RETURNS TO INDUSTRIAL REAL ESTATE

by

Joseph Andrew Callanan

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Signature of the Author

Joseph Andrew Callanan
Department of Urban Studies and Planning
July 29, 1988

Certified by

Dr. Marc Louargand
Lecturer, Department of Urban Studies and Planning
Thesis Supervisor

Accepted by

Michael Wheeler
Chairman
Interdepartmental Degree Program in Real Estate Development
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Joseph Andrew Callanan

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ABSTRACT

This thesis deals with returns to industrial real estate over economic cycles. Two distinct regional economies, Washington - Baltimore and Los Angeles, are examined and differentiated from the national economy. Returns to properties in these areas are examined to better understand the different effects that regional characteristics have on the investment returns to industrial property.

The results suggest that regional factors strongly affect returns to investment in industrial real estate. The industrial sector requires further classification of uses in order to properly assess its investment characteristics. The land component of warehouse property is a large factor in the investment process and is very susceptible to market forces. Consequently, the differing uses within the industrial sector have different demand factors causing distinct locational and reuse patterns that strongly influence these returns to investment.

Thesis supervisor: Dr. Marc Louargand
Lecturer
Department of Urban Studies and Planning
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INTRODUCTION

The industrial sector of the real estate business occupies the highest amount of built space and land in the United States and yet remains one of least studied and undocumented parts of the real estate industry. Industrial real estate has undergone tremendous changes in the past twenty years, reflecting fundamental changes in the industrial infrastructure of the country. In furthering the understanding of the behavior of returns to investment in industrial real estate, one can make better decisions with regard to the risks and rewards of this sector, especially for long term investment strategy.

Statement of the Problem

The purpose of this thesis is to examine the nature of returns to the industrial real estate sector. Real estate is a locational product, dependent not only on the national economic trends that influence investment decisions, but also extremely dependent on local factors in regional economies. Likewise, a regional economy may react differently to economic cycles than does the national economy because the regional economic fabric may be relatively self-contained. As a result, it may certainly be true that returns to investment in industrial real estate
may be affected by the regional economic forces. This study examines the extent of the relationship between these regional economic cycles and the national economic cycles in industrial real estate.

The study contains a survey of national economic forces that influence industrial real estate and the current data available on investment performance in industrial real estate. Two regional economies, Washington - Baltimore and Los Angeles, are examined in contrast with the national economy to understand the relative proportions by which certain factors affect and influence these returns. The returns are measured by a limited amount of actual return data, by the Frank Russell Index, and by overall vacancy rates. By looking at the correlations, one can draw conclusions about the nature of this property sector and propose which economic factors may be more important in assessing investment in industrial real estate. The overriding conclusion from this investigation is that the classification system for "industrial real estate" must be far more strictly organized in such a fashion that the many diverse users occupying such space be identified, allowing demand factors to be more accurately understood and analyzed. In so doing, the behavioral characteristics of these uses competing for industrial land will be more
understood with regard to the investment performance of industrial real estate.
Definition of Industrial Real Estate
In most metropolitan areas of the country, industrial real estate is a large component in the land market. Industrial outweighs office square footage 3 to 1 and in terms of land square footage, has a 16 to 1 advantage (Wheaton, 23). Within the industrial sector there is wholesale warehousing and manufacturing, with a host of flex (flexible, easily converted space with certain industrial uses) and various combinations within that spectrum. Over the last twenty years, manufacturing employment has not grown and wholesale activities have grown 80%. On top of that, wholesale is rapidly growing in terms of the amount of space and now occupies nearly 25% of industrial space whereas manufacturing is down to 75% from over 90% thirty years ago. (Wheaton, 23)

In its simplest form, industrial real estate might be considered the typical distribution warehouse or manufacturing facility. Construction is simple and inexpensive. Most buildings can be built in thirty days to six months to a year and can involve the simple "tilt-up"
structure and become more complex as additional office space or heavy machinery require higher construction standards. Other tenant considerations deal with proper loading dock numbers and height. Meanwhile, the boom in research and development has created an entire new type of product that is still classified within the industrial sector in addition to the "flex" and other hybrid forms of industrial products needed today. Unfortunately, no major studies have surveyed the amount of space in each category to assess the influences of each on local markets.

Location and Transportation
Location in industrial property is a major issue as with any real estate. Key factors are access to good transportation such as highway, rail, and ports. As highways have greatly improved and gradually dominated the transportation network nationwide, industrial sites have spread out and moved further away from the traditional cores into areas where employees had gradually been moving to the suburbs and land costs are significantly lower. Over the years, the improvement in the road and transportation systems has created more good locations.

Trucking and air cater to the higher end of trade with bulk goods and heavier equipment most often handled by ship or rail. As well, high-end trade is favored by merchant wholesalers which account for the greatest proportion of speculative warehouse demand. Captive operations are generally
vertically integrated to achieve cost savings and these operations are more often found in the bulk goods, heavy materials and equipment sectors of trade. (Grubb and Ellis, 13)

This suggests that more speculative industrial development is involved in high end trade goods. Possibly, the lower end trade goods will show lower returns because of the lower risk and therefore many will be owner occupied.

Residual Use Concept
In many ways, industrial property has taken on characteristics of agricultural land in its behavior as a residual in the land market. Because of the advancements in transportation, a clear understanding of the industrial sector suggests that industrial tends to be outbid by every other sector that could occupy a given site other than farmland (Wheaton, 23). The importance of this is that as land values rise in once high industrial areas, certain semi-industrial users and low "externality sensitive" users will begin to outbid industrial users for remaining space. Eventually, this can create pressure on existing built industrial space to be put to higher revenue uses and influences the motivation to alter the use of certain buildings.

Another important element in the industrial real estate sector is that companies often look for expansion rights for
existing plant allowing for future growth without the extremely costly expense of relocating entire facilities. This increases the desire for new industrial space users to relocate to areas further away from areas where land prices are likely to rise.

**Taxes**

Taxes in the local environment also considerably affect the choice of location for the industrial firm. Because of the low use of public services and the large amount of capital that the manufacturing firm may bring to the site, the local tax rate can be a significant element in determining desirability of certain locations. In order to attract jobs, some communities offer subventives on property taxes to industrial development. As a result, the influence of local government will play a part in industrial location and the variation in municipal jurisdictions within a given region can explain certain locational patterns. As will be seen, the differences in the Washington - Baltimore area and the Los Angeles area exemplify this. One other important factor here is the lease clause relating to taxes. Many industrial property tenants pay a portion of real estate taxes and the increase in taxes.

**General Risk Profile**

11
Industrial real estate has been considered to be the least risky of the real estate sectors and has had the reputation of having correspondingly low returns. Although this issue is explored far more deeply in this chapter, there are some generalities which can be made here. Investment in industrial property is generally less risky than investment in retail, residential, or office properties. One reason is that fewer buildings are built on speculation and as a result, there is less vacancy in the industrial sector than in the office or retail sectors in most markets. Another reason that industrial real estate is less risky is that the lease terms are structured in a way that brings the investor long term returns with little inflation risk. Long term triple net leases characterize most industrial property tenancies. These generalities vary greatly by the nature of the property itself, the region of the country, and the type of tenant in the project.

