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# Corporate real estate and performance: evidence from Italian manufacturing sectors

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## Abstract

**Purpose** – The purpose of this paper is to analyse the effect of real estate weight on Italian manufacturing companies and the effect of occupancy costs on income. The main purpose is to understand whether the ownership of properties, for non-real-estate companies, has an impact on performance.

**Design/methodology/approach** – The empirical research was carried out for a 10-year period (2004–2013) with a sample of 300 manufacturing companies belonging to six sub-sectors of the manufacturing sector. In the second part, a cluster analysis was conducted to identify better and more poorly performing companies. Companies were classified in different clusters according to their ROA, debt ratio and liquidity ratio. The analysis from the first part was repeated to verify the differences between the clusters with respect to their real estate holdings.

**Findings** – First, the authors found that manufacturing sub-sectors do not differ in terms of real estate holdings. They found that real estate holdings affect performance: companies with lower real estate asset weight and higher occupancy costs perform better.

**Research limitations/implications** – The main contribution of the paper is the finding that most Italian manufacturing companies do not take into account corporate real estate (CRE) decisions and the trade-off between ownership and leasing, thus showing that they are ineffective at CRE management.

**Practical implications** – It could be wise to pay more attention to the existing trade-off between the occupancy costs and the holdings of real estate as ownership, as a significant negative correlation between the two indicators was found for the best performing companies. However, the level of this correlation was still rather small. Moreover, to increase performance, companies should be able to recognise that maintaining constant investments in CRE is a better solution than increasing these investments and locking more capital into illiquid assets (which have lower returns than the core business), especially during periods of turmoil and financial crisis.

**Originality/value** – For the first time, the Italian manufacturing sector has been widely investigated.

**Keywords** CREM, Corporate real estate, Lease or buy, Occupancy cost, Own vs lease, Real estate weight

**Paper type** Research paper

## 1. Introduction

A relevant and important issue that companies should care about is whether capital addressed to corporate real estate (CRE) ownership creates value.

What is the proper level of CRE that companies should own? On the one hand, CRE investment might reduce returns, as core business investments are usually expected to be



more profitable. On the other hand, CRE might represent a strategic asset. The answer is not obvious because CRE plays different strategic roles in different sectors.

A relevant body of literature has investigated this issue, but empirical research on Italy is still missing. There are several reasons to analyse the Italian manufacturing sector. First, there is a high number of small- and medium-sized enterprises (SMEs), making it a “traditional” Italian sector from which many households draw their income and thus depend on, giving it great relevance in the national economy. According to ISTAT, the relative weight of the manufacturing sector in the Italian gross domestic product (GDP) in 2013 was around 20 per cent, making it the third largest sector of the Italian economy after the credit, real estate and professional services sector that took first place and the trade hospitality, transport and communication sector in the second place. Moreover, manufacturing is a real estate-intensive sector because most manufacturing companies own their facilities.

The purpose of this paper is to investigate whether more and less successful Italian companies show significant differences in terms of relevant real estate indicators. The analysis is based on two ratios that measure real estate intensity on the balance sheet and on the income statement. The occupancy cost will also be taken into consideration to include the income statement items, that is, to give weight to the fact that many companies rent their work spaces rather than owning them.

The whole sample of Italian manufacturing companies was first analysed by sector and then split into clusters according to performance to verify whether a trend exists. The main purpose was to compare relative CRE holdings between more and less successful companies. This type of division was not provided by the database but was created using relevant performance indicators based on return on assets.

The paper starts by discussing the existing relevant literature on the importance of real estate-related decisions for companies. It then describes the data and the methodology used in the empirical research. The core of the paper discusses the results obtained by comparing real estate ratios of more and less successful companies. Relevant conclusions are presented in the final section.

## 2. Literature review

Previous literature on CRE can be divided into two main clusters: studies investigating the relative weight of real estate in companies and studies highlighting the importance of CRE.

### 2.1 Real estate weights

Previous studies have focused on determining the historical weights of real estate components in corporate balance sheets over selected time spans. However, none of the studies examined has focused on Italy.

Johnson and Keasler (1993) studied real estate assets of American corporations by analysing a sample of 7,735 companies belonging to different SIC sectors in the period 1984-1991. Elements included as CRE were property, plant and equipment, based on the historical cost approach using several ratios such as real estate/total assets and real estate/stock value. The examined sectors had different values, as low as 2.35 per cent for the tobacco products sector and as high as 55.40 per cent for the agricultural products sector. The authors concluded that in the period examined, the weight of real estate in US corporate balance sheets grew continually.

Building on previous studies in terms of methodology and research aim, but using a different geographical sample, Kim Hiang (1999) analysed the size and relative weight of

real estate in 84 Singaporean non-property companies over 10 years in six sectors. He calculated a Property Asset Intensity ratio and concluded that real estate, with a relative weight of around 40 per cent, may represent opportunities and that the proportion “has increased to an extent where it has become an asset capable of enhancing corporate wealth”.

Nelson *et al.* (1999) conducted a similar study looking at US companies. They contended that although Johnson and Keasler (1993) provided useful information, the study proved to be somewhat ineffective, as the historical cost of real estate assets was used rather than their market value. The authors acknowledged the limitations of obtaining updated market data, but managed to obtain a good approximation by adjusting the assets’ value for inflation. The study covers the time span from 1990 to 1993. Rather than classifying the companies according to different sectors, they used relative size based on the relevant S&P indices. The CRE component was the sum of buildings, land and construction in progress, and it was divided by the total assets of the company and the firm’s market value to obtain two real estate-intensive ratios. The conclusion was that the relative weight of real estate was more or less constant over time, at 19 per cent.

