654
officetotret	8.795111	.2089772	42.09	0.000	8.385502 9.204721
age	-.004439	.0002154	-20.61	0.000	-.0048612 -.0040169
sqft	-3.08e-08	4.29e-09	-7.18	0.000	-3.92e-08 -2.24e-08
stype	.2702617	.0092478	29.22	0.000	.2521354 .2883881
estar	.1353892	.0080408	16.84	0.000	.1196287 .1511497
regensu	.0276932	.0219436	1.26	0.207	-.0153178 .0707041
regencb	.104639	.0125982	8.31	0.000	.0799457 .1293323
transitsu	.1597014	.0100618	15.87	0.000	.1399797 .1794231
transitcb	-.0751339	.0102416	-7.34	0.000	-.0952081 -.0550596
_cons	3.561717	.0360988	98.67	0.000	3.490961 3.632473

Consistent with their higher NOI, Energy Star properties had a higher market value relative to non Energy Star properties<sup>2</sup>

Similarly, properties in or near an urban regeneration zones had higher market values, consistent with their higher incomes. We found, however, that this difference was highly significant in the CBDs but, as in the case with NOI, not significant in the suburbs, suggesting that the CBD was where most of the added value from urban regeneration was to be found.

For properties near transit, our findings were again dependent on whether a property was in the CBD or suburbs, just as they were for NOI. Properties near transit in the suburbs had higher market value when compared to other suburban properties. Meanwhile, properties in the CBD had lower market values when compared to other CBD properties. This is consistent with the findings for NOI.

## Investment Returns

### Capital Appreciation Returns

Source	SS	df	MS	Number of obs = 18701		
Model	106.7542	15	7.11694666	F( 15, 18685)	=	526.04
Residual	252.794695	18685	.013529285	Prob > F	=	0.0000
-----				R-squared	=	0.2969
-----				Adj R-squared	=	0.2963
Total	359.548895	18700	.019227214	Root MSE	=	.11632

logret_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cempl23	.0182246	.000594	30.68	0.000	.0170603	.0193888
lmsadens	.0138617	.0012936	10.72	0.000	.0113262	.0163973
stal23	-.0140437	.0009676	-14.51	0.000	-.0159403	-.0121472
_Iregion_2	-.0385895	.0029457	-13.10	0.000	-.0443633	-.0328157
_Iregion_3	-.0354373	.0028659	-12.37	0.000	-.0410546	-.0298199
_Iregion_4	.0120507	.0022613	5.33	0.000	.0076184	.016483
officetotret	3.19087	.0633823	50.34	0.000	3.066635	3.315105
age	-.0002871	.0000693	-4.14	0.000	-.0004229	-.0001513
sqft	-7.59e-09	1.34e-09	-5.66	0.000	-1.02e-08	-4.96e-09
stype	.0368009	.0028297	13.01	0.000	.0312545	.0423473
regensu	-.0016103	.0038775	-0.42	0.678	-.0092105	.0059899
regencb	-.0021241	.0068737	-0.31	0.757	-.0155973	.011349
estar	.0008757	.002477	0.35	0.724	-.0039793	.0057308
transitsu	.0123616	.003122	3.96	0.000	.0062422	.0184809
transitcb	-.0117229	.0031555	-3.72	0.000	-.017908	-.0055378
_cons	-.1358232	.0110715	-12.27	0.000	-.1575244	-.114122

Capital Appreciation Returns are the quarterly percentage change in market value adjusted for capital expenditures and partial sales. Capital appreciation returns will be higher if the *increase* in value over time is greater. Properties could have a high market value per square foot as we found in the previous analysis but the appreciation in value would be average or below average if the change in value is the same or less than other properties. That is, capital appreciation returns measures the time series change in value as opposed to the cross-sectional comparisons of property values.

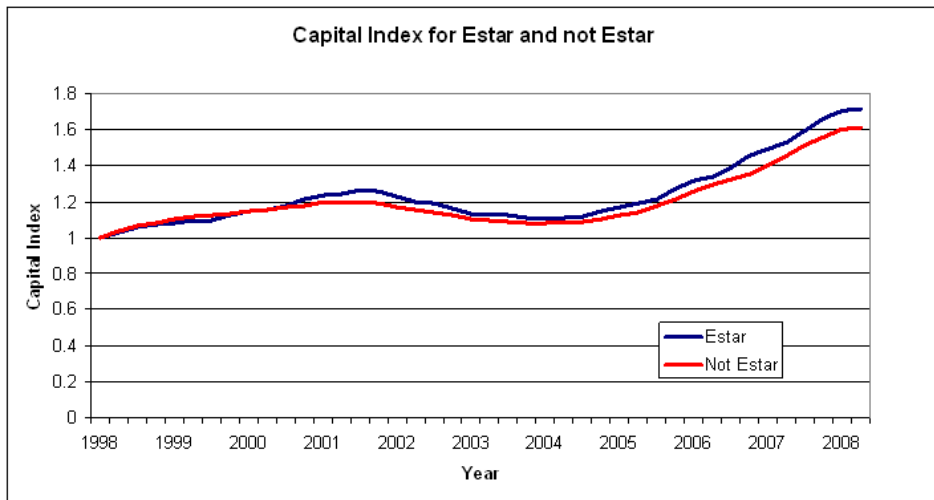
<sup>2</sup> When we separated Estar into having a dummy for the CBD and for the suburbs, the result was that it these properties had a higher value in both locations.

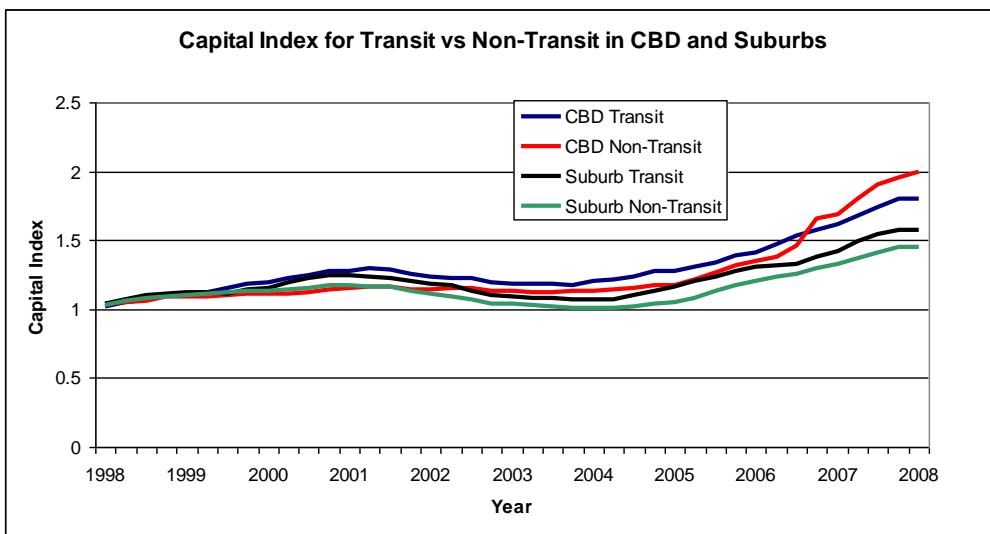
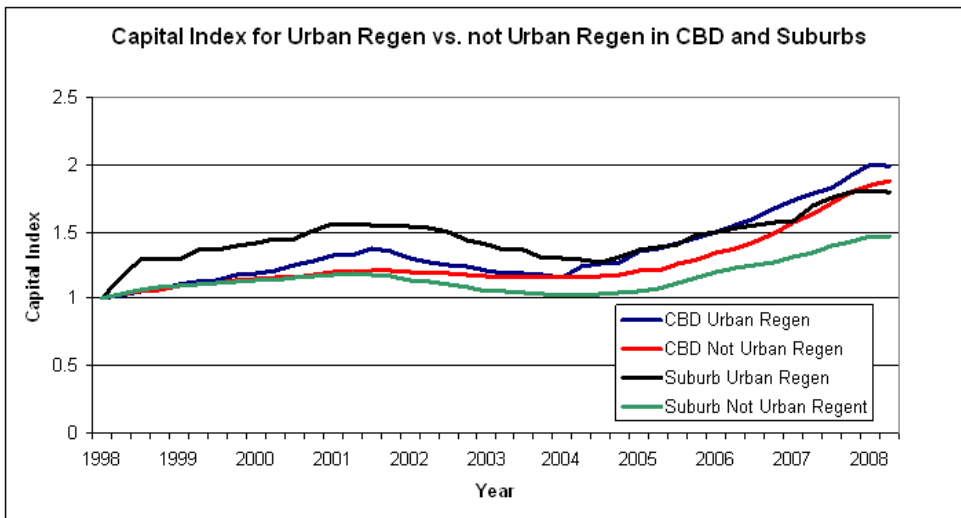
As with the analysis of income and valuation, there were differential findings for the properties near transit. Properties near suburban transit stations appreciated more quickly than other suburban properties, suggesting that investors had not fully anticipated the higher values per square foot reported above or that a decline occurred in the perceived risk associated with suburban transit properties relative to other suburban properties as suburban congestion or commuting costs became a greater threat to the accessibility and thus the value of suburban properties. Meanwhile, properties near CBD transit stations appreciated more slowly than other CBD properties. This suggests that the market had anticipated higher market values than those reported above relative to other CBD properties. Not only may the markets have already priced the value of proximity to CBD transit stations into the price of properties, it appears to have overvalued them somewhat relative to how the market actually valued them, which produced the underperformance observed here.