In recent years, the stability of the industrial sector has been supported by two other considerations. Because land cost is a much larger percentage of project cost in industrial real estate, the depreciation benefits are lower than in other forms of real estate. As a result, there are fewer tax driven industrial projects and construction has been more tied to user demand. Another reason is that
demand for land for R & D space and other office space has put upward pressure on the price of industrially zoned land. Consequently, as the R & D market has become overbuilt, the rent/land cost spread for warehouse space has made speculative development less feasible. (Grubb and Ellis, 14) It is important to note that these trends are crucial to the understanding of the returns to investment in industrial real estate because of the roles they play in the value of the land component in the investment.

Meanwhile, the industrial real estate sector is far less exposed to serious vacancy risk nationally. The amount of new product brought onto the market as a percentage of stock at any one time is far below the corresponding industrial vacancy rate. While national vacancy rates have seemed to hover around 10 to 11 percent during the past few years, for instance, the amount of stock being built was only around 2 percent. This is in large contrast to the office market. Grubb and Ellis estimates vacancies may reach from 15 to 20 percent while new stock for office may run from 9 to 15 percent of existing space at any given time. Consequently, this creates far less exposure to cycles within the demand for space and makes industrial developers more responsive to changes in the business cycle.
Additional Macroeconomic Influences

Industrial real estate also takes much of its character from the local area that creates demand for the space. Regions with very large manufacturing bases are characterized by more factories and distribution facilities. One method for tracking the local economy is to examine employment trends to understand the various mixes in the local economy and the importance of certain sectors. In addition, these statistics also give some hint about the sensitivity of the local market to economic cycles. Figures 1 and 2 illustrate the national employment trends since 1965 which are compared to the employment trends of Washington - Baltimore and Los Angeles in Chapter 5. The importance of these national statistics is the clear fact that certain sectors of the employment base move in more cyclic patterns than others.

Another indicator of the demand for industrial real estate space is the capacity utilization rate put out by the Federal Reserve which is the rate at which manufacturers are "using" existing plant and equipment. Rates generally follow the national economy as can be seen in Figures 3 and 4 which illustrate capacity in a variety of industries. When the rate reaches above the mid eighties, tremendous constraints to expansion occur. As a result, the index can be a good indicator of the demand for new industrial space.
Figure 4
U. S. Capacity Utilization Rate by sector
SEASONALLY ADJUSTED, PERCENT

TOTAL INDUSTRY

TOTAL MATERIALS

MINING

UTILITIES

MANUFACTURING

ELECTRICAL MACHINERY

MANUFACTURING

NONDURABLE

DURABLE

TEXTILE, PAPER AND CHEMICAL MATERIALS

RAW STEEL
However, there are many problems with the accuracy of the Capacity Utilization Index because many manufacturing firms are using plant and equipment that no longer is listed on the books because it has passed official depreciation terms, or has been written down in earlier periods of inactivity. As a result, some firms are technically operating above 100%.

Grubb and Ellis (14) examines unused plant capacity versus plant closings. Their comparison illustrates that as less capacity is used, more plants are closed, the closings lagging the unused capacity by 3 to 6 months. Thus the plant closings come on the market at a time when they are in the least demand. Increasingly, claims Grubb and Ellis, companies will face a situation where their surplus properties will bring prices far below book or replacement value.

The relationship of the industrial property sector to the wholesale and retail industry is very strong and the patterns of distribution are highly correlated to the performance of the industrial sector. According to Grubb and Ellis (14), demand for industrial space lags retail sales growth by 6 to 12 months. Thus, the performance of retail and shopping center space will be an indication of
the type and direction of industrial real estate performance. Meanwhile, continues Grubb and Ellis, the trade deficit does not affect the performance because distributors of imported goods require warehouse space.

Inflation and industrial rents in relation to land prices are also factors in determining the amount of supply brought onto the market.

Because warehouse rents are historically low relative to other land use categories, we do not expect rising rents to stimulate a great deal of new construction. While development will occur in selective areas, land prices have not declined sufficiently to make the development of distribution space feasible at current lease rates. In many markets, lease rates can rise by 50% before current land prices will provide attractive rent/cost spreads. As a result, we believe that there is ample opportunity for rental appreciation in many markets, particularly those that have been beset by high levels of R & D and office construction over the last several years. (Grubb and Ellis, 14)

The significance of this is that the supply for industrial real estate is less sensitive to short term changes in rent and very sensitive to land values.

Vacancy Rates
In addition to the important regional employment difference mentioned above, other regional factors can have dramatic influence on the real estate market. Given the Grubb and
Ellis observations mentioned above, Coldwell Banker's vacancy index from 1977 to 1987 suggests that cities have very different vacancies at different times. Although normal market fluctuations caused by supply and demand can have a cyclical effect on the local market at any given time, some markets seem to exhibit very high vacancy rates all the time while others have very low ones. Local factors such as regulatory control, health of the major industries, and size of the market itself can have a dramatic effect on this issue. These issues are explored in the regional contexts that establish the framework of this thesis.
CHAPTER 2: LITERATURE REVIEW

A great deal has been written about the nature of returns to investment in real estate and comparisons with various stock market indices or other market factor indices. Nearly all of this has called for more data on the actual returns to the properties. Much has been said about the differences in regions and the returns to investment.

James Hoag commented (Hoag, 12) that a national index might be created while others deem a city index a more appropriate measure for understanding likely returns to real estate. Interestingly, Hoag chose industrial property for the study because it is the most homogeneous part of the real estate market and he feels that the valuation characteristics could be readily discernable. The Hoag Index (see Figures 5 and 5a) attempts to create this national index using an appraisal based system to chart these values. However, the index does not really attempt to understand regional issues in the performance of industrial real estate.

Hartzell, Shulman, and Wurtzbach (10) examine the relative portfolio performance in 8 geographic areas in seeking differences with the 4 geographic areas commonly studied, as
Figure 5

HOAG INDEX

Industrial Properties National


Index Value, 1973 = 1

Index Values
Table 5a

HOAG INDUSTRIAL PROPERTY INDEX
1973 to 1978
1973 = 1

<table>
<thead>
<tr>
<th>YEAR/QTR</th>
<th>INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>73 :1</td>
<td>1.00</td>
</tr>
<tr>
<td>73 :2</td>
<td>1.02</td>
</tr>
<tr>
<td>73 :3</td>
<td>1.14</td>
</tr>
<tr>
<td>73 :4</td>
<td>0.91</td>
</tr>
<tr>
<td>74 :1</td>
<td>1.00</td>
</tr>
<tr>
<td>74 :2</td>
<td>0.89</td>
</tr>
<tr>
<td>74 :3</td>
<td>0.94</td>
</tr>
<tr>
<td>74 :4</td>
<td>1.11</td>
</tr>
<tr>
<td>75 :1</td>
<td>1.22</td>
</tr>
<tr>
<td>75 :2</td>
<td>1.02</td>
</tr>
<tr>
<td>75 :3</td>
<td>1.16</td>
</tr>
<tr>
<td>75 :4</td>
<td>1.22</td>
</tr>
<tr>
<td>76 :1</td>
<td>1.18</td>
</tr>
<tr>
<td>76 :2</td>
<td>1.11</td>
</tr>
<tr>
<td>76 :3</td>
<td>1.39</td>
</tr>
<tr>
<td>76 :4</td>
<td>1.03</td>
</tr>
<tr>
<td>77 :1</td>
<td>1.09</td>
</tr>
<tr>
<td>77 :2</td>
<td>1.21</td>
</tr>
<tr>
<td>77 :3</td>
<td>1.18</td>
</tr>
<tr>
<td>77 :4</td>
<td>1.21</td>
</tr>
<tr>
<td>78 :1</td>
<td>1.40</td>
</tr>
<tr>
<td>78 :2</td>
<td>1.17</td>
</tr>
<tr>
<td>78 :3</td>
<td>1.39</td>
</tr>
<tr>
<td>78 :4</td>
<td>1.74</td>
</tr>
</tbody>
</table>