### 2.2 *The role of corporate real estate*

Most companies often disregard the managerial implications of corporate real estate holdings. Many studies have attempted to examine those implications. It is believed that in this respect, Italian companies do not differ from their counterparts abroad and are either already considering these factors or should do so.

Booth (2000) examined how CRE-related decisions affect every company’s real goal, which, according to the author, is to maximise shareholders’ value. The author contends that the main component of CRE that affects the net operating income (and thus the shareholders’ value) is occupancy costs. He also discusses how CRE influences shareholders’ value through its effect on the cost of equity. He noticed that given the fact that CAPM is most often used to determine a company’s cost of equity, the CRE is mirrored inside the beta component that measures the systematic risk. The third way to create value is through leverage, as:

[...] the larger the proportion of fixed over variable costs (i.e. the higher the operating leverage), the more likely it is that net returns will vary more widely than the underlying sales cash flow; so shareholders bear more risk.

In an empirical study, Kühni and Christmann (2004) examined the managerial implications of CRE based on the case of Aventis, a pharmaceutical company, by assessing the influence of corporate real estate management (CREM) on the company’s performance. Aventis’s strategy was to separate non-core real estate assets, which in this case were 8 million square metres, and then create a separate company, Aventis Real Estate, to manage only these non-core real estate assets. The company also began to sell significant parts of this non-core real estate portfolio, gaining important amounts of money that were later used to refinance the company. This case proves how effective CREM can act as a profit booster, keeping the core assets intact inside a non-property company.

Another important aspect of CRE is the trade-off between ownership and leasing of real estate assets. This has been examined in various studies and can affect the success of a company. Golan (1999) lists the advantages and disadvantages of “*own vs lease*” decisions at the corporate level. He states that ownership gives more control over the asset than leasing and also that “ownership acts as an inflation hedge”, as lease payments rise with inflation, while ownership is inflation free. On the other hand, leasing is much more flexible when the

“*ease of disposition*” is considered and, in addition, is tax advantageous, as it offers higher tax deductibility. Hill (2001) also addresses the topic of “*own vs lease*” and points to greater control in the case of ownership and associates various financial advantages with ownership. He states that owned real estate can be used as collateral for mortgage loans and that major planned maintenance can be alternated to make space for other corporate needs that require cash on hand. In addition to that, the owner has higher certainty, as a lease contract can always be cancelled by the other party. However, Hill states that it is much more difficult to dispose of owned real estate assets than leased ones. Furthermore, as CRE does not represent the core business of non-property companies, it is unlikely that these assets will be managed with the same efficiency as the core business.

Other papers have examined how CRE affects companies’ performance by offering opportunities during different stages of company development.

Miles *et al.* (1989) highlight certain opportunities that exist through an effective management and overall valuation of CRE assets. The authors present a CRE valuation model that can be used by management to assess whether the CRE assets of a certain company are undervalued, overvalued or correctly priced. The conclusion is that a set of opportunities for companies exists when, through using the CRE valuation model, managers understand that the assets are undervalued and can then capture the previously unseen value.

Louargand (1999) explains different real estate strategies and their in-depth implications in terms of the firm’s enterprise value. Table I below, extracted from the referenced paper, shows which CRE strategies firms can adopt according to their maturity and the maturity of the market in which they operate.

As it is seen from Table I, there are four different CRE strategies that corporations can apply to fulfil their goals. In the upper left corner, it is stated that the best strategy for young firms operating inside a young market is to use real estate to be flexible and to help capture market share. In this case, leasing rather than ownership is a proper decision. In addition, young companies within young markets should also take into account the leasing of properties, meaning that they should be positioned in areas where they can align their strategy with that of their competitors and can benefit from emerging market trends. The strategy in the upper right corner refers to young companies operating inside a mature market. Here, the best strategy is to use real estate assets that can produce innovation with respect to already existing firms. These companies should position themselves in areas near their potential clients and should tend to lease space rather than own, as that will minimise the risks associated with unsuccessful innovation models. In the lower left corner, mature firms operating inside a young sector can be found. Here, the best strategy is to use existing CRE assets and subsidise the product to gain an advantage with respect to smaller and younger firms that make up the major part of the industry. In the lower right corner are

Stage of Firm	Stage of Market	
	Young	Mature
Young	Capture market share <i>Be flexible</i>	Innovate <i>Speed, cost, convenience</i>
Mature	Nurture the new <i>Subsidise</i>	Minimise costs <i>Own</i>

**Table I.**  
Matrix of different real estate strategies

Source: Louargand (1999)

mature firms operating in a mature market, whose best strategy is to own CRE and minimise the related costs. Given the fact that a mature company operating in a mature market has an already developed business model with a well-defined company strategy, the best course of action is to own real estate rather than lease, as the probability of large fluctuations occurring within the company is rather small.

Liow and Ooi (2004) examined some practical implications of CRE intensity and presence in the case of non-real estate firms in Singapore. The general conclusion was that an intensity that is too high can actually negatively affect firms' Economic Value Added (EVA) and Market Value Added (MVA), based on selected sample. This means that a large number of Singaporean companies were not managing CRE in the best possible manner, as reflected by poorer performance.