This suggests that incomes from the suburban properties near transit grew faster than anticipated, giving rise to above average appreciation. In the next section we will see that these properties also had higher income return rates. So they produced excess returns for investors. It appears that over the study period, the market increasingly recognized the benefits of proximity to suburban transit centers in a way that did not exist before. This drove higher incomes, presumably from lower vacancies or higher rents near transit stations, which were reflected in higher total incomes and better income returns. This could be attributable to improvements in suburban transit systems and rising congestion and commuting costs for auto travel.

For properties near urban regeneration zones, appreciation was slightly lower in both the CBDs and suburbs but the differences were not statistically significant. Again, even though these properties had higher NOI and were valued more highly, this additional value was already incorporated into their valuations at the start of each quarter and so they did not produce higher appreciation returns for their investors.

Energy Star properties had slightly more appreciation but the amount was not statistically significant. The following is a series of capital index charts (change in value net of capital improvements) illustrating the foregoing findings. Note, however, that these charts do not control for factors such as differences in size, age, and other factors as done in the regressions. The graph for properties near urban regeneration zones versus those that are not suggests that the value increased more for the properties near urban regeneration zones but after controlling for other factors there was no significant difference. The other results are consistent between the graphs and the regressions.





### Income Return

Source	SS	df	MS	Number of obs =	18701
Model	1.81943363	15	.121295575	F( 15, 18685) =	244.59
Residual	9.26606828	18685	.000495909	Prob > F =	0.0000
Total	11.0855019	18700	.000592808	R-squared =	0.1641
				Adj R-squared =	0.1635
				Root MSE =	.02227

logret_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cemp123	.0002676	.0001137	2.35	0.019	.0000447	.0004905
lmsadens	-.0033463	.0002477	-13.51	0.000	-.0038317	-.0028609
sta123	.0003151	.0001852	1.70	0.089	-.000048	.0006782
_Iregion_2	.0005213	.000564	0.92	0.355	-.0005841	.0016267
_Iregion_3	-.0034621	.0005487	-6.31	0.000	-.0045376	-.0023866
_Iregion_4	-.0060262	.0004329	-13.92	0.000	-.0068748	-.0051776

officetotret		-.4550488	.0121348	-37.50	0.000	-.478834	-.4312635
age		-.000029	.0000133	-2.18	0.029	-.000055	-2.95e-06
sqft		-1.19e-09	2.57e-10	-4.62	0.000	-1.69e-09	-6.82e-10
stype		.0008545	.0005417	1.58	0.115	-.0002073	.0019164
regensu		-.0006069	.0007424	-0.82	0.414	-.002062	.0008482
regencb		-.0006977	.001316	-0.53	0.596	-.0032772	.0018818
transitsu		.0001524	.0005977	0.25	0.799	-.0010192	.0013239
transitcb		-.004913	.0006041	-8.13	0.000	-.0060972	-.0037289
estar		-.0055282	.0004742	-11.66	0.000	-.0064578	-.0045987
_cons		.1164308	.0021197	54.93	0.000	.1122761	.1205856

Income return measures the portion of total return attributable to each property's net operating income. It is analogous to capitalization (cap) rates.

Energy Star properties had lower income returns that were statistically significant. Investors or appraisers assigned a premium per dollar of income for these properties, perhaps in anticipation of faster future income growth or lower risk. The lower cap rate for Energy Star properties translates into an increase in value for the Energy Star label. This could reflect expectations about future risk and income associated with potential regulations or energy price hikes that could benefit energy efficient properties relative to other buildings.

Cap rates for properties in or near regeneration areas also were lower but not significantly.

Properties near transit in the CBDs had significantly lower income returns. This suggests that a premium was being paid for these properties. Keep in mind that the properties are revalued every quarter. So appraisers were placing a higher value on these properties relative to their income. Yet as we saw in the prior section they did not appreciate as much. So the higher price may not have been warranted. Recall that the market value per square foot was lower for these properties than properties not near transit in the CBDs. But relative to their income, the price still may have been too high. When compared to other CBD properties, the lower price, NOI, valuation, and appreciation return suggest that these higher prices were not justified unless they were perceived as much safer investments, which could well be the case given the rising threat to accessibility associated with commuting costs and traffic congestion.

For properties near transit in the suburbs the income return was essentially the same as other properties in the suburbs. That is, a premium (or discount) was not paid for these properties. Recall that they actually had above average capital appreciation. So it appears that investors did not have to pay for this above average appreciation.

In the suburbs investors in properties near transit stations were able to buy each dollar of income at the same price as other suburban properties. They did not have to pay a premium as in the CBD.

### Total Returns

Source	SS	df	MS	Number of obs =	18701
Model	115.36267	15	7.69084465	F( 15, 18685) =	304.65
Residual	471.694891	18685	.025244575	Prob > F =	0.0000
				R-squared =	0.1965
				Adj R-squared =	0.1959
Total	587.057561	18700	.031393452	Root MSE =	.15889

ret_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
cemp123	.0197661	.0008113	24.36	0.000	.0181758 .0213564
lmsadens	.0122781	.001767	6.95	0.000	.0088145 .0157416
stal23	-.0141014	.0013217	-10.67	0.000	-.016692 -.0115107
_Iregion_2	-.041978	.0040238	-10.43	0.000	-.049865 -.0340911

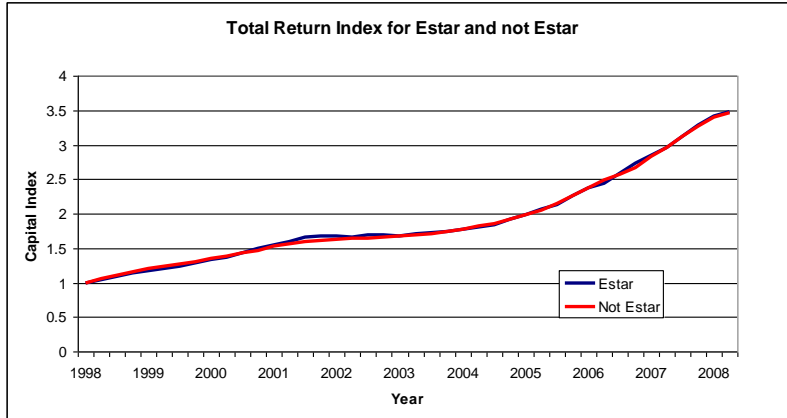
_Iregion_3		-.0436419	.0039147	-11.15	0.000	-.0513152	-.0359687
_Iregion_4		.0116857	.0030889	3.78	0.000	.0056312	.0177401
officetotret		3.29937	.0865793	38.11	0.000	3.129667	3.469074
age		-.000271	.0000946	-2.86	0.004	-.0004565	-.0000855
sqft		-1.27e-08	1.83e-09	-6.94	0.000	-1.63e-08	-9.13e-09
stype		.0453362	.0038653	11.73	0.000	.0377599	.0529124
regensu		-.0010545	.0052966	-0.20	0.842	-.0114362	.0093273
regencb		-.0069064	.0093894	-0.74	0.462	-.0253106	.0114978
estar		-.0071437	.0033835	-2.11	0.035	-.0137757	-.0005118
transitsu		.0153074	.0042646	3.59	0.000	.0069485	.0236663
transitcb		-.0227833	.0043104	-5.29	0.000	-.0312321	-.0143346
_cons		.9674078	.0151236	63.97	0.000	.9377642	.9970514

Total returns includes appreciation (or depreciation), realized capital gain (or loss) and income. It is computed by adding the Income and Capital Appreciation return on a quarterly basis. As such, it gives us a picture of the net result of the effects of RPI features on appreciation and income returns. Generally, the net results expressed by total returns showed that, with one exception, RPI features were either positive or neutral for returns.

For urban regeneration properties, total returns were not significantly higher or lower than other properties.

Energy Star properties had slightly lower total returns. The higher capital appreciation returns were offset by lower income returns. This suggests that the higher incomes associated with these properties produced higher values. The higher values produced higher appreciation returns but they were offset by lower income returns. This is a perfect example of how higher income and value doesn't necessarily produce higher investment returns.

These findings are illustrated in the following graphic. Energy Star properties had higher NOI per square foot. But they also had a higher value per square foot. On balance they performed virtually the same as other properties, as shown by the following graph of total return over time.

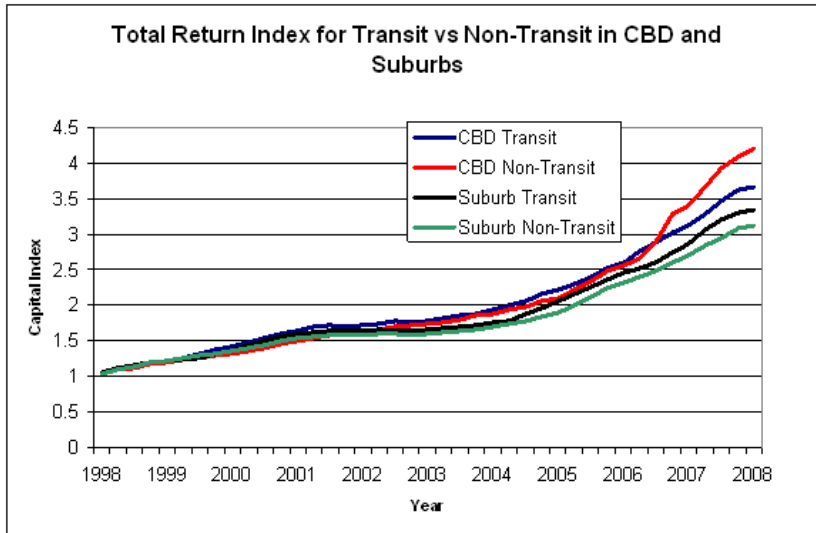


This does not mean that developers of new Energy Star properties or capital projects that reduced energy use did not earn a greater return. Since Energy Star properties have higher NOI and this is recognized in their higher market value, they have a higher value once built and operating. Depending on the cost of making the properties Energy Star compliant, developers could have made a profit so long as the added value exceeded the added cost. If the NOI and value had not been higher than we could not say this.