in the Frank Russell Index. They conclude that local indices play an important role in the evaluation of industrial real estate. Using such examples as the industrial midwest being the hardest hit by cyclical declines and global competition and Southern California being the U.S. capital of the Pacific Basin. Interestingly, they concluded that on the basis of regional analysis for portfolio diversification, there was no evidence the regional classification had any effect on portfolio performance.

Another important issue is their reasoning that there should be eight geographic regions, rather than the standard four. Eight regions provide, they argue, a more specific understanding of the regional forces at work within an area. They found that eight region categorization produces lower correlation coefficients than the traditional classification into four regions. The importance of this is that as boundaries for study become smaller, a greater understanding of the specific forces at work within a region can be understood.

Grissom, Hartzell, and Liu (8) examined market segmentation with respect to risk and return characteristics. They found that not only do risk premiums associated with a common systematic risk attributes vary for properties located in
different regions, but also the number of priced risk factors differs across regions. Consequently, regional risks and market considerations must be examined specifically for that market.

On the other hand, Hartzell, Heckman, and Miles (9) examined real estate returns and inflation, finding that industrial property provides the best hedge against expected inflation whereas retail property provides the best hedge against unexpected inflation. However, in long term inflationary periods, industrial real estate could also outperform retail. In terms of returns to investment in industrial real estate, the response of this sector to inflation suggests that industrial appreciation might be more closely correlated to this aspect of the national economy than other sectors of the real estate industry.

In consideration of the above studies on industrial property returns and regional classification, the following Chapters examine existing index data and then specifically the behavioral characteristics of the Baltimore - Washington and the Los Angeles regions.
CHAPTER 3: METHODOLOGY AND DATA

Correlation of Economic Cycles and Frank Russell Data

Understanding the relationships between national economic cycles and returns to investment in industrial property requires examination of macroeconomic influences and property return characteristics. The Frank Russell Index, a composite index of industrial properties nationwide held by unlevered institutional investors in evaluating the relative performance of real estate investment, is dissected and studied against these economic cycles.

The purpose of using Gross Private Fixed Investment, Gross Investment in nonresidential structures, and the Gross National Product is to establish and define the parameters of national economic cycles. There are clear signs of the 1974, 1981, and 1981-82 recessions within these statistics (See Figures 6,7,8). The importance of these is to show that the national economy illustrated marked slowdowns during these periods to the extent that overall investment in many sectors suffered. Gross Private Fixed Investment relates to the amount of investment in durable goods and suggests an amount of capital spent on plant and machinery. Investment in non-residential structures reflects amounts of
Figure 6

GNP by Quarter: 1965 to 1986

Seasonally Adjusted Annual Rates

Source: Department of Commerce
Gross Private Fixed Investment

Seasonally Adjusted Annual Rates

Billions of 1982 dollars

Source: Department of Commerce
Gross Private Investment
Nonresidential Structures (SAAR)

Billions of 1982 dollars

Source: Department of Commerce
capital invested in commercial construction. Gross National Product not only illustrates the pulse of the overall economy, but serves as an indirect barometer for the amount of demand created for new warehouse and manufacturing space at the time.

The relationship of the GNP, the Fixed Investment in Nonresidential Structures, and the General Fixed Investment can be compared to the Frank Russell Index, which monitors the performance of real estate all across the country. The Frank Russell Company, of Tacoma, Washington, monitors a large pool of unleveraged investment grade properties every year in all sectors and in all parts of the country. Changes in income and property value are indexed to the base period of 1977:IV.

In 1985, the Frank Russell Company began separating the Industrial Index into two segments consisting of "Office/Showroom/R&D" and "Industrial/Warehouse." The company developed the following characteristics used to assign individual industrial properties within the existing portfolio to either of these categories:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>IND/WARE</th>
<th>OFF/SHOW/R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling Hgt.</td>
<td>Generally above 14 feet</td>
<td>lower than 14 ft particularly in</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Finished Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Finish</td>
<td>Generally less than 15%</td>
</tr>
<tr>
<td></td>
<td>Generally more than 15%</td>
</tr>
<tr>
<td>Exterior Finish</td>
<td>Generally little</td>
</tr>
<tr>
<td></td>
<td>Higher quality</td>
</tr>
<tr>
<td></td>
<td>two or more sides</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Minimal if any</td>
</tr>
<tr>
<td></td>
<td>Some amount to extensive planting</td>
</tr>
<tr>
<td>Truck Docks</td>
<td>Dock height doors</td>
</tr>
<tr>
<td></td>
<td>Ground level doors</td>
</tr>
<tr>
<td>Parking</td>
<td>Low parking ratios</td>
</tr>
<tr>
<td></td>
<td>May approach office ratios</td>
</tr>
<tr>
<td>Railroad Siding</td>
<td>Sometimes</td>
</tr>
<tr>
<td></td>
<td>Almost Never</td>
</tr>
<tr>
<td>Stories</td>
<td>Seldom over one</td>
</tr>
<tr>
<td></td>
<td>Possibly two</td>
</tr>
</tbody>
</table>

Source: Frank Russell, (7)

A breakdown of the regional distribution of the portfolio is as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>Market Value (in millions)</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Office</td>
<td>$179.3</td>
<td>24</td>
</tr>
<tr>
<td>Warehouse</td>
<td>245.9</td>
<td>27</td>
</tr>
<tr>
<td>Midwest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Office</td>
<td>164.7</td>
<td>36</td>
</tr>
<tr>
<td>Warehouse</td>
<td>439.2</td>
<td>71</td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Office</td>
<td>261.2</td>
<td>51</td>
</tr>
<tr>
<td>Warehouse</td>
<td>487.1</td>
<td>104</td>
</tr>
<tr>
<td>West</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Office</td>
<td>829.1</td>
<td>92</td>
</tr>
<tr>
<td>Warehouse</td>
<td>840.9</td>
<td>118</td>
</tr>
</tbody>
</table>

From this breakdown, one notices that the index is heavily valued toward the Warehouse component in all areas other
than the West, where the number of properties is far higher than the other regions. It is also interesting to note that the Company reported that the West R&D/Office component is heavily made up of properties in the Southern California area.