Although these studies make reference almost exclusively to US companies, we expect that Italian companies have no reason to behave differently. Our study starts from the assumption that the conclusions of the aforementioned studies can be applied to the Italian market. Furthermore, that would mean that the performance of Italian companies is also affected by their strategies with regard to real estate holdings. This paper examines whether Italian companies are taking into account the previous findings in the literature and aims to provide managers with some suggestions regarding CREM and its impact in the Italian corporate sector.

### 2.3 Data and methodology

A sample of 300 companies belonging to six manufacturing sub-sectors was used to perform relevant comparisons:

- (1) Code 10[1] – Food industry (*Alimentare*);
- (2) Code 13 – Textile industry (*Tessile*);
- (3) Code 20 – Chemicals production (*Chimica*);
- (4) Code 21 – Pharmaceuticals production (*Farmaceutico*);
- (5) Code 24 – Metallurgy (*Metallurgico*); and
- (6) Code 31 – Furniture manufacturing (*Arredamento*).

From each of the above-listed sectors, the top 50 companies by revenue over a 10-year (2004-2013) time span were chosen. Companies whose available financial statements did not cover the 10-year time span were excluded. As shown in Table II, the largest 50 companies by revenue cover a large part of each sector, even when the number of companies inside the

No.	Ateco code 2007	Name of the sector	Total no of companies	% of total sector revenues for the first 50 companies chosen	Revenues of the entire sector (thousands of euros)
1	10	Food industry	13,169	28	99,502,080
2	13	Textile industry	6,463	20	21,370,558
3	20	Chemicals production	4,166	42	51,526,575
4	21	Pharmaceuticals production	716	71	26,316,335
5	24	Metallurgy	2,541	58	58,796,670
6	31	Furniture manufacturing	7,991	26	19,120,730

**Table II.**  
Summary of the sectors analysed

sector is high. The revenues of the total sample of 300 companies correspond to 41 per cent of the total revenues of the six sub-sectors.

For example, in the Food sector, the top 50 companies included in the analysis cover 28 per cent of the sector, which is made up of 13,169 companies. Such a result can be explained by the fact that the largest companies produce the highest revenues and, as such, have the largest market share.

The analysis is based on the calculation of two ratios for each company as measures of the effect of real estate weight on company performance.

- (1) *Ratio 1*: Real Estate Weight (REW) is the percentage of all the real estate components owned out of the value of total assets of the same company and is calculated as the sum of “Land and buildings” and “Construction in progress/advances”, divided by “Total Assets”. This weight of real estate as a percentage of the total assets represents the company’s direct investments in CRE.
- (2) *Ratio 2*: Real Estate Cost (REC) is obtained by dividing income statement component “Leases and rentals” by “Total production costs”. This represents the percentage of a company’s total operating costs spent on the rentals of real estate assets necessary for regular business operation.

The 10-year time span is divided into four relevant periods:

- (1) 2004-2007: pre-crisis period;
- (2) 2008: economic incentives in Italy;
- (3) 2009-2010: beginning of the crisis; and
- (4) 2011-2013: deep crisis.

A first analysis was based on a comparison of the two ratios (REW and REC) between the six industry sectors and between four time periods.

A second analysis was based on ANOVA, which is used to determine whether differences in REW between the six sectors exist and whether they are statistically significant. This was done to test whether some sub-sectors show significantly different holdings of real estate than the rest and whether they use a specific strategy regarding their corporate real estate. When ANOVA assumptions were violated, the Kruskal–Wallis One-Way Analysis of Variance was used as alternative method. A correlation test was used to check whether any significant correlation exists between the companies’ decision to own rather than lease real estate assets.

Finally, a cluster analysis was used to divide the sample into groups according to ROA, Liquidity Ratio and Debt Ratio, independently of sub-sector. ANOVA was used to check for differences between more and less successful companies in terms of their real estate ratios. The main aim was to verify whether the results in the Italian market are in line with previous studies’ findings, which would suggest that better performing companies have taken into account the relevant real estate strategy suggestions, while the less successful ones have not.

### 3. Analysis and results

In this section, the sub-sectors are first compared according to REW and REC ratios. Whether the sub-sectors show significant differences over time is tested as well. Then, the whole sample is analysed according to clusters, using the performance indicators ROA, Liquidity Ratio and Debt Ratio. Finally, the clusters are compared according to their REC and REW values.

3.1 Sectors comparison by ratios

As shown in Figure 1, Ratio 1 (REW) and Ratio 2 (REC) changed drastically over the analysed time frame.

Apart from minor differences, all sub-sectors followed the same trend. The sectors showed constant values during the 2004-2007 time period, with a very sharp increase in 2008. This is because of the *Manovra Economica 2008/2009*[2], an effective set of government incentives that was implemented to entice companies to mark their real estate assets to market value on their balance sheet for civil and fiscal purposes.

The initial aim of this law was to align book values of properties to their market values, thus allowing companies to show the actual state and values of their assets and increasing at the same time shareholders' equity book value. Costs associated with this revaluation were tax deductible and this acted as a real incentive for companies.

If it had not been for this incentive policy, then it is likely that the real estate weights on companies' balance sheets would have remained more or less constant, as in other periods. This means that if the effect of the economic incentives is isolated, then all sub-sectors maintained the relative value of their real estate on their balance sheets at constant levels.