Properties near transit were a different story. Total returns were significantly higher for properties near transit in the suburbs (compared to other properties in the suburbs) and significantly lower for properties near transit in the CBDs (compared to other properties in the CBDs). Recall that capital appreciation was significantly higher for suburban transit properties and significantly lower for CBD transit properties (compared to other suburban and CBD properties, respectively). But investors did not have to pay a premium for the properties near transit in the suburb as they did in



the CBD. Thus the total return was higher for the properties near transit in the suburbs. This is illustrated below. Note that both CBD transit and non-transit properties outperformed both types of properties in the suburbs. But within the CBD and suburbs, non-transit did better than transit in the CBD whereas transit did better than non-transit in the suburbs. This is consistent with all of our other findings on the differences between the CBDs and suburbs for transit properties.



### Summary and Discussion of Results

1. According to the portfolio analysis, investors in a portfolio of just RPI properties would have earned a slightly higher return at slightly lower risk compared to a portfolio of all non-RPI properties between 1998 and 2008.
2. The following table summarizes the regression coefficients for the RPI variables. In general, RPI properties were purchased at lower capitalization rates, suggesting that buyers expected more price appreciation, income growth or lower risk; and they actually received more price appreciation over this time period. The exception is properties near transit. In the CBDs properties near transit were purchased at lower capitalization rates but received less price appreciation while in the suburbs properties near transit were purchased at the same capitalization rate as other suburban properties but received more price appreciation.

### Summary of Regression Coefficients for RPI Variables

	NOI	Market Value	Capital Appreciation Return	Income Return (Cap Rate)	Total Return
estar	.217*	.135*	.001	-.006*	-.007*
regensu	.170	.028	.002	-.001	-.001
regencb	.217*	.105*	.002	-.001	-.007
transitsu	.652*	.160*	.012*	.000	.015*
transitcb	-.697*	-.075*	-.012*	-.005*	-.023*

\* = significant at .05 level

3. Although CBD properties had higher market values and higher NOI (per square foot) than suburban properties, properties near a transit line in a CBD had lower values and lower NOI compared to other CBD properties. On the other hand, properties near transit lines in the suburbs had higher values and higher NOI relative to other properties in the suburbs.

4. Investors in properties near transit lines in the suburbs were able to purchase properties at the same cap rates (ratio of NOI to value) as similar properties that were not near transit lines. The properties near transit lines in the suburb achieved more price appreciation. Thus, total returns were higher for properties near transit lines in the suburbs than for properties not near transit lines in the suburbs.
5. In the CBDs, however, investors paid a premium for properties near transit lines (lower cap rate) and received less price appreciation than properties not near transit. Therefore the returns for properties near transit lines in the CBDs were not as good compared to properties that were not near transit lines in the CBDs.
6. Buildings in or near an urban regeneration zone in the CBDs and suburbs had a higher market value per square foot than other properties, particularly in the CBDs. Because NOI was also higher, the returns were not significantly different from properties not near urban regeneration zones.
7. Energy Star properties had higher NOI per square foot but they were purchased at higher prices (lower cap rate) and their price appreciation was virtually the same as for non Energy Star properties. So their total return was about the same.
8. Developers of Energy Star properties may have earned higher returns by developing these properties since they did have higher values. This depends on costs of earning the Energy Star label. But the evidence suggests that the value upon completion may be as much as 14% higher than non-Energy Star properties.
9. Understanding the impact of RPI factors on NOI, property values, cap rates, and expected importance and how that differs by location, especially the CBDs versus the suburbs, is clearly important.

## Conclusion

These findings have several implications for the practice of Responsible Property Investing.

First, real estate executives can invest in these types of properties with greater confidence, knowing that over the past decade they have neither harmed total returns nor increased risk.

Second, it may be possible to develop more specialized portfolios or funds focused on energy efficient, transit-oriented, and urban regeneration properties capable of producing returns on par with more conventional portfolios. While some funds of this nature can already be found (e.g. the Morley igloo Urban Regeneration Fund), there is growing interest in the creation of more such funds among socially responsible investors and other stakeholders committed to “less automobile-dependent and more energy-efficient cities where worker well-being and urban revitalization are priorities.”

Third, the fact that these types of RPI properties have not significantly outperformed other properties suggests that capital will not flow disproportionately toward RPI in search of higher risk adjusted returns. While investors may move in this direction for other reasons with the knowledge that it will not dilute returns, there is no strong financial impulse for doing so. This may change if trends in energy prices and global warming shift tenant demand toward the types of properties in this study, if they continue to put pressure on the cost of operating inefficient buildings, and if they continue to worry investors that conventional buildings may lose value relative to more responsible “future proofed” alternatives. But so far, we do not see substantial financial trends leading to significant shift in capital flows. Faster transformation may depend on regulations and incentives being joined with the investment opportunities documented here. Nevertheless, we may be coming from a time when, given tenant and investor ignorance and apathy, appraisers were not expected to consider RPI issues. It is worth noting that as we move into a world where investors and tenants are increasingly going to care, possibly a great deal more, about these issues, a greater economic difference in the appraisal and exchange value of RPI and non-RPI features may emerge (McNamara 2008).

Salzmann *et al.* (2005) found various shortcomings in prior empirical studies on the relationship between corporate financial and social/environmental performance including the use of a variety of sometimes poor measures, a lack of significance testing and control for interactions with other variables, inadequate sampling due to limited data

availability, and pan-sector samples which mask sector specific differences. The methods used here avoid these problems. The measures for financial performance are based on the industry standard established by NCREIF, the measures used for responsible properties are not combined into an opaque composite index but rather represent specific and transparent examples of property types defined in terms of recognized government and professional standards, statistical tests of significance and controls of potentially confounding variables are utilized, a large sample of all NCREIF properties is analyzed and only one property type is examined.

Hopefully, this will be the first in a series of studies on the relationship between investment returns and responsible property investing. Some productive study questions for future examination could include the following.

- 1) How do other RPI attributes affect office investment risk and returns? This could address features like water efficiency, fair labor practices, green building certification, childcare services, affordability, handicapped accessibility, indoor air quality, recycling, mixed use neighborhoods and other concerns of responsible property investors. In addition, what effects do they have in other types of property beyond offices?
- 2) What RPI features can feasibly be improved through cost-effective capital expenditures? RPI features that related to a property's location cannot be altered, but many others can be as properties are managed, maintained and refurbished. What are the best opportunities for maintaining or improving risk adjusted returns while upgrading the social or environmental performance of properties?
- 3) To what degree might the social or environmental performance of properties affect the level of institutional investment? Prior studies of equities suggest a positive relationship (Cox *et al.* 2004) but it is unclear whether such information may affect investment decisions in the property sector.
- 4) How can the data needed to address these questions be compiled? The data collections maintained by both for-profit and non-profit organizations were not designed to answer these kinds of questions. However, with some additional effort they could become very useful for answering questions about the social, environmental and financial performance of buildings and the relationships among them.

Investors wanting proof that Responsible Property Investing does not harm returns should be comforted by the findings of this study. At least for US office buildings, the record shows there are no penalties for investing in energy efficient, transit-oriented and urban regeneration properties; and in the case of energy efficiency, returns are generated at lower risk. Therefore, since RPI can produce social and environmental benefits and fulfill fiduciary duties, it would be economically irrational and ethically unjustifiable to not engage in Responsible Property Investing.

## Appendix: Rent Regression

Source	SS	df	MS	Number of obs =	15709
Model	955696.188	116	8238.76024	F(116, 15592) =	38.71
Residual	3318403.30	15592	212.827302	Prob > F =	0.0000
				R-squared =	0.2236
				Adj R-squared =	0.2178
Total	4274099.49	15708	272.096988	Root MSE =	14.589

