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# Capital Market Expectations and the London Office Market

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## Abstract

The analysis of office market dynamics has generally concentrated on the impact of underlying fundamental demand and supply variables. This paper takes a slightly different approach to many previous examinations of rental dynamics. Within a Vector-Error-Correction framework the empirical analysis concentrates upon the impact of economic and financial variables on rents in the City of London and West End of London office markets. The impulse response and variance decomposition reveal that while lagged rental values and key demand drivers play a highly important role in the dynamics of rents, financial variables are also influential. Stock market performance not only influences the City of London market but also the West End, whilst the default spread plays an important role in recent years. It is argued that both series incorporate expectations about future economic performance and that this is the basis of their influence upon rental values.

# Capital Market Expectations and the London Office Market

## 1: Introduction

Over the last decade a number of papers have considered the dynamics of the London office market. The London office market is of interest from a number of perspectives because it is one of the largest property markets globally, both in terms of occupied space and investment activity, and because it contains a number of submarkets that have quite distinct characteristics. While earlier work tended to broadly follow the general literature regarding office cycles and considered the application of structured simultaneous models (Wheaton et al., 1997), or error-correction frameworks (Hendershott et al, 1999, 2002), more recent papers have expanded upon this form of analysis. For example, Hendershott et al. (2002) use a two-equation system whereby rents and vacancy rates are estimated for the City of London market within an error-correction framework. Farrelly & Sanderson (2005) consider the appropriateness of adopting non-linear models in the context of modeling office rents. These authors find evidence of non-linearity in the City of London office market, noting in particular that non-linear models provide a better fit during the downturn of the late eighties and early nineties. More recently, Hendershott et al. (2010) extends upon the issue of non-linearity by utilizing an asymmetric error-correction framework that considers the response of real rents to employment and supply shocks. The authors find evidence of asymmetry with significant results being reported in respect to upward shocks in employment and supply that lead to positive and negative responses respectively. However, downward shocks to employment and supply do not produce significant results.

The vast majority of papers examining London have tended to consider either the overall metropolitan market (e.g. Wheaton et al., 1997) or the City of London (e.g. Hendershott et al., 1999, 2010, Stevenson & McGrath, 2003, Farrelly & Sanderson, 2005). While Stevenson (2007) utilizes a multiple error-correction framework to examine London office submarkets, with the results illustrating a high level of interaction, little work has been undertaken that has considered differences in the dynamics of the submarkets explicitly. The current paper takes a slightly different approach to previous work by modeling office rents within the two largest submarkets (the City of London and the West End) within a Vector Error-Correction (VECM) framework[1]. The two office submarkets under investigation have quite distinct characteristics that can lead to both spatial and structural fragmentation. These differences relate to both tenant mix and property specific issues such as office specifications. These differences can result in divergent

dynamics between the two markets. For example, the City market is dominated by tenants operating within the financial services industry, financial institutions and firms in related areas such as legal services. Further, the City market has comparatively light planning restrictions in place that allow the development of large scale modern office buildings. In contrast, the West End operates under a far stricter planning system, which effectively constrains the development of large modern office space. While the importance of the financial services sector has grown in recent years due to firms such as hedge funds locating in the market, the West End is still dominated by more traditional industrial sectors. Both of these key differences can lead to divergences in the supply characteristics between the two markets.

The focus of the analysis is on the Variance Decomposition and Impulse Response components of the VECM model, with the aim being to consider possible differences in influencing dynamics. In particular, given the nature of especially the City market, the paper takes the specific focus of considering the importance of capital market variables upon rental values. Many previous studies have examined the relationship between private real estate and the stock market. Most of these have concentrated on the contemporaneous relationship between the two and have tended to produce evidence of an insignificant relationship (Quan & Titman, 1999). However, if an extended time frame is examined this relationship can change. This is illustrated by Quan & Titman (1999) who find a significant positive relationship between private real estate and the stock market using a cross-sectional approach. Using a similar VECM model to the one that is adopted in this study, Tuluca et al. (2000), also find a strong relationship between equities and real estate. Because of the dynamic lag structure of the model, the use of a VECM framework allows a deeper examination of the inter-linkages between the two assets.