The results of the analysis for Ratio 2 (REC) are presented in Figure 2.

Real estate costs did not represent a significant percentage of the total costs of production. Almost all sectors had increasing values of Ratio 2 (REC) until year 2009, in which a clear decrease occurred. This can be explained by the fact that the Italian economic crisis following the global financial crisis really began in 2009 and that companies then decided to cut down on lease and rental costs that were not pertinent for their core business.

The pharmaceutical sector was the only one that showed significant discrepancies from the others. Ratio 1 (REW) did not exhibit such a sharp increase in 2008 and 2009 as in the other sectors, while Ratio 2 (REC) was decreasing from the very beginning of the period. Different from other sectors, most of the pharmaceutical companies are subsidiaries of foreign companies that are registered and operate in Italy. Because of this,

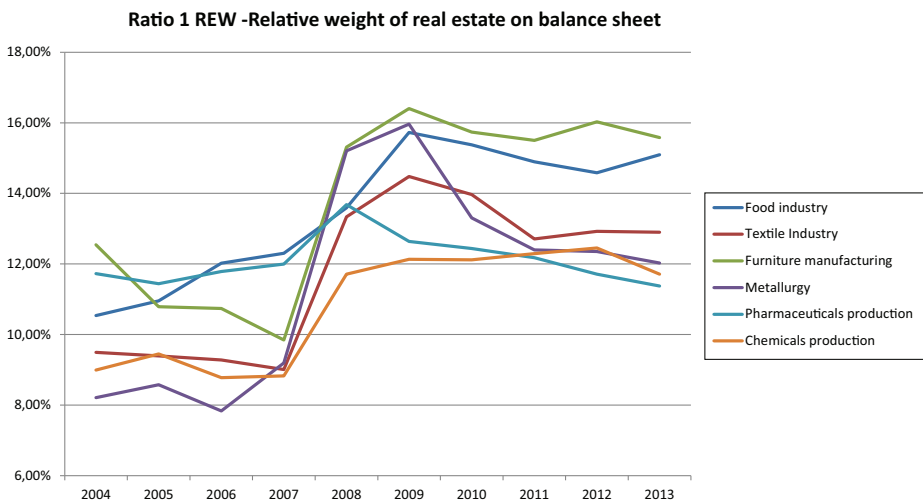
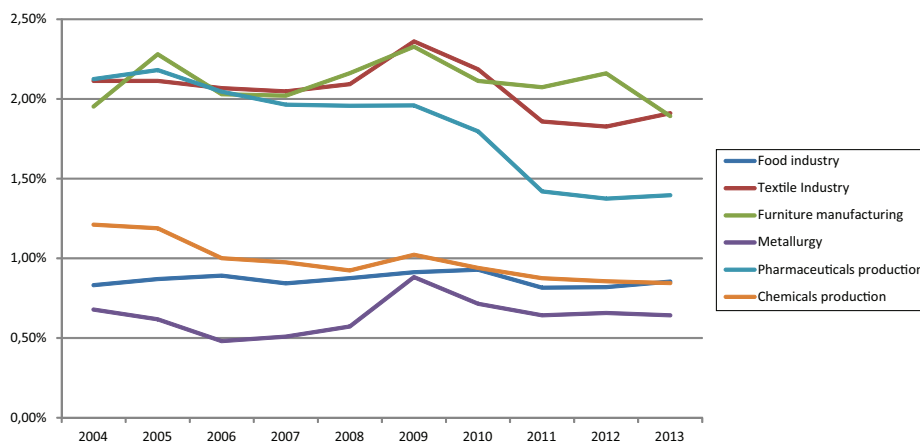


Figure 1. Matrix of different real estate strategies (Louargand, 1999)



**Figure 2.**  
Relative weight of real estate on total assets over the period 2004-2013

it was perhaps much easier for these companies to move part of their production or offices to other countries, avoiding the negative effects of the Italian crisis.

A comparison between sectors was carried out using ANOVA analysis of the four periods.

For the 2004-2007 period, the basic assumptions of the ANOVA were violated and the ANOVA test could not be used. Instead, the Kruskal–Wallis test was used and the results show that the differences in Ratio 1 (REW) between the six sectors for the period of 2004-2007 are not statistically significant. Thus, we can conclude that the manufacturing sub-sectors did not differ in terms of their relative real estate holdings. The ANOVA/Kruskal–Wallis analysis was repeated for the remaining three periods and gave the same result as for the first period.

As a general conclusion, there were no statistical differences in Ratio 1 (REW) between the sub-sectors. All sub-sectors had the same relative weights of real estate on their balance sheet and so they tend to move in the same direction when it comes to their real estate investments.

### 3.2 Cluster analysis

In the second analysis, the criteria for dividing the sample into different groups were not pre-determined using sector affiliation, but rather new clusters were formed using Liquidity Ratio (current assets/current liabilities), Debt Ratio (total assets/equity[3]) and ROA (Return on Assets).

According to the variables used, three clusters were obtained for each of the selected periods and the quality of such clustering analysis was always high.

The relative sizes of the three clusters for the first period examined are shown in Figure 3. One cluster is extremely small when compared to the others and accounts for only 2 per cent of the total. As the period examined (2004-2007) represents a time of economic accomplishment for Italian companies, it is highly probable that the smallest cluster represents the least successful of the companies.