inctotsf_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
transitcb	-3.863007	.6482214	-5.96	0.000	-5.133596	-2.592417
transitsu	1.120308	.4470104	2.51	0.012	.244116	1.996501
regensu	1.930424	1.172309	1.65	0.100	-.3674383	4.228286
regenb	1.66136	.7492184	2.22	0.027	.1928053	3.129915
estar	2.692404	.4231037	6.36	0.000	1.863072	3.521736
stype	8.429636	.5559638	15.16	0.000	7.339882	9.519389
sqft	-7.56e-06	1.15e-06	-6.56	0.000	-9.81e-06	-5.30e-06
sqft2	3.53e-12	7.26e-13	4.86	0.000	2.11e-12	4.95e-12
sqft3	-4.20e-19	8.63e-20	-4.87	0.000	-5.89e-19	-2.51e-19
floors	.1672862	.0164324	10.18	0.000	.1350768	.1994955
age	.0159715	.0096866	1.65	0.099	-.0030154	.0349584
_Icbas_10740	.8549177	5.009631	0.17	0.864	-8.964542	10.67438
_Icbas_11260	9.460787	6.05449	1.56	0.118	-2.406716	21.32829
_Icbas_12060	5.32411	3.952823	1.35	0.178	-2.423883	13.0721
_Icbas_12420	1.843383	3.995728	0.46	0.645	-5.988707	9.675474
_Icbas_12580	5.562704	4.013413	1.39	0.166	-2.304051	13.42946
_Icbas_13820	4.148746	4.341611	0.96	0.339	-4.361317	12.65881
_Icbas_14460	13.85619	3.945323	3.51	0.000	6.122896	21.58948
_Icbas_14500	6.420659	4.519526	1.42	0.155	-2.438137	15.27945
_Icbas_14860	19.53775	4.112871	4.75	0.000	11.47605	27.59945
_Icbas_15980	(dropped)					
_Icbas_16740	.5168898	4.085674	0.13	0.899	-7.491505	8.525284
_Icbas_16980	6.249498	3.928252	1.59	0.112	-1.450331	13.94933
_Icbas_17140	-.7759679	4.128574	-0.19	0.851	-8.868452	7.316516
_Icbas_17460	(dropped)					
_Icbas_17820	2.544357	4.494839	0.57	0.571	-6.266049	11.35476
_Icbas_18140	3.122881	4.12001	0.76	0.448	-4.952818	11.19858
_Icbas_18180	-.9285509	5.035409	-0.18	0.854	-10.79854	8.941435
_Icbas_19100	4.701371	3.939315	1.19	0.233	-3.020144	12.42289
_Icbas_19660	11.13726	11.03867	1.01	0.313	-10.4998	32.77433
_Icbas_19740	4.511603	3.950635	1.14	0.253	-3.232101	12.25531
_Icbas_19780	(dropped)					
_Icbas_19820	9.439208	4.077785	2.31	0.021	1.446277	17.43214
_Icbas_20500	7.030142	5.881369	1.20	0.232	-4.498023	18.55831
_Icbas_21340	(dropped)					
_Icbas_24660	.3141686	4.565072	0.07	0.945	-8.633903	9.26224
_Icbas_24860	-10.76938	7.625975	-1.41	0.158	-25.71718	4.178412
_Icbas_25420	-6.302798	5.019506	-1.26	0.209	-16.14161	3.536016
_Icbas_25540	6.866817	4.840413	1.42	0.156	-2.620954	16.35459
_Icbas_26180	4.569375	4.749461	0.96	0.336	-4.74012	13.87887
_Icbas_26420	2.229417	3.970436	0.56	0.574	-5.553098	10.01193
_Icbas_26900	-3.999849	4.262272	-0.94	0.348	-12.3544	4.354699
_Icbas_27260	1.972202	4.37882	0.45	0.652	-6.610793	10.5552
_Icbas_27940	9.958747	4.726434	2.11	0.035	.694388	19.22311
_Icbas_28140	5.670538	4.106474	1.38	0.167	-2.378627	13.7197

_Icbসা_28940	-8.611238	7.152132	-1.20	0.229	-22.63025	5.407771
_Icbসা_29820	(dropped)					
_Icbসা_30780	(dropped)					
_Icbসা_31100	13.94245	3.933898	3.54	0.000	6.231548	21.65334
_Icbসা_31140	-4.481098	4.949846	-0.91	0.365	-14.18337	5.221174
_Icbসা_31700	7.366454	6.237033	1.18	0.238	-4.858855	19.59176
_Icbসা_32820	1.979555	4.564877	0.43	0.665	-6.968133	10.92724
_Icbসা_33100	10.04255	3.958477	2.54	0.011	2.283476	17.80162
_Icbসা_33340	3.699203	4.147333	0.89	0.372	-4.430052	11.82846
_Icbসা_33460	4.166297	3.973844	1.05	0.294	-3.622898	11.95549
_Icbসা_34100	(dropped)					
_Icbসা_34940	14.13312	5.089333	2.78	0.005	4.157438	24.10881
_Icbসা_34980	3.685583	4.241892	0.87	0.385	-4.629019	12.00018
_Icbসা_35620	24.69196	3.953798	6.25	0.000	16.94206	32.44187
_Icbসা_36540	2.019351	6.473307	0.31	0.755	-10.66908	14.70778
_Icbসা_36740	2.97614	4.111973	0.72	0.469	-5.083803	11.03608
_Icbসা_37100	-4.631738	4.680595	-0.99	0.322	-13.80625	4.542771
_Icbসা_37980	7.145089	4.040777	1.77	0.077	-.7753018	15.06548
_Icbসা_38060	7.415226	3.96053	1.87	0.061	-.347872	15.17832
_Icbসা_38300	1.200159	4.077774	0.29	0.769	-6.792752	9.19307
_Icbসা_38860	-3.200101	9.339338	-0.34	0.732	-21.50629	15.10609
_Icbসা_38900	.8809236	3.995393	0.22	0.825	-6.95051	8.712357
_Icbসা_39300	-8.867298	5.272426	-1.68	0.093	-19.20186	1.467269
_Icbসা_39580	3.81974	4.271437	0.89	0.371	-4.552772	12.19225
_Icbসা_39900	(dropped)					
_Icbসা_40060	4.634028	6.060053	0.76	0.444	-7.24438	16.51244
_Icbসা_40140	6.820394	4.953896	1.38	0.169	-2.889816	16.53061
_Icbসা_40900	5.925597	4.064484	1.46	0.145	-2.041264	13.89246
_Icbসা_41180	8.161292	4.172298	1.96	0.050	-.0168966	16.33948
_Icbসা_41500	7.231281	9.290129	0.78	0.436	-10.97845	25.44101
_Icbসা_41540	17.83404	5.769781	3.09	0.002	6.524597	29.14348
_Icbসা_41620	-6.467978	4.404758	-1.47	0.142	-15.10181	2.165858
_Icbসা_41700	-1.818723	4.176511	-0.44	0.663	-10.00517	6.367723
_Icbসা_41740	8.110817	3.966964	2.04	0.041	.3351081	15.88653
_Icbসা_41860	16.64095	3.930164	4.23	0.000	8.93737	24.34452
_Icbসা_41940	14.04302	3.995078	3.52	0.000	6.212203	21.87384
_Icbসা_42060	10.02322	8.27956	1.21	0.226	-6.205677	26.25212
_Icbসা_42220	5.092033	6.042323	0.84	0.399	-6.751622	16.93569
_Icbসা_42660	6.961075	3.981606	1.75	0.080	-.8433339	14.76548
_Icbসা_42680	9.098174	11.03782	0.82	0.410	-12.53724	30.73359
_Icbসা_43780	.0388063	5.265737	0.01	0.994	-10.28265	10.36026
_Icbসা_43900	6.678297	15.11387	0.44	0.659	-22.94664	36.30324
_Icbসা_45220	-.8714493	4.754417	-0.18	0.855	-10.19066	8.44776
_Icbসা_45300	5.531945	4.031174	1.37	0.170	-2.369624	13.43351
_Icbসা_45820	-2.813581	5.090438	-0.55	0.580	-12.79143	7.164269
_Icbসা_45940	17.27143	4.31191	4.01	0.000	8.81959	25.72328
_Icbসা_46060	(dropped)					
_Icbসা_46140	(dropped)					
_Icbসা_47260	-5.935359	5.89575	-1.01	0.314	-17.49171	5.620995
_Icbসা_47900	15.09889	3.923163	3.85	0.000	7.409032	22.78874
_Icbসা_49340	10.84147	5.529212	1.96	0.050	.0035687	21.67936
_Icbসা_99999	4.548451	4.724382	0.96	0.336	-4.711886	13.80879
_Iyyyy~20011	.2045278	1.21568	0.17	0.866	-2.178347	2.587402
_Iyyyy~20012	1.379046	1.191583	1.16	0.247	-.9565949	3.714688
_Iyyyy~20013	2.059896	1.186394	1.74	0.083	-.2655732	4.385366
_Iyyyy~20014	3.563105	1.164442	3.06	0.002	1.280663	5.845547
_Iyyyy~20021	3.172907	1.162728	2.73	0.006	.8938248	5.451989

_Iyyyy~20022		4.011961	1.150409	3.49	0.000	1.757026	6.266896
_Iyyyy~20023		3.560293	1.131425	3.15	0.002	1.342568	5.778018
_Iyyyy~20024		4.1212	1.112234	3.71	0.000	1.941092	6.301308
_Iyyyy~20031		4.001251	1.073099	3.73	0.000	1.897853	6.104649
_Iyyyy~20032		3.768616	1.071764	3.52	0.000	1.667834	5.869398
_Iyyyy~20033		3.195625	1.079322	2.96	0.003	1.080029	5.311221
_Iyyyy~20034		2.640847	1.07446	2.46	0.014	.5347803	4.746914
_Iyyyy~20041		3.231262	1.06819	3.02	0.002	1.137486	5.325038
_Iyyyy~20042		3.27262	1.069336	3.06	0.002	1.176597	5.368642
_Iyyyy~20043		2.376257	1.068269	2.22	0.026	.282326	4.470188
_Iyyyy~20044		1.539971	1.070225	1.44	0.150	-.5577934	3.637736
_Iyyyy~20051		1.571368	1.078369	1.46	0.145	-.5423599	3.685095
_Iyyyy~20052		1.038713	1.077279	0.96	0.335	-1.07288	3.150305
_Iyyyy~20053		1.060253	1.079398	0.98	0.326	-1.055493	3.175998
_Iyyyy~20054		.8447737	1.069006	0.79	0.429	-1.250603	2.94015
_Iyyyy~20061		.7654688	1.079035	0.71	0.478	-1.349566	2.880503
_Iyyyy~20062		.863866	1.077387	0.80	0.423	-1.247938	2.97567
_Iyyyy~20063		1.339355	1.075101	1.25	0.213	-.7679686	3.446678
_Iyyyy~20064		1.526047	1.076015	1.42	0.156	-.5830678	3.635161
_Iyyyy~20071		2.036556	1.066201	1.91	0.056	-.0533214	4.126434
_Iyyyy~20072		2.776815	1.075317	2.58	0.010	.669069	4.88456
_Iyyyy~20073		3.241602	1.071687	3.02	0.002	1.140972	5.342233
_Iyyyy~20074		3.83921	1.066041	3.60	0.000	1.749646	5.928774
_Iyyyy~20081		4.187814	1.0692	3.92	0.000	2.092059	6.28357
_cons		13.01221	4.003968	3.25	0.001	5.163969	20.86045