The indices are broken out into an income factor and an appreciation factor, which illustrate the change in earnings and value to given properties back to 1977 when the index was initially put together. One way of examining this is to study the regression result of the level of GNP and the other statistics to the national FRC index for that given year. By comparing this to the warehouse division, the more homogenous of the two indices, generalities regarding the influence of these economic statistics can be made. In running regression analysis with these warehouse figures one can derive the following results:

FRC Total Index to GNP
R squared = .85
t statistic = 13.9

FRC Total Index to Investment in Non-Residential Structures
R squared = .17
t statistic = 2.7

FRC Total Index to General Fixed Investment
R squared = .39
t statistic = 4.7

These statistics illustrate that there is a far higher
correlation with the GNP and the FRC Industrial Warehouse Index than with the other economic indicators. This might suggest that this FRC index is more closely related to overall performance of the economy rather than activity in Fixed Investment or Nonresidential structures. Taking this a bit further, GNP was then compared to the various components of the FRC Industrial Index including the appreciation component for each geographic region. The FRC breaks up the country into four regions, South, Midwest, West, and East, and reports the changes in appreciation and income. As can be seen in the Figures 9 through 14, the income component of each of these is generally the same and appears to be independent of economic cycles, and on the other hand, the appreciation components seem to suggest that the appreciation component has extreme regional differences. In understanding the relationship of this component to the GNP, each appreciation series was regressed on the GNP:

WAREHOUSE/INDUSTRIAL

GNP to FRC east appreciation
R squared = .80
t statistic = 11.7

GNP to FRC west appreciation
R squared = .69
t statistic = 8.9

GNP to FRC midwest appreciation
R squared = .38
t statistic = 4.6
Figure 10

FRC INDEX WAREHOUSE/INDUSTRIAL

Appreciation Component Only

Source: Frank Russell Company
Figure 11

FRC INDEX WAREHOUSE/INDUSTRIAL

Income Component Only

Index Value, 100 = 1977

Source: Frank Russell Company
Figure 12

FRC INDEX R&D/OFFICE

Totals for Appreciation and Income

Source: Frank Russell Company
Source: Frank Russell Company
Figure 14

FRC INDEX R&D/OFFICE

Income Only

Source: Frank Russell Company
GNP to FRC south appreciation
R squared = .80
\(t\) statistic = 11.8

\textbf{R&D/OFFICE}

GNP to FRC east appreciation
R squared = .79
\(t\) statistic = 11.4

GNP to FRC west appreciation
R squared = .79
\(t\) statistic = 11.3

GNP to FRC midwest appreciation
R squared = .60
\(t\) statistic = 7.2

GNP to FRC south appreciation
R squared = .63
\(t\) statistic = 7.6

This regression analysis illustrates clearly that there are major differences between various regions in the FRC index and the GNP in terms of appreciation from 1977 until 1987. In addition, there are some differences between the R & D and the warehouse divisions. In the south and east regions, for instance, there are strong correlations with the Gross National Product in terms of appreciation in the industrial sector. The west, though performing far higher than the national average, also has strong correlations with GNP. In contrast, the Midwest, facing widespread industrial decline over the past twenty years, has fallen below the national average in terms of appreciation and also has a low correlation with the GNP. Meanwhile, the R & D sector was very similar in all areas in terms of appreciation, though
the Midwest was quite lower. Despite this, the Midwest R & D sector did not experience the very low correlation of the Midwest Warehouse. Finally, the total growth for R & D and warehouse were very close, R & D being 380 and warehouse being 350 and the income components were very similar.

In understanding these graphs in relation to the specific cycles, one can make some conjectures about the performance of the industrial sector during the economic slowdowns. The Totals for both the warehouse and R & D categories do reflect changes in the amounts of growth over the 10 year period. During the 1981 downturn, the appreciation factor actually does decline slightly, though it remains strong for the other parts of the decade. The South seems to mirror the national trend, though there is a strong decline in the later part, probably due to the extensive drop in oil prices. The performance of the east is very close to the national average while the midwest lags substantially. Not only is the midwest below average, but it never really recovers to its pre-1981 level. The west outperforms all regions, as mentioned. One can notice a strong indication, though, of the 1981 flattening in its meteoric rise over the decade. It would seem from this analysis that there are some regions which follow very closely with the national average in terms of increase in values, yet may perform in
different ways from regional economic factors.

A regression on the GNP to Total R & D Appreciation and Total Warehouse Appreciation components offers some insights regarding the differences of these categories:

<table>
<thead>
<tr>
<th>Regression Type</th>
<th>R square</th>
<th>T Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNP to FRC Total Office/Showroom/R&amp;D</td>
<td>77.2%</td>
<td>10.7</td>
</tr>
<tr>
<td>GNP to FRC Total Warehouse/Industrial</td>
<td>68.9%</td>
<td>8.7</td>
</tr>
</tbody>
</table>

Taking this regression information into consideration with regard to the appreciation component of the Frank Russell Index, the office/showroom/R&D segment seems to have a slightly higher correlation with the GNP series. This might indicate that office substitutes have moved more closely with GNP than warehouse. Since R & D space is, by definition, often occupied by start-up type companies, it would follow that R & D space would be more sensitive to economic fluctuations at the margin since the tenants are more sensitive to them.

**Selection for Regional Studies** Two regions defined by Metropolitan Statistical Areas have been selected for a closer look at industrial property returns. Although a study of all cities within the country would be ideal in
drawing conclusions about the nature of industrial real
estate in economic cycles, these cities exhibit
characteristics that are very different from one another and
are located on opposite ends of the country.

The Los Angeles/Long Beach area exhibits the fastest growing
industrial base in the country. Los Angeles has a very
large manufacturing sector and rapidly growing service
sector. Meanwhile, California has benefited greatly from
the Pacific Trade Basin and the current boom in Pacific
trade has been increasingly important to the industrial
market.

The Washington Baltimore corridor, on the other hand, is a
declining manufacturing area where wholesale and retail
trade is growing. Baltimore's port access has been very
important to the region in terms of trade with Europe and
other parts of the world. The area is smaller than Los
Angeles, yet is in many ways more recession proof because of
the very large number of government employees in the
Washington area. Because Washington's largest employer is
the Federal Government, the overall employment rates are far
more stable and related industries do not suffer as much
from downturns. The extent of this in terms of actual
investment returns is examined in the next chapters.
CHAPTER 4: LOS ANGELES

Overall Characteristics of the Los Angeles Economy

It is difficult for outsiders to grasp the size and diversity of the Southern California economy. One should think of the area in terms of a number of smaller regions, each of which can hold its own in comparison with other U.S. regional economies. In the aggregate sense, the figures are staggering. In 1987, L.A. produced $250 billion worth of goods and services. Greater L.A. is the largest aerospace center in the world. Amazingly, this sector only employs 7.7% of the region's workers and manufacturing of other goods will continue to remain strong. (Lockwood and Leinberger, 16)

This leads back to this region's relationship to the national economy. Lockwood and Leinberger (16) contend that Los Angeles industries are either cyclical such as oil and tourism, or project oriented, as in entertainment, or both, such as aerospace and real estate development. This makes the regional economy very susceptible to change, and it is L.A.'s ability to adapt to this that makes the region so successful. As a result, companies in Los Angeles, contend Lockwood and Leinberger, have long been at the front lines
of competitiveness in the business world. For instance,

This corporate nimbleness at reacting to external circumstances has imbued the aerospace work force with a somewhat cavalier attitude toward change. Job hopping in Los Angeles is not only acceptable in Los Angeles aerospace circles, it is essential. (Lockwood and Leinberger, 16)

In terms of the Los Angeles region's involvement in the business cycle, this might suggest that L.A. may ride out the most difficult times and cope efficiently with slowdown.