Cluster 1 has the lowest Debt Ratio and, at the same time, has the highest values for Liquidity Ratio and ROA. This cluster is marked as “Best”. Cluster 3 has the highest Debt Ratio and the smallest value of liquidity and even a negative ROA. This cluster is marked as “Worst”. Cluster 2 has medium values for the three variables. This cluster is marked as “Medium”.

**Figure 3.**  
Relative weight of  
real estate costs on  
income statement



The “Worst” cluster in this period includes only 6 out of the 300 selected companies, while “Best” has 99 and “Medium” 195. 2004-2007 represents a pre-crisis period and more companies had better performance than in the subsequent periods.

The cluster analysis was repeated for the subsequent periods (2008; 2009-2010 and 2011-2013)[4] using the same procedures. In each of the remaining three periods, three clusters were obtained. Table III shows the number of companies in each cluster for all the sub-periods.

The number of companies in the “Best” cluster decreases as the crisis period approaches, while the numbers of companies in the “Worst” and “Medium” clusters continue to increase as an effect of the crisis on all the sectors. This is not surprising, as the effects of the financial crisis in Italy started in 2009, when companies in all sectors started registering losses and having serious difficulties.

A cluster retention rate analysis was also conducted. It was found that 54.3 per cent of companies stayed in the same cluster over the four periods. Companies that changed cluster at most once by one notch (i.e. “Best” and “Worst” companies could move only to the “Medium” cluster and vice versa, while changes from “Best” to “Worst” and vice versa were not allowed) make up 84 per cent of the sample. Such good cluster retention marks a very stable and high quality clustering. This means that companies belonging to the manufacturing sector generally did not change behaviour; those showing the weakest results did not tend to improve, and those with the best results tended to remain in that group and did not lose their leadership position, even over a 10-year period.

*3.3 Comparison between clusters according to relative real estate indicators*

Whether statistically significant differences exist between clusters was analysed using Ratio 1 (REW) and Ratio 2 (REC).

**Table III.**  
Cluster membership  
by period

Cluster	2004-2007	2008	2009-2010	2011-2013
Best	99	68	88	34
Medium	195	186	185	246
Worst	6	46	27	20

The “Best” cluster often had the smallest relative weight of real estate components on the balance sheet. Ratio 1 (REW) for the “Best” cluster tended to consistently increase, with the only significant decrease seen in the period 2011-2013.

The “Medium” cluster tended to follow nearly the same trend as “Best”, with the only difference being the fact that the “Medium” cluster always had much larger values of Ratio 1 (REW), with the difference being up to 6 per cent.

The “Worst” cluster had its own particular trend over the period 2004-2013, in which REW was almost always increasing. This cluster started with the lowest values of Ratio 1 (REW) in 2004-2007, then surpassing other clusters during the final period.

These results shed light on how the Italian manufacturing sector coped with the crisis in terms of their real estate holdings. The best performing companies always had lower weights of real estate holdings or lower amounts of funds invested in real estate than the less successful companies. This could mean that they are prudent and capable of understanding the risks associated with holding too much real estate investment, or alternatively, these companies may better allocate their capital to core businesses that generally produce higher returns than properties. On the other hand, the least successful companies showed the opposite trend, where they usually continued to increase the real estate holdings on their balance sheet and had higher holdings than the better performing companies. The major and the most important difference between the two groups is evidenced in the last period examined (2011-2013). During the harshest period of the crisis in Italy, the best performing companies decreased their ownership of real estate, while the least successful ones had an increasing trend. The medium performance companies tended to mimic the behaviour of the high performing companies, but were less prudent, as the ratio values were always higher than in the “Best” cluster.

As a conclusion, the poorest performing companies proved to be the least prudent or had less developed real estate management capabilities, as they continued to increase their real estate holdings during the crisis.

Again, the ANOVA/Kruskal–Wallis analysis was conducted. The conclusion is that the differences in Ratio 1 (REW) between clusters are always statistically significant[5]. This shows that sharp differences exist in how manufacturing companies handle their properties; these differences are the result of the different management choices of the companies.

The same analysis was repeated for Ratio 2 (REC), as shown in [Figure 5](#).

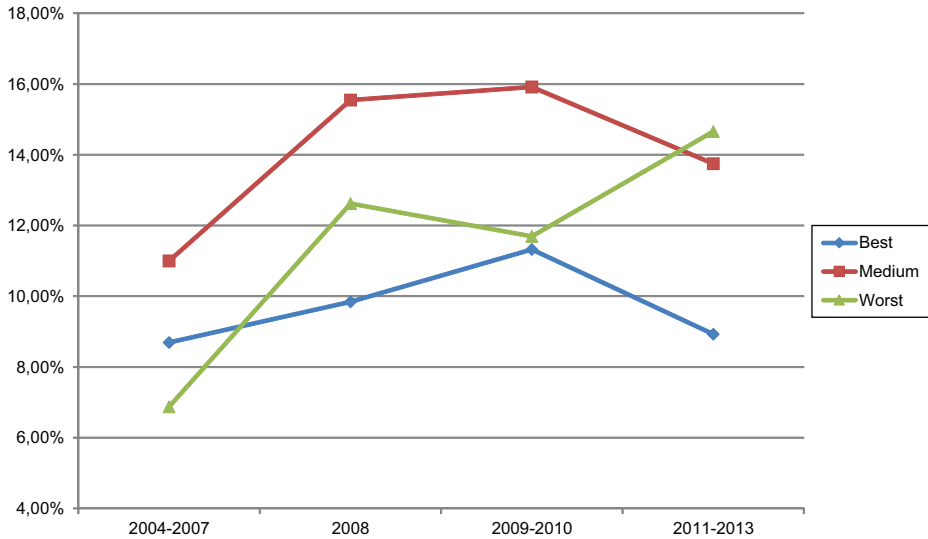
The “Best” cluster shows a consistently increasing trend during the four periods. The “Medium” cluster shows a relatively constant trend, with a decrease in the last period examined. On the other hand, the “Worst” cluster shows a generally decreasing trend.