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## Appendix: Occupancy Regression

Source	SS	df	MS	Number of obs =	20477
Model	43.7037776	124	.35244982	F(124, 20352) =	19.99
Residual	358.873952	20352	.017633351	Prob > F =	0.0000
				R-squared =	0.1086
				Adj R-squared =	0.1031
Total	402.57773	20476	.019660956	Root MSE =	.13279

occupancy	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
transitcb	.0050431	.005117	0.99	0.324	-.0049866	.0150729
transitsu	.0161689	.0035286	4.58	0.000	.0092526	.0230853
regensu	-.0108241	.0091342	-1.19	0.236	-.0287279	.0070796
regencb	-.0035622	.0060273	-0.59	0.555	-.0153762	.0082518
estar	.0037464	.0034036	1.10	0.271	-.0029248	.0104177
stype	.0306804	.004392	6.99	0.000	.0220719	.039289
sqft	-2.67e-08	9.10e-09	-2.94	0.003	-4.46e-08	-.8.88e-09
sqft2	2.56e-14	5.72e-15	4.47	0.000	1.44e-14	3.68e-14
sqft3	-3.56e-21	6.83e-22	-5.22	0.000	-4.90e-21	-2.23e-21
floors	-.0011719	.0001325	-8.84	0.000	-.0014317	-.0009122
age	-.0011235	.0000759	-14.81	0.000	-.0012722	-.0009748
_Icbসা_10740	-.0858426	.0419083	-2.05	0.041	-.1679863	-.003699
_Icbসা_11260	-.0387846	.0463499	-0.84	0.403	-.1296341	.0520648
_Icbসা_12060	-.1447424	.0326016	-4.44	0.000	-.2086441	-.0808406
_Icbসা_12420	-.0960313	.0329452	-2.91	0.004	-.1606065	-.0314562
_Icbসা_12580	-.0579038	.0331386	-1.75	0.081	-.1228582	.0070506
_Icbসা_12940	(dropped)					
_Icbসা_13820	-.0457484	.0358942	-1.27	0.202	-.1161039	.024607
_Icbসা_14460	-.1013314	.0325582	-3.11	0.002	-.1651481	-.0375147
_Icbসা_14500	-.0099229	.0376055	-0.26	0.792	-.0836326	.0637869
_Icbসা_14860	-.086571	.0339419	-2.55	0.011	-.1530997	-.0200422
_Icbসা_15980	(dropped)					
_Icbসা_16180	.0265347	.0993366	0.27	0.789	-.1681731	.2212424
_Icbসা_16740	-.0959546	.0335596	-2.86	0.004	-.1617341	-.0301751
_Icbসা_16980	-.1070164	.0324338	-3.30	0.001	-.1705893	-.0434435
_Icbসা_17140	-.0899066	.0340225	-2.64	0.008	-.1565935	-.0232197
_Icbসা_17460	(dropped)					
_Icbসা_17820	-.1087521	.0366614	-2.97	0.003	-.1806115	-.0368928
_Icbসা_18140	-.1490732	.0338216	-4.41	0.000	-.2153663	-.08278
_Icbসা_18180	.0094224	.0421073	0.22	0.823	-.0731112	.091956
_Icbসা_19100	-.1194533	.0325227	-3.67	0.000	-.1832004	-.0557062
_Icbসা_19660	-.0575334	.0676167	-0.85	0.395	-.1900674	.0750007
_Icbসা_19740	-.1255229	.0326059	-3.85	0.000	-.1894332	-.0616126
_Icbসা_19780	-.1613626	.0832564	-1.94	0.053	-.3245519	.0018267
_Icbসা_19820	-.1438253	.0337473	-4.26	0.000	-.2099728	-.0776778
_Icbসা_20500	.0006902	.0479483	0.01	0.989	-.0932924	.0946728
_Icbসা_21340	(dropped)					
_Icbসা_23420	.0615268	.0993565	0.62	0.536	-.13322	.2562737
_Icbসা_24340	(dropped)					
_Icbসা_24660	-.0726979	.03795	-1.92	0.055	-.1470829	.0016871
_Icbসা_24860	-.0350172	.0571215	-0.61	0.540	-.1469799	.0769455
_Icbসা_25420	.0072068	.0419786	0.17	0.864	-.0750747	.0894883
_Icbসা_25540	-.072929	.0392956	-1.86	0.063	-.1499514	.0040935
_Icbসা_26180	-.1396687	.038365	-3.64	0.000	-.2148671	-.0644703

_Icbসা_26420		-.1036393	.0327509	-3.16	0.002	-.1678336	-.039445
_Icbসা_26900		-.1554167	.0348785	-4.46	0.000	-.2237814	-.087052
_Icbসা_27260		-.1705238	.0359802	-4.74	0.000	-.2410478	-.0999998
_Icbসা_27940		.0016	.0396744	0.04	0.968	-.0761649	.079365
_Icbসা_28140		-.1007468	.0339133	-2.97	0.003	-.1672195	-.0342741
_Icbসা_28940		-.226408	.055003	-4.12	0.000	-.3342183	-.1185977
_Icbসা_29820		-.0067189	.0631698	-0.11	0.915	-.1305368	.1170989
_Icbসা_30780		(dropped)					
_Icbসা_31100		-.0711468	.0324552	-2.19	0.028	-.1347616	-.007532
_Icbসা_31140		-.1236867	.0414422	-2.98	0.003	-.2049168	-.0424566
_Icbসা_31700		-.1204838	.0470686	-2.56	0.010	-.212742	-.0282256
_Icbসা_32820		-.1299638	.0378298	-3.44	0.001	-.2041133	-.0558143
_Icbসা_33100		-.0981612	.03266	-3.01	0.003	-.1621774	-.0341451
_Icbসা_33340		-.0925479	.0342859	-2.70	0.007	-.1597509	-.0253449
_Icbসা_33460		-.124662	.0327991	-3.80	0.000	-.188951	-.0603731
_Icbসা_34100		(dropped)					
_Icbসা_34940		-.0953068	.0405973	-2.35	0.019	-.1748807	-.0157329
_Icbসা_34980		-.0234267	.0350644	-0.67	0.504	-.0921557	.0453023
_Icbসা_35300		(dropped)					
_Icbসা_35380		(dropped)					
_Icbসা_35620		-.0478395	.0326081	-1.47	0.142	-.1117541	.0160751
_Icbসা_36540		-.0275353	.051436	-0.54	0.592	-.1283541	.0732835
_Icbসা_36740		-.1173011	.0337587	-3.47	0.001	-.1834708	-.0511314
_Icbসা_37100		-.0647255	.0383498	-1.69	0.091	-.1398942	.0104432
_Icbসা_37980		-.0727776	.0332163	-2.19	0.028	-.1378842	-.0076711
_Icbসা_38060		-.0826917	.0326643	-2.53	0.011	-.1467163	-.0186671
_Icbসা_38300		-.0918942	.0336854	-2.73	0.006	-.1579203	-.0258682
_Icbসা_38860		.0839887	.0635542	1.32	0.186	-.0405827	.20856
_Icbসা_38900		-.0575726	.0329818	-1.75	0.081	-.1222196	.0070745
_Icbসা_39300		.035361	.0443808	0.80	0.426	-.051629	.1223509
_Icbসা_39580		-.0936513	.0349515	-2.68	0.007	-.162159	-.0251436
_Icbসা_39900		-.1109084	.0994147	-1.12	0.265	-.3057693	.0839524
_Icbসা_40060		-.0930996	.0490739	-1.90	0.058	-.1892885	.0030893
_Icbসা_40140		-.0003959	.0393142	-0.01	0.992	-.0774549	.0766632
_Icbসা_40900		-.0787933	.0335114	-2.35	0.019	-.1444784	-.0131082
_Icbসা_41180		-.1276921	.0341428	-3.74	0.000	-.1946147	-.0607695
_Icbসা_41500		-.0427513	.0631088	-0.68	0.498	-.1664497	.0809471
_Icbসা_41540		-.2089868	.0472682	-4.42	0.000	-.3016362	-.1163373
_Icbসা_41620		-.0970824	.0357182	-2.72	0.007	-.1670929	-.0270718
_Icbসা_41700		-.1508042	.0344528	-4.38	0.000	-.2183344	-.083274
_Icbসা_41740		-.0655299	.0326803	-2.01	0.045	-.129586	-.0014738
_Icbসা_41860		-.0872207	.0324476	-2.69	0.007	-.1508205	-.0236208
_Icbসা_41940		-.1169705	.0329114	-3.55	0.000	-.1814795	-.0524614
_Icbসা_42060		-.0353819	.0596723	-0.59	0.553	-.1523445	.0815806
_Icbসা_42220		-.0381894	.0489388	-0.78	0.435	-.1341134	.0577345
_Icbসা_42660		-.0625017	.0328208	-1.90	0.057	-.1268332	.0018297
_Icbসা_42680		-.0103392	.0676112	-0.15	0.878	-.1428625	.1221842
_Icbসা_43780		-.1708517	.0438096	-3.90	0.000	-.256722	-.0849813
_Icbসা_43900		.0143998	.0738568	0.19	0.845	-.1303655	.159165
_Icbসা_45220		-.0331264	.039883	-0.83	0.406	-.1113002	.0450474
_Icbসা_45300		-.0675939	.0332695	-2.03	0.042	-.1328048	-.002383
_Icbসা_45820		-.0514738	.0398925	-1.29	0.197	-.1296662	.0267186
_Icbসা_45940		-.0397725	.0358113	-1.11	0.267	-.1099655	.0304205
_Icbসা_46060		(dropped)					
_Icbসা_46140		(dropped)					
_Icbসা_47260		-.0560215	.0480585	-1.17	0.244	-.1502199	.038177
_Icbসা_47900		-.0582565	.0323893	-1.80	0.072	-.1217421	.0052291