The use of a VECM framework allows a deeper examination of the inter-linkages between the two assets due to the dynamic lag structure of the model. By considering a lagged structure, and by considering both performance and turnover, we hope to be able to capture any possible impact upon rents due to the influence on corporate occupier demand. However, stock market performance can also have an influence due to the different nature of pricing present in the equity market in comparison to the private real estate market. In particular, equity prices contain a far greater degree of expectations than does private property. Therefore, we may be able to capture an element of the expectations concerning future economic and financial conditions in equity prices that subsequently feeds through into rental levels. In addition, the use of rental values, rather than either capital values or total returns, further emphasises the expectations element in

the rationale as rental values contain an even smaller expectations component than capital values. A similar rationale can also be applied with respect to the term and default spreads. Both the term and default spreads have been shown to provide effective proxies for expected economic growth (Harvey, 1991) and have been used as effective explanatory variables in the modeling of real estate in studies such as Seck (1996) and Ling & Naranjo (1997). The term-spread is included to provide a measure of the yield curve and therefore some indication of interest rate expectations. The default spread can also be viewed as containing information concerning market expectations about economic conditions. For example, a widening default spread would imply more negative expectations about future economic performance due to the impact upon corporate credit worthiness. The default spread is also of particular interest given the nature of the recent economic and financial crisis.

The results in the paper highlight that while lagged rental values and demand drivers are key variables, the role of the other series is perhaps currently under appreciated. The performance of the UK equity market plays an important role both in terms of the impact of shocks upon rents and in relation to the variance decomposition results. Furthermore, these results are evident not only in the City of London market but also in the West End, implying that the results are not solely due to impact on occupier demand in the Square Mile. It is argued in the paper that this is possibly due to the expectations element concerning future economic performance incorporated into stock prices. In addition, particularly in the sample period that incorporates the recent financial and economic crisis, the importance of the default spread is clearly evident. The broader impact of the expectations element would explain why the findings are not just constrained to the City. The remainder of the paper is laid out as follows. Section 2 presents the modeling framework used in this paper. Section 3 reports the empirical findings while Section 4 provides concluding comments.

## 2: Data and Methodological Framework

The data used in this paper consists of prime rents data for the City of London and West End of London sourced from CBRE on a quarterly basis from Quarter 1 1987 through to Quarter 2 2009. Exhibit 1 displays these rental values, in nominal terms. The variables included in the modeling framework are service sector employment, service sector GDP, industrial production, stock market performance, stock market turnover, short-term interest rates, the default spread and the term spread. All of the analysis is undertaken in real terms after adjustment for inflation. The

first three variables are designed to proxy underlying fundamental occupational demand in the office market. The use of specific employment and GDP figures is aimed at capturing the driving forces of the office sector and have been used extensively in previous studies on the London market (e.g. Hendershott et al, 2010 and Stevenson & McGrath, 2003)[2]. Industrial production has also been used extensively in previous modeling research and should provide a proxy for overall economic activity.

{Exhibit 1}

The use of two specific stock market variables reflects the economic concentration of London and the potential affect the markets may have on the corporate performance of tenants. This performance may in turn affect occupier demand and also impact the expectations element contained in stock prices. Two alternative measures of stock market activity are used in the paper. The first is the actual performance of the stock market as proxied by the FTSE 100. The second measure of the stock market is turnover and is included in an attempt to capture some indication of financial service based corporate activity. The final three variables included in the modeling framework are all interest rate based, with the 3-month Treasury Bill rate used as well as measures of the term and default spreads. The term-spread is defined as the difference between the 10-year Government bond yield and the 3-month Treasury Bill rate while the default spread is calculated as the difference in the yield between corporate and government bonds. As noted in the introduction, the term-spread is intended to provide a measure of interest rate expectations, while the default spread should also capture expectations about the economic and financial climate. The nature of the recent economic crisis means that the analysis is conducted over two slightly different time periods. The first considers the period 1987-2004, while the second extends the sample period to 2009. While the full analysis allows us to consider the impact of the recent financial crisis and recession, the curtailed analysis avoids the possibility that the results reported are solely due to the nature of the credit crisis.

The modeling framework adopted in the paper is a Vector Error-Correction Mechanism (VECM). Such a framework is based upon a standard Vector Autoregressive (VAR) model and on the premise that all variables in a system of equations are endogenous. Further, a fundamental premise is that each variable can be depicted as a linear function of its own lagged values and the lagged values of all other variables in the system[3]. The VECM framework also addresses

potential methodological issues with respect to VAR models (Hendershott et al., 2010) and the implications of failing to initially test for co-integration (see Tuluca et al., 2000).