The “Worst” cluster exhibited diametrically opposite behaviour for Ratio 1 (REW) and Ratio 2 (REC). This means that each time Ratio 1 (REW) increased, Ratio 2 (REC) decreased, indicating that when the companies increased real estate investment, they tended to decrease the amount of rent they paid. Thus, these companies preferred CRE ownership rather than leasing.

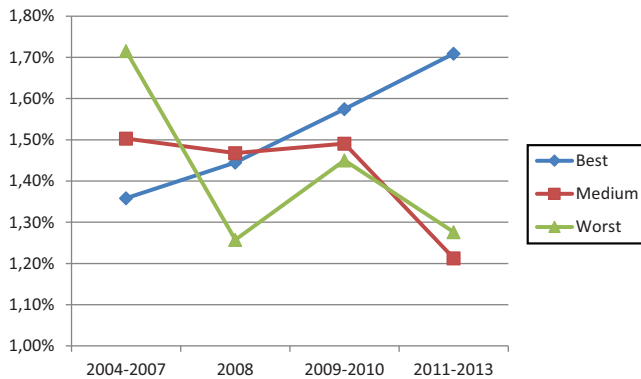
The “Best” cluster continually increased their values of Ratio 2 (REC), so they tended to increase rent-related costs. Even when they decreased their relative investments in real estate during the 2010-2013 period, they still tended to increase their rent-related costs as a percentage of their total production costs. These companies opted for rent over ownership of their CRE.

If a comparison is made between [Figures 4](#) and [5](#), then it appears that “Medium” companies invested more heavily in CRE than renting. Only in the last period did they show a decrease in both ratios, indicating that they were decreasing their real estate dependency by selling assets because of the economic crisis.

Ratio 1 REW - Relative weight of real estate on BS



**Figure 4.**  
Overview of variables  
for three clusters  
(2004-2007)



**Figure 5.**  
Relative weight of  
real estate on balance  
sheet for three  
clusters

To confirm these results related to “own vs rent” decisions, a correlation analysis was conducted between Ratio 1 (REW) and Ratio 2 (REC) for each of the three clusters. The level of correlation was  $-0.232$ , and this value was statistically significant. Table IV contains the correlation coefficient values for the three clusters.

The highest performance companies (“Best” cluster) showed the highest correlation and as the performance of companies decreased, so did the correlation (in absolute terms). The correlation was not statistically significant for the “Worst” cluster.

The conclusion is that the highest performing companies were taking into account both ratios, at least to some degree. In the case of lower performance companies, the correlation decreased and for the “Worst” cluster was not even statistically significant, meaning that those companies were not considering the trade-off between owning and renting CRE assets.

#### 4. Conclusions

This paper provides a thus-far missing “map” of the CRE exposure of Italian companies, specifically those in the manufacturing sector. It also discusses the managerial implications of CRE decisions for Italian companies.

The initial analysis of the four selected periods (2004-2007, 2008, 2009-2010, 2011-2013) showed that manufacturing sub-sectors do not differ in terms of real estate investments.

A cluster analysis classified the whole sample into higher and lower performance groups according to three selected variables: ROA, Debt Ratio and Liquidity Ratio. The analysis produced three clusters of companies (“Best”, “Medium” and “Worst”) for each of the examined periods. Then, the clusters were compared according to their real estate components (Ratio 1 and Ratio 2). The results showed that companies belonging to “Best” cluster are the most prudent, meaning that they have chosen mainly to “lease” rather than to “own”. As cluster performance decreases, so does the prudence of the firms. The “Best” cluster had the smallest relative weight of CRE on their balance sheets during the four periods selected and, thus, were more cautious by investing less in real estate and more in their core business. Although CRE investments tend to provide control and security to the business, they also tend to “lock up” capital, decreasing liquid assets and making the company more vulnerable during less stable periods (like the recent financial crisis). In fact, the companies in the “Worst” cluster continually increased their CRE holdings, locking up funds in the process and ending up with a small liquid base and extremely negative operating results as a consequence. In addition, the companies from the “Best” and “Medium” clusters showed some logical pattern in their “own vs lease” decisions, increasing the occupancy costs when decreasing CRE ownership and vice versa. This can be seen through the negative correlation coefficient between the Ratio 1 and Ratio 2 for these companies. Although these correlations were not high in absolute terms (around  $-0.25$  for the “Best” companies), they were still negative and significant, which means that these companies were well aware of the existing “own vs lease” trade-off. For the “Worst” companies, this was not the case.