_Icbasa_49340		-.1361095	.0438844	-3.10	0.002	-.2221265	-.0500925
_Icbasa_99999		-.1416892	.0390956	-3.62	0.000	-.2183197	-.0650586
_Iyyyy~20002		.000718	.0103252	0.07	0.945	-.0195203	.0209563
_Iyyyy~20003		.0116443	.0101718	1.14	0.252	-.0082933	.0315818
_Iyyyy~20004		.0160292	.0100556	1.59	0.111	-.0036806	.035739
_Iyyyy~20011		.0158804	.0099156	1.60	0.109	-.0035549	.0353157
_Iyyyy~20012		.0092552	.0099057	0.93	0.350	-.0101608	.0286712
_Iyyyy~20013		-.0025987	.0099366	-0.26	0.794	-.0220753	.0168779
_Iyyyy~20014		-.0076954	.0097792	-0.79	0.431	-.0268634	.0114725
_Iyyyy~20021		-.0169323	.0095655	-1.77	0.077	-.0356816	.0018169
_Iyyyy~20022		-.0416645	.0091173	-4.57	0.000	-.0595353	-.0237938
_Iyyyy~20023		-.0501237	.0091187	-5.50	0.000	-.0679971	-.0322504
_Iyyyy~20024		-.0583799	.0091909	-6.35	0.000	-.0763947	-.0403651
_Iyyyy~20031		-.0694347	.0091433	-7.59	0.000	-.0873563	-.0515132
_Iyyyy~20032		-.0709834	.0090713	-7.83	0.000	-.0887638	-.053203
_Iyyyy~20033		-.0770427	.0090569	-8.51	0.000	-.0947949	-.0592904
_Iyyyy~20034		-.0822848	.0091007	-9.04	0.000	-.100123	-.0644466
_Iyyyy~20041		-.0852172	.0090712	-9.39	0.000	-.1029975	-.067437
_Iyyyy~20042		-.0773757	.0091104	-8.49	0.000	-.0952329	-.0595185
_Iyyyy~20043		-.0714196	.0090744	-7.87	0.000	-.0892061	-.0536331
_Iyyyy~20044		-.0716981	.0091048	-7.87	0.000	-.0895443	-.0538519
_Iyyyy~20051		-.0679249	.0090928	-7.47	0.000	-.0857475	-.0501023
_Iyyyy~20052		-.0630176	.0091001	-6.92	0.000	-.0808546	-.0451807
_Iyyyy~20053		-.0610173	.0090928	-6.71	0.000	-.0788399	-.0431947
_Iyyyy~20054		-.0551695	.0090887	-6.07	0.000	-.072984	-.0373549
_Iyyyy~20061		-.0440344	.0091413	-4.82	0.000	-.0619521	-.0261167
_Iyyyy~20062		-.0383607	.0090678	-4.23	0.000	-.0561343	-.0205871
_Iyyyy~20063		-.0369864	.0090537	-4.09	0.000	-.0547324	-.0192404
_Iyyyy~20064		-.0329108	.0090193	-3.65	0.000	-.0505893	-.0152324
_Iyyyy~20071		-.0315552	.0089812	-3.51	0.000	-.049159	-.0139514
_Iyyyy~20072		-.0285771	.0090391	-3.16	0.002	-.0462944	-.0108597
_Iyyyy~20073		-.0273151	.0090175	-3.03	0.002	-.0449902	-.00964
_Iyyyy~20074		-.0291243	.0089492	-3.25	0.001	-.0466654	-.0115832
_Iyyyy~20081		-.0318684	.0090212	-3.53	0.000	-.0495508	-.0141861
_cons		1.044649	.033117	31.54	0.000	.9797375	1.109561

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## Appendix: Total Expenses Regression

Source	SS	df	MS	Number of obs =	15122
Model	534615.399	117	4569.36238	F(117, 15004) =	144.23
Residual	475350.013	15004	31.6815525	Prob > F =	0.0000
				R-squared =	0.5293
				Adj R-squared =	0.5257
Total	1009965.41	15121	66.7922367	Root MSE =	5.6286

exptotsf_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IncSF	1.579272	.0156174	101.12	0.000	1.54866	1.609884
transitcb	.596108	.254382	2.34	0.019	.0974882	1.094728
transitsu	-.8628003	.1767252	-4.88	0.000	-1.209203	-.5163974
regensu	1.121188	.4745297	2.36	0.018	.1910517	2.051324
regenbc	.4843563	.2922939	1.66	0.098	-.0885755	1.057288
estar	.2460441	.1658908	1.48	0.138	-.079122	.5712102
stype	-.754129	.2204935	-3.42	0.001	-1.186323	-.3219349
sqft	-1.28e-06	4.54e-07	-2.83	0.005	-2.17e-06	-3.95e-07
sqft2	5.52e-13	2.84e-13	1.95	0.052	-3.77e-15	1.11e-12
sqft3	-5.75e-20	3.36e-20	-1.71	0.088	-1.23e-19	8.48e-21
floors	.0855744	.0064467	13.27	0.000	.072938	.0982107
age	.07193	.0038265	18.80	0.000	.0644296	.0794305
_Icbas_10740	3.907111	1.933081	2.02	0.043	.1180362	7.696187
_Icbas_11260	2.945496	2.336414	1.26	0.207	-1.634159	7.525152
_Icbas_12060	4.579807	1.527331	3.00	0.003	1.586051	7.573562
_Icbas_12420	4.42361	1.544037	2.86	0.004	1.397109	7.450111
_Icbas_12580	3.957833	1.549902	2.55	0.011	.919837	6.995829
_Icbas_13820	3.233224	1.675221	1.93	0.054	-.050413	6.516862
_Icbas_14460	4.311049	1.523818	2.83	0.005	1.32418	7.297918
_Icbas_14500	1.910855	1.743935	1.10	0.273	-1.507471	5.329182
_Icbas_14860	4.28514	1.590064	2.69	0.007	1.16842	7.401859
_Icbas_15980	(dropped)					
_Icbas_16740	2.726954	1.578203	1.73	0.084	-.3665164	5.820425
_Icbas_16980	4.911289	1.516079	3.24	0.001	1.939589	7.882989
_Icbas_17140	4.459934	1.596829	2.79	0.005	1.329954	7.589914
_Icbas_17460	(dropped)					
_Icbas_17820	3.745651	1.768285	2.12	0.034	.2795966	7.211706
_Icbas_18140	6.599162	1.594551	4.14	0.000	3.473648	9.724676
_Icbas_18180	3.944069	1.942813	2.03	0.042	.1359174	7.75222
_Icbas_19100	5.007751	1.520686	3.29	0.001	2.027021	7.988482
_Icbas_19660	8.211315	4.259228	1.93	0.054	-.1372912	16.55992
_Icbas_19740	5.765002	1.525321	3.78	0.000	2.775187	8.754817
_Icbas_19780	(dropped)					
_Icbas_19820	4.637002	1.57955	2.94	0.003	1.540891	7.733114
_Icbas_20500	2.647058	2.269428	1.17	0.243	-1.801298	7.095415
_Icbas_21340	(dropped)					
_Icbas_24660	.8839158	1.76138	0.50	0.616	-2.568603	4.336435
_Icbas_24860	4.971109	2.942932	1.69	0.091	-.7973965	10.73961
_Icbas_25420	7.260884	1.937136	3.75	0.000	3.46386	11.05791
_Icbas_25540	5.966883	1.867724	3.19	0.001	2.305916	9.627849
_Icbas_26180	7.90193	1.832769	4.31	0.000	4.309479	11.49438
_Icbas_26420	5.3158	1.533281	3.47	0.001	2.310383	8.321217
_Icbas_26900	4.852473	1.651775	2.94	0.003	1.614792	8.090154
_Icbas_27260	4.860574	1.719312	2.83	0.005	1.490512	8.230637