**Employment Characteristics in Los Angeles - Long Beach**

As mentioned above, employment in the Los Angeles area has grown dramatically over the past twenty years and has shown a marked resemblance to national cycles. (see Figures 15 and 16) The total employment for Los Angeles illustrates the earlier point that the region is very much responsive to change in national economic cycles.

Meanwhile, the most striking aspect of the Los Angeles economic picture is the significant amount of manufacturing employment in the region. Los Angeles benefits from a large and new pool of unskilled immigrant workers, replacing more expensive labor, and as a result has attracted many manufacturing firms to the city. Meanwhile, the manufacturing sector of the economy has been the most sensitive to the economic downturns, in part because of its ability to quickly lay off workers when orders dry up.
L. A. TOTAL EMPLOYMENT: 1965 - 1987

Figure 15

Source: Bureau of Labor Statistics

□ Total Employment
L. A. EMPLOYMENT BY SECTOR: 1965 – 1987

Employment by Major Division

Figure 16

Source: Bureau of Labor Statistics

- □ Manufacturing
- + Wholesale/Retail
- Δ Services
- × Government
- ◊ FIRE

MILLIONS OF EMPLOYEES


1965 - 1987 Employment by Major Division

0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10
However, another interesting aspect of the manufacturing sector, in keeping with national manufacturing trends, is that it did not experience the rapid growth in employment that is experienced by the other sectors. Service and wholesale and retail continue to be the fastest growing sectors of the region and show the least sensitivity to economic conditions.

In retrospect, employment data such as this can confirm characteristics mentioned above in that segments of the region's employment are more reactive to the national business cycle. This is important not only for understanding the relevance to the regional economy's performance, but because manufacturing has many ties to the uses associated with industrial real estate including plant and warehouse space.

In contrast to the relative stability of the manufacturing sector, wholesale and retail employment increased 80% during the '65 - 87 period. Moreover, services are the fastest growing element of the economy. Wholesale and Retail is the second fastest growing, which complements the demand for distribution facilities. Manufacturing and wholesale - retail constitute about one half of all employment in the Los Angeles area, a statistic suggesting the city may be
more susceptible to changes in economic cycles than regions with a larger dominance of service and government employees.

Survey of Los Angeles Industrial Markets

In surveying the dispersment of the industrial real estate market, the Grubb and Ellis Los Angeles Real Estate Profile (13) offers not only a number of trends in this market, but some insights regarding the fundamental patterns of movement in the region for industrial space. By focusing on the four major industrial areas, Los Angeles (east of downtown), San Gabriel Valley, South Bay, and the San Fernando Valley, one can track some of tendencies that industrial real estate has followed in evolving into its current market situation. By understanding these behavioral patterns, one can draw some conclusions about the nature and meaning of returns to industrial real estate.

Los Angeles

The first area is Los Angeles, consisting of the Downtown, San Gabriel Valley, Santa Ana Corridor East, and the Santa Ana Corridor West. This area is composed of 40 cities and 500 square miles. The region's largest airport, Los Angeles International, serves 30 million passengers per year and moves 1 million tons of freight. The Los Angeles Harbor is the third largest in the nation and serves 8000 ships per
year carrying more than 82 million tons of cargo. In addition, the area boasts three continental railroads and 15 interconnected freeways (Grubb and Ellis, 13).

Property in this part of the Los Angeles region is representative of the behavioral characteristics of industrial property in the region. With its very diverse product types, it is the oldest industrial area in Southern California. The stock contains mostly traditional industrial buildings containing little or no space for research and development. Presently land here is very expensive and this strongly affects the pattern of development for industrial property. Consequently, new development consists of tearing down old masonry structures for new space, much of which consists of a product that will justify the higher land costs.

San Gabriel Valley
A number of companies needing larger space are moving to San Gabriel Valley which includes Inland Empire West, Chino, Fontana, Montclair, Ontario, Rancho Cucamonga, and Upland.

Because of the amount of land available, this area is the most rapidly growing industrial area in the country. Along with moderately priced land, there is affordable housing for
employees, a modern transportation network, and the Ontario International Airport, the 16th largest airport in the nation in air freight. More significantly, in 1985 a Foreign Trade Zone was established surrounding the eastern section of the Ontario Airport. This zone is an extension of the Port of Long Beach Trade Zone and is the largest Foreign Trade Zone in Southern California. This is important to the industry located there because:

1) Storage of goods quickly without full custom formalities is possible.
2) Duties are deferred until goods leave the zone.
3) If exported outside the US from the zone, no duty is paid. (Grubb and Ellis, 13)

Consequently, merchandise can be stored to wait out the most favorable conditions. This system offers extensive advantages to firms involved in international commerce and those importing for manufacturing and distribution purposes. Given the Los Angeles importance to the Pacific Rim Trade, the Foreign Trade Zone can have a very significant impact on the returns to real estate located in that area. One important observation is that industrial real estate is often the most out-bid of the real estate sectors in that other uses such as office and retail will outbid industrial users when the location could serve both. Accordingly, this artificial trade zone constraint acts as a way of keeping industrial property in one location with a higher value to
the land.

**South Bay**
The South Bay area features a very high number of Pacific Rim companies, as well as a number of domestic aerospace industries. This is important because location and proximity to LAX make this a very strong area for these firms and they are willing to pay more for it. Because of short supply of space here, some locations near the airport are leasing close to rates seen in the office market. In this area, vacant land is in such short supply, developers are beginning to recycle older industrial buildings for use as higher income properties.

**San Fernando Valley**
The San Fernando Valley, consisting of the East Valley, Central, West Valley, Technology Corridor, Conejo Valley, and Ventura Coastal Plain, is a relatively new market and thus seems to have higher vacancy rates. Again, land prices determine the location of new uses brought onto the market. Accordingly, higher costs of land lead to more Research and Development product being brought onto the market.

**Historical Vacancy Rates - Coldwell Banker**
The only long term vacancy statistics for the Los Angeles
region come from the Coldwell Banker data service which has been available since 1977. Coldwell Banker counts industrial properties over 100,000 square feet throughout the country and assembles national and local vacancy statistics. The Grubb and Ellis vacancy statistics, on the other hand, count buildings that are 25,000 feet and over and report a consistently higher vacancy rate than Coldwell Banker. Nevertheless, the Coldwell Banker is the only national vacancy information available that covers any length of time. Using this information, one can make some assertions about the effects that cycles are having on the amount of space vacant at any given time.