From this analysis, some managerial implications and advice emerge for the Italian manufacturing sector. Italian companies should pay more attention to the existing trade-off between occupancy costs and holdings of real estate as ownership, as it was shown that the best performing companies exhibit a significant negative correlation between the two indicators. Moreover, to improve results, Italian companies should be able to recognise that maintaining stable investments in CRE is a better solution than continuing to increase these investments and locking more capital into illiquid assets with lower returns than the core business, especially during periods of turmoil and financial crisis.

Two possible limitations of this approach are because of use of book values and the lack of intangible asset considerations. This proves to be a limitation despite the fact that the economic incentives of 2008 tended to bring book and market values closer to one another, as book values do not reflect nor represent a company’s goodwill.

In the second part of the analysis, intangible assets were not taken into account. This could also prove to be a drawback because non-balance sheet items sometimes prove to be pertinent

Cluster	Correlation	Significant
Best	$-0,232$	Yes
Medium	$-0,158$	Yes
Worst	$-0,116$	No

**Table IV.**  
Summary of correlations between Ratio 1 and Ratio 2 for each of the clusters

to a company's leading position. These items were not included in the analysis because it is very difficult to quantify how intangible assets influence the success of a company.

The paper may represent a starting point for further studies and researches on the effects of corporate real estate management on the performance of non-real estate companies.

#### Notes

1. Code 2007 has been used.
2. 16 to 23 of Article 15 of Law Decree 185/2008 (Decree "Anti-economic crisis").
3. Ratio is not the standard debt/equity ratio, since the AIDA database did not provide this data for most of the companies. Instead, total assets/equity ratio was used. In order to be sure that the results obtained are correct and comparable, a correlation analysis between the total assets/equity ratio and debt/equity ratio was conducted for the companies with available data. These two ratios showed very high positive correlation (ranging from 0.70 to 0.95) that was also statistically significant. Thus, the total assets/equity ratio used in this analysis will show higher values, but will regardless give a very accurate representation of the debt holdings of selected groups/clusters.
4. are in the appendix.
5. are reported in the appendix.

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#### Further reading

Altalex (2009), "Manovra economica 2008/2009: rivalutazione dei beni immobili d'impresa", 25/02/2009, available at: [www.altalex.com/index.php?idnot=44859](http://www.altalex.com/index.php?idnot=44859) (accessed 29 January 2017).

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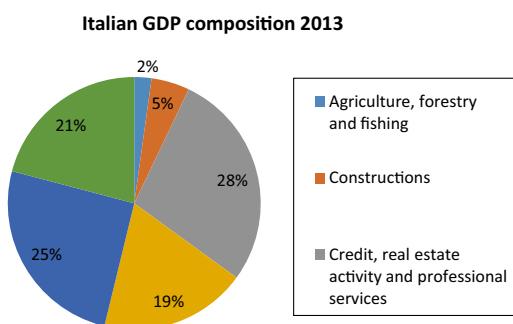
**Appendix**

Inside this appendix, all the data and tables referring to the empirical analysis, that were deemed redundant in the main part of the paper, are reported. (Figure A1)

The first group of graphs refers to the ANOVA/Kruskal–Wallis analysis that was conducted before the clustering to see if the differences between the six manufacturing sectors with respect to real estate investments are statistically significant or not:

The second group of graphs and tables refers to the clustering analysis that was conducted to obtain the new division of the whole sample of companies into more and less successful ones: (Figures A2, A3 and A4)

The third and final group of graphs refers to the ANOVA/Kruskal–Wallis analysis that was conducted after the clustering to see if the differences in real estate holdings between the new obtained groups are statistically significant or not:



**Figure A1.** Relative weight of real estate costs on income statement

Ratio_1	df1	df2	Significance
Levene Statistic	5	294	0,005

**Table AI.** Test of homogeneity of variance 2004-2007 – assumption of ANOVA

	Ratio_1
Chi-Square	8,971
Df	5
Asymptomatic significance	0,110

**Table AII.** The results of Kruskal–Wallis test 2004-2007: Test Statistics<sup>a, b</sup>

**Notes:** <sup>a</sup>Kruskal–Wallis Test; <sup>b</sup>Grouping Variable: Sector

Ratio_1	df1	df2	Significance
Levene statistic	5	294	0,000

**Table AIII.** Test of homogeneity of variance 2008 – assumption of ANOVA

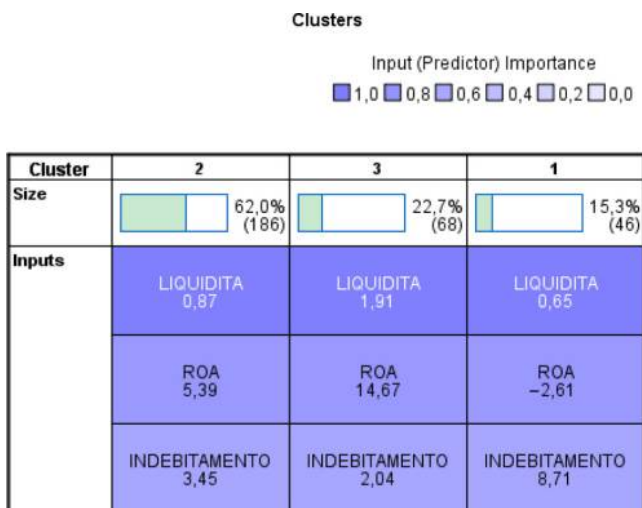
		Ratio_1
<b>Table AIV.</b>		
The results of	Chi-Square	3,036
Kruskal–Wallis test	Df	5
2008: Test	Asymptomatic significance	0,694
Statistics <sup>a, b</sup>	<b>Notes:</b> <sup>a</sup> Kruskal–Wallis Test; <sup>b</sup> Grouping Variable: Sector	