_Icbসা_27940		2.827626	1.824089	1.55	0.121	-.7478104	6.403062
_Icbসা_28140		4.708052	1.584581	2.97	0.003	1.60208	7.814024
_Icbসা_28940		8.534255	2.945928	2.90	0.004	2.759876	14.30863
_Icbসা_29820		(dropped)					
_Icbসা_30780		(dropped)					
_Icbসা_31100		4.071652	1.518868	2.68	0.007	1.094485	7.048818
_Icbসা_31140		3.000259	1.910387	1.57	0.116	-.744333	6.74485
_Icbসা_31700		5.310149	2.406483	2.21	0.027	.5931494	10.02715
_Icbসা_32820		6.893527	1.774378	3.89	0.000	3.41553	10.37152
_Icbসা_33100		6.022681	1.527916	3.94	0.000	3.027779	9.017582
_Icbসা_33340		5.176701	1.601956	3.23	0.001	2.036671	8.316731
_Icbসা_33460		6.019305	1.535914	3.92	0.000	3.008727	9.029884
_Icbসা_34100		(dropped)					
_Icbসা_34940		6.390431	1.963888	3.25	0.001	2.540971	10.23989
_Icbসা_34980		2.757395	1.640741	1.68	0.093	-.458657	5.973448
_Icbসা_35620		5.636282	1.529082	3.69	0.000	2.639095	8.633469
_Icbসা_36540		3.709547	2.608517	1.42	0.155	-1.403465	8.822558
_Icbসা_36740		4.33891	1.58844	2.73	0.006	1.225373	7.452447
_Icbসা_37100		2.946289	1.824257	1.62	0.106	-.6294767	6.522054
_Icbসা_37980		3.108447	1.561109	1.99	0.046	.048482	6.168412
_Icbসা_38060		4.687192	1.529877	3.06	0.002	1.688446	7.685938
_Icbসা_38300		4.733645	1.574879	3.01	0.003	1.64669	7.8206
_Icbসা_38860		-3.139328	3.604312	-0.87	0.384	-10.20422	3.925565
_Icbসা_38900		2.409018	1.541693	1.56	0.118	-.6128878	5.430924
_Icbসা_39300		1.525795	2.063042	0.74	0.460	-2.518019	5.569608
_Icbসা_39580		3.431939	1.650001	2.08	0.038	.1977352	6.666144
_Icbসা_39900		(dropped)					
_Icbসা_40060		3.702492	2.338484	1.58	0.113	-.8812229	8.286207
_Icbসা_40140		3.165633	1.911647	1.66	0.098	-.5814283	6.912695
_Icbসা_40900		2.988598	1.569128	1.90	0.057	-.0870835	6.064279
_Icbসা_41180		6.113947	1.60993	3.80	0.000	2.958287	9.269607
_Icbসা_41500		2.731429	3.584577	0.76	0.446	-4.294779	9.757636
_Icbসা_41540		4.644058	2.226843	2.09	0.037	.2791749	9.008942
_Icbসা_41620		3.022004	1.703529	1.77	0.076	-.3171201	6.361128
_Icbসা_41700		6.618289	1.614813	4.10	0.000	3.453058	9.78352
_Icbসা_41740		2.329032	1.531111	1.52	0.128	-.6721338	5.330197
_Icbসা_41860		3.738575	1.517473	2.46	0.014	.7641426	6.713007
_Icbসা_41940		2.086968	1.544334	1.35	0.177	-.9401146	5.11405
_Icbসা_42060		.8801554	3.194774	0.28	0.783	-5.381992	7.142303
_Icbসা_42220		5.391615	2.405918	2.24	0.025	.675721	10.10751
_Icbসা_42660		2.181572	1.536707	1.42	0.156	-.8305615	5.193705
_Icbসা_42680		2.511158	4.258905	0.59	0.555	-5.836814	10.85913
_Icbসা_43780		5.715031	2.060079	2.77	0.006	1.677024	9.753037
_Icbসা_43900		.3861122	5.831592	0.07	0.947	-11.04452	11.81674
_Icbসা_45220		4.785256	1.834741	2.61	0.009	1.18894	8.381572
_Icbসা_45300		4.847167	1.555737	3.12	0.002	1.797733	7.896601
_Icbসা_45820		5.960714	2.062889	2.89	0.004	1.9172	10.00423
_Icbসা_45940		2.51173	1.665015	1.51	0.131	-.7519029	5.775363
_Icbসা_46060		(dropped)					
_Icbসা_46140		(dropped)					
_Icbসা_47260		3.232659	2.411756	1.34	0.180	-1.494677	7.959994
_Icbসা_47900		1.970321	1.514815	1.30	0.193	-.9989026	4.939544
_Icbসা_49340		6.149896	2.133654	2.88	0.004	1.967674	10.33212
_Icbসা_99999		7.469695	1.880115	3.97	0.000	3.78444	11.15495
_Iyyyy~20011		.0056523	.4803895	0.01	0.991	-.9359698	.9472744
_Iyyyy~20012		.3060061	.4707931	0.65	0.516	-.6168058	1.228818
_Iyyyy~20013		.3875136	.4675006	0.83	0.407	-.5288445	1.303872

_Iyyyy~20014		.8465485	.458691	1.85	0.065	-.0525418	1.745639
_Iyyyy~20021		.5525787	.4574446	1.21	0.227	-.3440686	1.449226
_Iyyyy~20022		.7895954	.452107	1.75	0.081	-.0965896	1.67578
_Iyyyy~20023		1.02319	.4466403	2.29	0.022	.1477203	1.898659
_Iyyyy~20024		1.100969	.4395953	2.50	0.012	.2393089	1.96263
_Iyyyy~20031		1.452438	.4247577	3.42	0.001	.6198614	2.285015
_Iyyyy~20032		1.819413	.4249202	4.28	0.000	.9865178	2.652309
_Iyyyy~20033		1.997842	.4271005	4.68	0.000	1.160673	2.835011
_Iyyyy~20034		2.01305	.4257435	4.73	0.000	1.178541	2.847559
_Iyyyy~20041		2.391349	.4229884	5.65	0.000	1.56224	3.220458
_Iyyyy~20042		2.212414	.4241791	5.22	0.000	1.380971	3.043856
_Iyyyy~20043		1.798532	.4236359	4.25	0.000	.9681543	2.62891
_Iyyyy~20044		1.932887	.4252862	4.54	0.000	1.099275	2.7665
_Iyyyy~20051		1.766357	.4274537	4.13	0.000	.9284956	2.604218
_Iyyyy~20052		1.940322	.4276407	4.54	0.000	1.102094	2.77855
_Iyyyy~20053		1.738836	.4284751	4.06	0.000	.8989722	2.578699
_Iyyyy~20054		1.642917	.4257364	3.86	0.000	.8084215	2.477412
_Iyyyy~20061		1.482813	.4285996	3.46	0.001	.6427053	2.32292
_Iyyyy~20062		1.370498	.4276449	3.20	0.001	.5322614	2.208734
_Iyyyy~20063		1.479701	.4269582	3.47	0.001	.6428105	2.316591
_Iyyyy~20064		1.494006	.4270085	3.50	0.000	.6570177	2.330995
_Iyyyy~20071		1.281097	.4229776	3.03	0.002	.4520091	2.110185
_Iyyyy~20072		1.178797	.4258227	2.77	0.006	.3441329	2.013462
_Iyyyy~20073		1.413211	.4242272	3.33	0.001	.581674	2.244748
_Iyyyy~20074		1.248317	.4233279	2.95	0.003	.4185426	2.078091
_Iyyyy~20081		1.405969	.4234697	3.32	0.001	.5759168	2.236021
_cons		-5.703611	1.548401	-3.68	0.000	-8.738666	-2.668555

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## Appendix: Utility Expense Regression

Source	SS	df	MS	Number of obs =	19427
Model	39370.1123	118	333.64502	F(118, 19308) =	198.27
Residual	32491.312	19308	1.68279014	Prob > F =	0.0000
				R-squared =	0.5479
				Adj R-squared =	0.5451
Total	71861.4243	19426	3.69923939	Root MSE =	1.2972

utilsf_yr	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IncSF	.3002781	.0022845	131.44	0.000	.2958002	.304756
estar	-.2317672	.034885	-6.64	0.000	-.3001448	-.1633896
stype	-.3073285	.0298144	-10.31	0.000	-.3657672	-.2488897
sqft	-9.99e-07	9.15e-08	-10.92	0.000	-1.18e-06	-8.20e-07
sqft2	5.72e-13	5.99e-14	9.56	0.000	4.55e-13	6.90e-13
sqft3	-6.42e-20	7.21e-21	-8.90	0.000	-7.83e-20	-5.01e-20
floors	.0045122	.0013065	3.45	0.001	.0019514	.007073
age	.0141087	.0007345	19.21	0.000	.012669	.0155484
_Icbসা_11260	-1.157932	.4867851	-2.38	0.017	-2.112073	-.2037908
_Icbসা_12060	-.5518025	.2649699	-2.08	0.037	-1.071167	-.0324384
_Icbসা_12420	-.5820062	.2680047	-2.17	0.030	-1.107319	-.0566936
_Icbসা_12580	.3684539	.2742351	1.34	0.179	-.1690707	.9059785
_Icbসা_13820	-.0961983	.2884261	-0.33	0.739	-.6615385	.4691418
_Icbসা_14460	-.157042	.2651598	-0.59	0.554	-.6767782	.3626943
_Icbসা_14500	-.5343864	.2936551	-1.82	0.069	-1.109976	.0412031
_Icbসা_14860	-.467061	.2774611	-1.68	0.092	-1.010909	.0767867
_Icbসা_15980	-1.479444	.5907423	-2.50	0.012	-2.63735	-.3215373
_Icbসা_16740	-.6550873	.2756266	-2.38	0.017	-1.195339	-.1148352
_Icbসা_16980	-1.189779	.2629461	-4.52	0.000	-1.705176	-.6743817
_Icbসা_17140	-.2171123	.2825825	-0.77	0.442	-.7709986	.336774
_Icbসা_17460	(dropped)					
_Icbসা_17820	-.3841166	.3411849	-1.13	0.260	-1.052869	.2846353
_Icbসা_18140	-.2770283	.2743222	-1.01	0.313	-.8147236	.260667
_Icbসা_18180	-.0975349	.3853604	-0.25	0.800	-.8528748	.6578049
_Icbসা_19100	-.2305135	.2647424	-0.87	0.384	-.7494315	.2884045
_Icbসা_19660	1.266236	.9543427	1.33	0.185	-.6043589	3.13683
_Icbসা_19740	-.3939724	.2658283	-1.48	0.138	-.915019	.1270742
_Icbসা_19820	-.3001782	.283395	-1.06	0.290	-.855657	.2553007
_Icbসা_20500	-.5082757	.4569144	-1.11	0.266	-1.403867	.3873162
_Icbসা_24660	-.6902254	.4170389	-1.66	0.098	-1.507658	.1272072
_Icbসা_24860	.1875492	.6374891	0.29	0.769	-1.061985	1.437083
_Icbসা_25420	-.039037	.3819004	-0.10	0.919	-.787595	.709521
_Icbসা_25540	.1559516	.3647255	0.43	0.669	-.5589421	.8708452
_Icbসা_26180	-.0131409	.3531662	-0.04	0.970	-.7053773	.6790955
_Icbসা_26420	-.0352526	.266872	-0.13	0.895	-.5583449	.4878398
_Icbসা_26900	-.1344614	.300259	-0.45	0.654	-.722995	.4540723
_Icbসা_27260	-.2211106	.3477119	-0.64	0.525	-.9026561	.460435
_Icbসা_27940	-.6214013	.3553698	-1.75	0.080	-1.317957	.0751545
_Icbসা_28140	-.4948598	.2794895	-1.77	0.077	-1.042683	.0529639
_Icbসা_28940	-1.290757	.6375423	-2.02	0.043	-2.540395	-.0411184
_Icbসা_29820	.7297538	.5055367	1.44	0.149	-.261142	1.72065
_Icbসা_30780	.5621516	.333549	1.69	0.092	-.0916335	1.215937