Perhaps the most important observation one can make about the Los Angeles vacancy statistics is that it has a remarkably high correlation coefficient with the national vacancy rate, the coefficient being .935. Graphically, one can see this close relationship as well (see Figure 17). This suggests that the Los Angeles area might be very close in supply and demand factors to the national market. The importance of this is that Los Angeles is diversified in terms of its overall industrial real estate market and it washes out many of the peculiarities of a smaller specialized region. In addition, as evidenced by the Frank Russell Company data, much of the R & D space for the entire
Figure 17

COLDWELL BANKER VACANCY RATES

Southern California

Source: Coldwell Banker

Percent of Vacant Industrial Space

Source: Coldwell Banker

- Southern California
+ National

Years: 1977 to 1987
West is located in Southern California, offering an explanation for higher returns.

The pattern of vacancy during this ten year period suggests some loose assumptions one might make about vacancy and the general economic slowdown. In this data, industrial vacancy in Southern California shows a 1.5% increase following the 1981 economic slowdown and remains higher, trending at around 6%.

One caveat that is important here is that the data used here is from a variety of sources with differing definitions of the regional boundaries under question, as well as the type of data collected. The tools used by Grubb and Ellis and Coldwell Banker vary greatly and it was mentioned by a researcher at Grubb and Ellis that the vacancy statistics in the industrial sector are the least reliable not only because they are the newest of the vacancy statistics, but also because the brokerage offices which collect the data often have inconsistent standards of counting for such problems as owner occupied space and other technical distinctions.

**Frank Russell Data**

In consideration of the above, the Frank Russell index
offers some insights about the growth of industrial properties in terms of income and appreciation. Los Angeles being a significant part of the portfolio in the West region, this statistic might suggest some characteristics of the returns that could be seen in return to investment in the industrial sector.

As mentioned, in all areas, the West outperformed the rest of the country in terms of the appreciation factor. The index, which begins in 1977, very quickly establishes a superior position and maintains the higher appreciation rate throughout the early eighties. It is important to notice that the index leveled off in the 1981 and 1982 downturn. Meanwhile, the income factor remains even and constant for all regions.

Investment Return Data Collected From Developers and Investors in Los Angeles

The search for data from real projects located in the Los Angeles area that can be used for historical purposes poses a number of interesting problems, which by their existence indicate a great deal about the nature of the industrial sector and the ability to create some kind of generality about investment returns by region.
Copley Real Estate Advisors, of Boston, Massachusetts, has joint ventured a number of industrial property developments in Southern California. In its internal study of 1986, Real Estate Development: Investment Risks and Rewards, 1986 Update, it examined a cross section of its many deals consisting of about 60 properties located across the country to determine the relative risk factors associated with various parts of its deals in the past. In looking at the Southern California deals, there is a small source of return data that can be used to understand returns to investment in this area over the years from the mid-seventies until 1986.

In all cases, the income for any given project out of the 22 projects examined in this study is steady throughout the entire holding period. After the initial cash outflow, no further downturns are visible for the holding period. As a result, rather than examine the overall aggregate NOI for the term, a test charting the various deals with the IRR against year of acquisition and also year of sale (or 1986 with the capitalized value used). There was complete lack of any pattern of return to years held, date of acquisition, and date of sale. From this analysis, it appears that industrial property returns are very stable.

One other analysis is to spread IRR returns over the holding
period of each individual property. By averaging the IRR for each given year, the result may illustrate average returns to the industrial sector. This form of analysis on the Copley Properties indicates a noticeable, though very small decrease in returns during the years 1981 to 1983 (see Figure 18). As a result, one might conjecture that the portfolio was sensitive to some of the economic pressures of the early 1980's. In discussing this observation with the Asset Management people at Copley, no major alterations in planning, management, or accounting were implemented at this time, though it was pointed out the type of analysis this was and the smallness of the sample probably diminished the significance of these results.

A major developer of industrial property in the Los Angeles area has been Wayne Ratkovich (18), a strong player in the market for many years and long-time partner of Copley Real Estate Advisors. Ratkovich mentioned that during the past ten years, yields in industrial property have dropped though there is not likely to be much vulnerability in the appreciation factors due to the geographic restrictions and growth potential of the area. Interestingly, as an aside to the issue of industrial location, he finds some firms are beginning to return to the older factories for more manufacturing. He cites this as risky and still untested,
Figure 18

Southern California Average IRR by Year

Source: Copley Real Estate Advisors
but suggests that it might be a future market.

In comparing the 1974 recession to the 1981 recession, the expected developer reactions were issued by Mr. Ratkovich. With the very high interest/high inflation rates of the early 80's, many owners wanted tenants to go under in order to raise rents. In contrast, in the 1970's, if one lost a tenant, continues Mr. Ratkovich, there were far fewer companies then who could take the space over at any rent. These comments reflect reactions to national economic influences as they affect the local decision making.

One can see clearly in the Los Angeles market, that the diversity of the regional economy presents not only a strong correlation with the national economy, but also presents a host of important local considerations. These local considerations, over the longer time period have a strong bearing on the performance of the industrial sector, such that changing uses over time have a strong influence on land values and investment performance. Meanwhile, as Mr. Ratkovich mentioned, national forces have made other more focused and direct impacts on the reactions of developers and investors.
CHAPTER 5: WASHINGTON - BALTIMORE CORRIDOR

The Washington Baltimore area stands in marked contrast to the regional economy of Los Angeles. Not only are the demographic, economic, and cultural differences pronounced, many of the behaviorial characteristics of the regions' industrial real estate differ. This is largely in part because the history of development of stock in the industrial sector is quite different in Washinton - Baltimore and Los Angeles.

Demographic

In understanding the Baltimore - Washington area as a "region" one must define its boundaries and grasp the population content of the area. In 1990, the Bureau of the Census will classify this as a "Consolidated Metropolitan Statistical Area," recognizing it as a distinct regional economy with its own unifying features. With 5.8 million people, 2.1 million households, and 3.4 million jobs, it will be the fourth largest CMSA in the country (WBRA, 22).

The area can be defined as the MSA's of Baltimore and Washington and St. Mary's county in Southern Maryland. Stretching from the Maryland - Pennsylvania border on the
North to Stafford County, Virginia and the lower Potomac River to the South, and from Queen Anne's County, Maryland and the Chesapeake Bay west to the Appalachian Mountains, the area cover 6948 square miles and includes 17 separate counties and seven independent cities. (WBRA, 22)

Economic

The Baltimore Washington Regional Association boasts that in 1990, the region will become:

1st in personal income per capita,
   economic stability,
   number of college grads,
   and relocation acceptance among transferees;
3rd in business climate;
5th in commercial air service,
   volume of retail sales,
   and employment in FIRE;
9th in manufacturing jobs;
10th in wholesale sales, and in the
   number of headquarters among the major national markets.

Meanwhile, the area serves as a very important transportation hub serving the eastern seaboard. With I-95 passing through the region, major north-south destinations
serving millions of people can be reached. In terms of air transportation, Baltimore Washington International, Washington Dulles International, and Washington National handled over 335 million pounds of freight in 1987. By water, the Port of Baltimore is 200 miles closer to the industrial Midwest than any other East Coast port and serves 100 ocean carriers with 3000 ships annually. The Port of Baltimore tops all US Gulf and Atlantic ports except New York in container shipping with a yearly output of nearly five million tons of container freight. Moreover, six million feet of warehousing, 4.7 million square feet of cold storage, and 13 million bushels of grain storage are currently available at the port. Ground storage of 57,000 rail cars is also possible (WBRA, 22).