		Ratio_1			Significance
<b>Table AV.</b>					
Test of homogeneity of	Ratio_1				
variance 2009-2010 –	Levene Statistic	df1	df2		
assumption of					
ANOVA	7,302	5	294		0,000

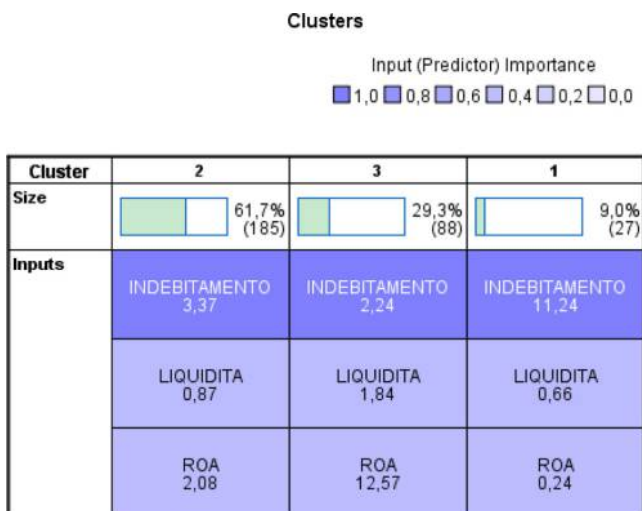
		Ratio_1
<b>Table AVI.</b>		
The results of	Chi-Square	5,555
Kruskal–Wallis test	Df	5
2009-2010: Test	Asymptomatic significance	0,352
Statistics <sup>a, b</sup>	<b>Notes:</b> <sup>a</sup> Kruskal–Wallis Test; <sup>b</sup> Grouping Variable: Sector	

		Ratio_1			Significance
<b>Table AVII.</b>					
Test of homogeneity	Ratio_1				
of variance 2011-2013	Levene Statistic	df1	df2		
– assumption of					
ANOVA	6,362	5	294		0,000

		Ratio_1
<b>Table AVIII.</b>		
The results of	Chi-Square	5,252
Kruskal–Wallis test	Df	5
2011-2013: Test	Asymptomatic significance	0,386
Statistics <sup>a, b</sup>	<b>Notes:</b> <sup>a</sup> Kruskal–Wallis Test; <sup>b</sup> Grouping Variable: Sector	

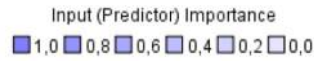


**Figure A2.**  
Italian GDP  
breakdown in 2013



**Figure A3.**  
Overview of variables –  
2008: Clusters

Clusters



Cluster	2	1	3
<b>Size</b>	82,0% (246)	11,3% (34)	6,7% (20)
<b>Inputs</b>	INDEBITAMENTO 3,28	INDEBITAMENTO 1,94	INDEBITAMENTO 14,29
	LIQUIDITA 0,96	LIQUIDITA 2,91	LIQUIDITA 0,61
	ROA 4,54	ROA 14,39	ROA -0,23

**Figure A4.**  
Overview of variables for three clusters – 2009-2010

**Table AIX.**  
Test of homogeneity of variance 2009-2010 – after clustering

Ratio_1	Levene Statistic	df1	df2	Significance
	2,316	2	297	0,100

**Table AX.**  
ANOVA between three clusters according to Ratio 1 – after clustering

Ratio_1	Sum of squares	Df	Mean square	F	Significance
Between groups	0,144	2	0,072	6,826	0,001
Within groups	3,142	297	0,011		
Total	3,287	299			

**Table AXI.**  
Test of homogeneity of variance 2004-2007 – after clustering

Ratio_1	Levene statistic	df1	df2	Significance
	3,099	2	297	0,047

	Ratio_1	
Chi-Square	7,873	<b>Table AXII.</b> The results of Kruskal–Wallis test 2004-2007 – after clustering: Test Statistics <sup>a, b</sup>
Df	2	
Asymptomatic significance	0,020	

**Notes:** <sup>a</sup>Kruskal–Wallis Test; <sup>b</sup>Grouping Variable: Group

Ratio_1	df1	df2	Significance	<b>Table AXIII.</b> Test of homogeneity of variance 2008 – after clustering
Levene statistic				
5,593	2	297	0,004	

	Ratio_1	
Chi-Square	14,309	<b>Table AXIV.</b> The results of Kruskal–Wallis test 2008 – after clustering: Test Statistics <sup>a, b</sup>
Df	2	
Asymptomatic significance	0,001	

**Notes:** <sup>a</sup>Kruskal–Wallis Test; <sup>b</sup>Grouping Variable: Group

Ratio_1	df1	df2	Significance	<b>Table AXV.</b> Test of homogeneity of variance 2011-2013 – after clustering
Levene statistic				
3,776	2	297	0,024	

	Ratio_1	
Chi-Square	8,259	<b>Table AXVI.</b> The results of Kruskal–Wallis test 2011-2013 – after clustering: Test Statistics <sup>a, b</sup>
df	2	
Asymptomatic significance	0,016	

**Notes:** <sup>a</sup>Kruskal–Wallis Test; <sup>b</sup>Grouping Variable: Group