_Icbসা_31100		-.4343769	.263099	-1.65	0.099	-.9500736	.0813199
_Icbসা_31140		-.3288792	.3717495	-0.88	0.376	-1.05754	.3997821
_Icbসা_31700		-.3087196	.5053504	-0.61	0.541	-1.29925	.6818111
_Icbসা_32820		.4586943	.3391298	1.35	0.176	-.2060295	1.123418
_Icbসা_33100		-.2472736	.2659366	-0.93	0.352	-.7685323	.2739852
_Icbসা_33340		-.643886	.2951977	-2.18	0.029	-1.222499	-.0652729
_Icbসা_33460		-.2654769	.2671766	-0.99	0.320	-.7891662	.2582124
_Icbসা_34940		-.7198427	.3905248	-1.84	0.065	-1.485305	.0456198
_Icbসা_34980		-.3025941	.293198	-1.03	0.302	-.8772876	.2720994
_Icbসা_35620		.1475873	.2650864	0.56	0.578	-.372005	.6671797
_Icbসা_36540		-1.247615	.4866224	-2.56	0.010	-2.201437	-.2937928
_Icbসা_36740		-.2101216	.2776067	-0.76	0.449	-.7542548	.3340116
_Icbসা_37100		-.4471085	.3280715	-1.36	0.173	-1.090157	.1959401
_Icbসা_37980		-.045003	.2728884	-0.16	0.869	-.5798878	.4898819
_Icbসা_38060		-.7396228	.2673001	-2.77	0.006	-1.263554	-.2156914
_Icbসা_38300		-.0833012	.2723087	-0.31	0.760	-.6170499	.4504475
_Icbসা_38860		-1.155792	.795685	-1.45	0.146	-2.715404	.4038195
_Icbসা_38900		-.8752262	.2719615	-3.22	0.001	-1.408294	-.342158
_Icbসা_39300		-.197063	.6996508	-0.28	0.778	-1.568439	1.174313
_Icbসা_39580		-.4493032	.2838881	-1.58	0.114	-1.005749	.1071421
_Icbসা_39900		-.7281349	.3330498	-2.19	0.029	-1.380941	-.0753284
_Icbসা_40060		.0974775	.326702	0.30	0.765	-.5428869	.7378419
_Icbসা_40140		-.6094547	.3616027	-1.69	0.092	-1.318227	.0993179
_Icbসা_40900		-.8200063	.2790805	-2.94	0.003	-1.367028	-.2729843
_Icbসা_41180		-.6109228	.2794775	-2.19	0.029	-1.158723	-.0631227
_Icbসা_41500		-.8963024	.7936411	-1.13	0.259	-2.451908	.6593031
_Icbসা_41540		-.5289924	.4561351	-1.16	0.246	-1.423057	.365072
_Icbসা_41620		-.5223409	.2927503	-1.78	0.074	-1.096157	.0514751
_Icbসা_41700		-.2582747	.2879017	-0.90	0.370	-.8225871	.3060377
_Icbসা_41740		-1.151028	.2683358	-4.29	0.000	-1.676989	-.6250662
_Icbসা_41860		-.6900739	.2633696	-2.62	0.009	-1.206301	-.1738465
_Icbসা_41940		-.6157939	.2712672	-2.27	0.023	-1.147501	-.0840867
_Icbসা_42060		-.2554527	.6999387	-0.36	0.715	-1.627393	1.116488
_Icbসা_42220		.250275	.5055523	0.50	0.621	-.7406515	1.241201
_Icbসা_42660		-.8137904	.2664094	-3.05	0.002	-1.335976	-.2916048
_Icbসা_42680		-2.426309	.9544098	-2.54	0.011	-4.297035	-.5555827
_Icbসা_43780		-.1291799	.4092059	-0.32	0.752	-.9312589	.6728991
_Icbসা_43900		-1.085225	1.324069	-0.82	0.412	-3.680516	1.510066
_Icbসা_45220		-.2838081	.3543879	-0.80	0.423	-.9784391	.410823
_Icbসা_45300		-.1408651	.2731138	-0.52	0.606	-.6761919	.3944618
_Icbসা_45820		-.2912282	.4165151	-0.70	0.484	-1.107634	.5251776
_Icbসা_45940		-.4121843	.2999047	-1.37	0.169	-1.000024	.175655
_Icbসা_46060		1.548814	.9544622	1.62	0.105	-.3220153	3.419642
_Icbসা_46140		-1.530719	.5909634	-2.59	0.010	-2.689059	-.3723798
_Icbসা_47260		-.0651906	.3312039	-0.20	0.844	-.7143791	.5839979
_Icbসা_47900		-.9362301	.2631463	-3.56	0.000	-1.45202	-.4204406
_Icbসা_49340		-.7175893	.3193897	-2.25	0.025	-1.343621	-.0915578
_Icbসা_99999		-1.665597	.3204409	-5.20	0.000	-2.293689	-1.037505
_Iyyyy~20011		-.0499818	.1010225	-0.49	0.621	-.2479948	.1480311
_Iyyyy~20012		.0579288	.0981367	0.59	0.555	-.1344276	.2502852
_Iyyyy~20013		.1141718	.0973676	1.17	0.241	-.0766771	.3050206
_Iyyyy~20014		.1401767	.0954054	1.47	0.142	-.0468261	.3271795
_Iyyyy~20021		.097135	.0950291	1.02	0.307	-.0891303	.2834003
_Iyyyy~20022		.0865644	.0933328	0.93	0.354	-.096376	.2695048
_Iyyyy~20023		.1943238	.0921422	2.11	0.035	.013717	.3749306
_Iyyyy~20024		.184459	.0912903	2.02	0.043	.005522	.3633959
_Iyyyy~20031		.173786	.0876318	1.98	0.047	.0020201	.3455519

_Iyyyy~20032		.2221048	.0874946	2.54	0.011	.0506077	.3936019
_Iyyyy~20033		.2815366	.0878448	3.20	0.001	.1093531	.4537201
_Iyyyy~20034		.2923406	.0876307	3.34	0.001	.1205769	.4641043
_Iyyyy~20041		.3549469	.087198	4.07	0.000	.1840313	.5258626
_Iyyyy~20042		.2976031	.0872937	3.41	0.001	.1264999	.4687062
_Iyyyy~20043		.273284	.0873258	3.13	0.002	.1021178	.4444501
_Iyyyy~20044		.3104489	.08772	3.54	0.000	.1385102	.4823876
_Iyyyy~20051		.3048014	.0882423	3.45	0.001	.1318388	.477764
_Iyyyy~20052		.3399083	.0881314	3.86	0.000	.167163	.5126536
_Iyyyy~20053		.3771349	.0882797	4.27	0.000	.2040991	.5501708
_Iyyyy~20054		.4007779	.0878996	4.56	0.000	.228487	.5730687
_Iyyyy~20061		.3870229	.0885475	4.37	0.000	.2134622	.5605836
_Iyyyy~20062		.4096661	.0883704	4.64	0.000	.2364524	.5828797
_Iyyyy~20063		.5166542	.0879669	5.87	0.000	.3442314	.689077
_Iyyyy~20064		.5750027	.0879778	6.54	0.000	.4025585	.7474469
_Iyyyy~20071		.5368642	.0872474	6.15	0.000	.3658517	.7078767
_Iyyyy~20072		.4522607	.0877983	5.15	0.000	.2801685	.6243528
_Iyyyy~20073		.514287	.0873772	5.89	0.000	.34302	.685554
_Iyyyy~20074		.5011015	.0872362	5.74	0.000	.3301111	.672092
_Iyyyy~20081		.4581556	.0871419	5.26	0.000	.2873498	.6289613
_cons		.5337599	.2713169	1.97	0.049	.0019552	1.065565

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