**Employment**

Employment characteristics of the Baltimore Washington area reflect heavy governmental influence from Washington as well as the continually declining manufacturing trend seen in most Eastern seaboard cities. Though very similar in some respects, the two MSA's have different employment patterns with regard to this government effect. The overall CMSA, according to the Baltimore Washington Regional Association, contains 64% of its employment base in the government and services sector.
In examining the trends of the Washington employment statistics, government employment increased steadily until about 1980 when it leveled off (see Figures 19 and 20). Meanwhile, there was a corresponding increase in the services sector which has been the fastest growing sector and is now the largest. Wholesale and retail employment has always been lower than services and is slower growing than other areas of the country. Like many other regions, the manufacturing, FIRE, and transportation sectors are flat.

In studying the overall Washington employment totals, there are some interesting conclusions one can make about the regional responses to economic downturns in the national picture. Employment in Washington has increased 50% in the ten years from 1977 to 1987 and has never decreased at any point during that time. During the 1981, and 1982 to 1983 downturns, the employment growth rate in the Washington area did slow at first before the recession really was underway on the national scale. Meanwhile, it pulled out very quickly and rebounded with even more acceleration. The conclusion one can draw is that the overall employment base is being driven by the increases in the services sector and the implications of this on the industrial real estate market are discussed below.
WASHINGTON EMPLOYMENT: 1965 - 1987

Figure 19

Total Employment

Source: Bureau of Labor Statistics

Total Employment

MILLIONS OF EMPLOYEES

WASHINGTON EMPLOYMENT BY SECTOR

1965 - 1987

Source: Bureau of Labor Statistics

-制造业 (Manufacturing)
-批发/零售 (Wholesale/Retail)
-服务 (Services)
-政府 (Government)
-保险业 (FIRE)
Meanwhile, in Baltimore, manufacturing has traditionally been a strong factor in the employment base of the area though it has steadily declined since the mid-sixties (see Figures 21 and 22). This decline is more pronounced than national patterns. As in Washington, the service sector is the fastest growth segment of the employment, though only surpassing wholesale and retail in the past few years. The strong position of the wholesale and retail sector is probably influenced by Baltimore's strong port and distribution facilities. Meanwhile, the FIRE, construction, and transportation and utilities segments all remain relatively flat for the duration of the study.

In the aggregate employment statistics, Baltimore, because of its larger amounts of manufacturing employment, seems more sensitive to the economic downturns experienced in 1974 and in 1981. This part of the Baltimore Washington region, therefore, will influence the economy by making it slightly less recession proof. On average, Baltimore has a population of about one half that of Washington suggesting that the steadiness of the Washington market will have a stronger effect on the regional economy. The effect of changes in the employment versus contract aspects of government work is considered next, leading to some
BALTIMORE TOTAL EMPLOYMENT

1965 - 1987

Source: Bureau of Labor Statistics

Total Employment

Figure 21
Baltimore Employment by Sector

1965 - 1987

Source: Bureau of Labor Statistics

- □ Manufacturing
- △ Services
- + Wholesale/Retail
- × Government
- ♦ FIRE
observations on the way this might affect industrial properties.

**Government Sector Influence**

According to the Baltimore Washington Regional Association, the government sector has been declining proportionally in importance as the number of private workers in the region continues to rise. The government continues to fuel a large portion of the region's activity, as evidenced by the more than 12.3 billion in procurement contracts awarded by the government in 1985 and the large number of corporations, trade associations, consultants and other professional organizations which have found it advantageous to locate near the Washington area. Nonetheless, the number of government employees in the region is expected to increase from its present level of 922,100 to 997,000 over the next six years. This is 1.3% per year. Federal Government employment has leveled off during the 1980's with almost no growth. Most of this forecasted growth will be from state and local government.

The Federal Government no longer dominates the area as a direct employer (though in the District itself about one third of all workers are federal employees). Barbara Smith, of *The Economist* reports:
The government still employs roughly the same number of people as it did 15 years ago, but new jobs are going to private industry. In the splurge of growth since 1983, the government has accounted for only 3% of the new jobs; in the big government days some 20 years ago it accounted for around 30% of the growth. Yet Washingtonians continue to live on money from the federal government. The difference is that less of it comes directly in the form of salaries and pay checks. What matters nowadays is not government jobs but government contracts, sub-contracts and procurment. Companies come to Washington to service the government and sell things to it. Increasingly the government contracts out jobs that it once did in-house. About half the region's total sales of technology are now government related. (Smith, 19)

These changes have very important ramifications for the industrial real estate business. Contracts, as noticed in Los Angeles, are more cyclical in nature than empoyment. Because government is using more outside services to perform functions once done within the public sector, there are great opportunities for the private sector but this also allows the Federal Government to turn off the spigot more promptly. Consequently, the regional economy has become less recession proof and more subject to project oriented decisions of the Federal Government.

Meanwhile, many of the research and development firms that have developed as a result of this, have chosen locations that are outside the greater Washington area in the areas outside Baltimore such as Columbia and Frederick. Barabara Smith also reported that more than two thirds of working
Washingtonians in the metropolitan area go to work in the suburbs (19). Traditionally, suburban speculative space for office/R&D has exhibited higher vacancy rates than older more established urban locations. (Grubb and Ellis, 14)

**Real Estate Overview**

The Baltimore Washington Region has 200,000 acres zoned for commercial and industrial use, nearly half of which is still available for development to meet expansion needs. Nearly 19 percent of that total, over 38,000 acres, is situated in the region's more than 230 business parks with approximately 18,000 acres still available for development. (WBRA, 22)

Special pro-business tax considerations include Maryland's tax exemption for equipment used in research and development and Virginia's workman's compensation tax rate structure. In addition, Maryland, Virginia, and The District of Columbia have adopted "enterprise zone" legislation that incorporates special tax incentives to attract new ventures. Meanwhile, the Baltimore Washington Regional Association reported that construction costs for Prime Industrial Buildings is slightly lower than the national average at 44.50 versus 45.00.

One other important consideration with regard to the
location of industrial property is the local property taxes. The area offers a wide array of assessment practices because it spans two states and the District of Columbia. The region ranks fifth lowest in overall tax rates among major CMSA's, Los Angeles being the lowest, with Philadelphia being the only eastern city offering a lower tax rate. (WBRA, 22)

This wide array of municipal authority which spans the region has other effects on the location and performance of industrial real estate. For instance, according to Barbara Smith of The Economist (19),

Maryland state law gives the counties more authority over development than does Virginia law. This is a north-south distinction. Maryland is a border state, neither northern nor southern. But Virginia is an integral part of the old South, where the laws of the land favor the landowner.

This would effect the market in a number of ways. In real estate sectors where tenant landlord relationships are more important to the owner, such as the retail and residential sectors, it would seem more likely that these uses would outbid the industrial sector for areas that might be developed in either direction.

Unlike the Los Angeles region, this area contains far more diversity in terms of the types of influence of local regulation and the laws. As local communities outside the
Baltimore and Washington cities face this "urban sprawl" reactions to development have started, but vary among counties. Some counties have established rigorous standards for new development. Montgomery County, according to Barbara Smith, prides itself on being more organized than Fairfax County. The goal here has been to have infrastructure in place before the businessmen descend.

The mysterious roads that crisscross Germantown, a quiet residential neighborhood in the northern part of the county, were explained when the Marriott Corporation, a huge hotel and food service group, announced that it had chosen this patch of countryside for its headquarters - which it plans to make as big as the Pentagon. (Smith, 19)

The Manekin Corporation, an important suburban developer planning an adjacent project, has conducted its own traffic studies and claims that the capacity projected for the new roads is not what the County had hoped and may even need increased ramps and access (Warren, 21). The importance of this is that many of these local communities do not have the sophistication to handle many of the complex problems which are moving their way both in terms of changes to the land value and regional planning. For industrial real estate developers, this makes industrial sites easier to locate and build out, creating a strong influence for more firms to locate away from traditional industrial areas where office users may have bid up the price of land.
Coldwell Banker Vacancy Data

The industrial vacancy data for the Washington and Baltimore areas is limited and more subject to local shifts in supply and demand. The Washington market (see Figure 23) has remained far below the national average, though in the early eighties it escalated to close to the national average, and then sharply declined. Data for this area does not go back before 1980 levels and thus it is difficult to make conclusions regarding any specific level of vacancy in Washington. With current vacancy so low, there is more pressure than ever to build in the greater Washington area. Again, there is a note of caution in the statistics, for the Coldwell Banker figures only report industrial buildings over 100,000 square feet and often have varied reporting standards between brokerage offices.

The vacancy statistics in Baltimore reflect even lower vacancy for a consistent though brief period of time. Baltimore is a much smaller market than Washington and the statistics for vacancy are only a few years old. Nevertheless, in comparison with other markets, there seems to be an overall regional vacancy rate that is far below the national average though other trends in relation to the economy cannot be determined from this information.
COLDWELL BANKER VACANCY RATES

Figure 23

Source: Coldwell Banker
Frank Russell Data

The Eastern Region of the Frank Russell Index consists of properties throughout the East Coast and, like the west region, encompasses many real estate markets. However, in terms of the Washington Baltimore market for industrial real estate, it may provide a backdrop for understanding the appreciation of properties in the area as they relate to other markets experiencing the rapid growth and suburbanization of many East Coast cities. The Frank Russell Company did not readily have data available on the actual percentage of the Washington Baltimore participation in the Eastern region's statistics, though the region has the fewest number of properties in the portfolio, consisting of 24 office/R&D and 27 warehouse properties.

Unlike the West, the East did not experience a great advance in appreciation rates. The East remains very much in keeping with the proportions of the national index, though the downturn from the 1981 and 1982 period is very brief and not very deep, less so than the national average. This would concur perhaps with some of the employment statistics of the Washington area, which also recovered quickly from the recession. The East felt less of the recession and seems to have rebounded more quickly. Like the West, the East has a consistent and similar income growth rate with
the rest of the nation.

Investment Return Data Collected From Developers and Investors in the Washington - Baltimore Region

Like the Los Angeles area, the dearth of long-term returns to industrial properties remains an obstacle to fully understanding the returns to this sector. Not only have uses dramatically changed in the stock of industrial property but the owners have changed accordingly. As a result, very little information can be accumulated that would make this search a useful way of analyzing returns to the industrial sector. Nevertheless the limited returns that are available can be used with the above information as a backdrop to observe any patterns that may have evolved.

Copley Real Estate Advisors reports one deal in this area which can be tracked for a short period of time in Washington D.C. from 1977 to 1985. The project had an IRR of 18.3% and the cash flows were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>(2,861,000)</td>
</tr>
<tr>
<td>1978</td>
<td>184,000</td>
</tr>
<tr>
<td>1979</td>
<td>307,000</td>
</tr>
<tr>
<td>1980</td>
<td>(1,543,000)</td>
</tr>
<tr>
<td>1981</td>
<td>414,000</td>
</tr>
<tr>
<td>1982</td>
<td>662,000</td>
</tr>
<tr>
<td>1983</td>
<td>734,000</td>
</tr>
<tr>
<td>1984</td>
<td>972,700</td>
</tr>
<tr>
<td>1985</td>
<td>9,029,300</td>
</tr>
</tbody>
</table>
No significant conclusions can be drawn from this data regarding the relationship of these returns to the national economy other than the fact that the project was not noticeably affected by the 1981 and 1982-3 downturns.
CONCLUSION

In this study of returns to industrial real estate, a number of conclusions and observations can be made with regard to the performance of this sector during economic cycles.

a) National Economic Cycles affect returns to some degree. This observation is based on the statistical analysis of the GNP and the Frank Russell Index within the regions specified. The data implies that the overall economy, not just the Fixed Investment or Non-residential, has a stronger correlation with returns as defined by the index.

b) Different regions respond differently to the National economic cycles and to different degrees. The Frank Russell data indicates that appreciation varies greatly from one region to the next, reflecting the influence of land values on returns to industrial property. The income component to the index is almost identical in all regions, underlying the fact that much of the industrial space built is less location sensitive than other property types. Because of the difference in land use patterns within regions, this further underscores the necessity of study of regional locational patterns.
c) Vacancy rates confirm these conclusions. However, existing vacancy data in the industrial sector is poor, reflecting little information on the performance of investment. Vacancy estimates can be useful, however, in learning relative differences in various markets if somewhat comparable collection techniques are used.

d) Behavioral characteristics within regions are influenced by a number of factors including taxes, planning, zoning, and other land pricing factors. Meanwhile, competing demand for complimentary uses within the industrial sector heightens the need for further research of these patterns.

e) The sector itself is divided into a number of segments including warehouse/industrial, flex, office, showroom, and research and development. Each of these factors influences returns to the overall sector and are influenced themselves by different demand factors. The more rigorous the classification for the categories, the greater understanding there will be about these returns.

These conclusions set parameters for an informed agenda for developing strategies for investing in industrial property. In addition to establishing the rigid systems of
classification for the industrial sector, the behavioral movements of each category such as R & D, flex, etc. must be understood with respect to the demand factors for that category. From this, the varied effects that land values have on these behavioral characteristics play a large role in determining movements within the industrial property sector. Consequently, artificial constraints such as zoning and other government involvement also influence these characteristics. All of these considerations underlie the basic premise that returns must be examined in a regional context, relating regional economic forces to national economic forces.

Returns to investment in industrial property must be measured in accordance with all of these considerations. One might find that examining homogenous warehouse space in an isolated area over economic cycles will offer long term return information. However, in many instances industrially zoned land has progressively been developed with higher densities and uses offering higher returns to justify higher land costs. By creating a system of classification and evaluating changes in uses, understanding returns will be a more informed process.

These issues reflect not only the location specific nature
of real estate in general, but also the many changes to the industrial infrastructure of the United States over the past thirty years.
BIBLIOGRAPHY