While the coefficients from the model are discussed, the emphasis with regard to the empirical findings is on the impulse response functions and variance decompositions. The impulse response function examines the impact of a shock in a variable to all other variables within the system. Due to the dynamic lag structure inherent in a VECM framework and the inter-relationships between the endogenous variables, a shock to one variable is also transmitted to all of the other variables within the system. The variance decomposition results provide the percentage of the variation in each variable that can be attributed to both the variable itself and the other variables within the system. Given the inclusion of lags within a VECM, the impact of variables upon rents can be considered over an extended period, rather than the more conventional concentration of analysis on the contemporaneous relationships.

Any modeling of assets in a VECM framework initially requires testing for the presence of co-integrating relationships. The results from the Johnansen co-integration procedure are displayed in Exhibit 2. The results do provide clear evidence of co-integration amongst the variables, with significant findings being reported with respect to both submarkets and for the trace and maximum eigenvalue test statistics. However, for both the City and West there is a divergence in the estimated number of co-integrating relations between the two test statistics. In the case of the City, the trace statistic indicates that there are seven co-integrating equations at the 0.05 significance level, while only four are indicated by the maximum eigenvalue. With respect to the West End the trace statistic again indicates the presence of seven co-integrating equations, while in this case the maximum eigenvalue statistic reports only two. The need to determine the number of co-integrating equations is necessary due to the need to incorporate them into the VECM model. For the purposes of this study it was felt that is was more appropriate to defer to the findings from the Maximum Eigenvalue. The rationale behind this decision was based on the nature of the hypotheses the two tests are based on. Whereas the Eigenvalue test is based on an alternate hypothesis of more than $r$ co-integrating vectors, the trace statistic's alternate is $r$+1. Furthermore, based on the findings of papers such as Gregory (1994), it is generally felt that more weight should be placed upon the Maximum Eigenvalue statistic. Based on these findings the VECM models are estimated, with four co-integrating vectors included in the case of the City and two for the West End. The detailed results from the two VECM models are displayed in the Appendix[4]. Exhibit 3 displays the results of the Block Exogeneity Wald tests. These results show

the significance concerned with the exclusion of each exogenous variable in turn from the VAR/VECM systems. Given the number of variables included in each model and that many of them are attempting to proxy the same affects, it is not surprising that there is a relative lack of significant findings. There are, however, a number of findings that do warrant comment. Firstly, the tests incorporating all of the non-rent series are significant in each case bar the West End in the extended time-period. Secondly, with regard to the City of London, the influence of the stock market itself is clearly illustrated with significant chi-squared tests reported for both time periods.

{Exhibits 2 & 3}

**3: Variance Decomposition and Impulse Response Analysis**

This section of the paper presents the empirical analysis of primary concern, the variance decomposition and impulse response results from the VECM models. Initially the discussion will be concerned with the curtailed time-frame up to 2004. We will then consider the results following the inclusion of the subsequent five years including the global financial crisis. Exhibits 4 and 5 report the variance decomposition and impulse response results for the initial sample period through to the end of 2004. In each table, Panel A presents the findings with respect to the City of London and Panel B the West End market.

As would be expected from the variance decomposition results, the respective rental series account for a high proportion of the variability due to the frequently observed autocorrelation structure of rental values. This effect is particularly noticeable at shorter lags; with evidence of a dissipation of the impact as the lag length is increased. Specifically, with respect to the variance decomposition findings, lagged rental figures account for the highest proportion of the variation in the rental series dynamics. This is the case for all 12-lag lengths for the West End. The impulse response findings also confirm this, with shocks to the rental data having the largest and most sustained impact upon rents, again throughout all 12 lags for the West End. With regard to the City market, the impact of lagged rents dissipates more quickly. While having the highest proportionate influence upon the variability, the variance decomposition results show that this reduces quickly and that lagged rents are no longer the primary influencing series after four quarters. For the impulse response results, the impact of a shock in rents is relatively stable but is not of the same magnitude as observed in the West End. Importantly, these findings illustrate that while both markets are affected by their own lagged dynamics, the relative importance of them differs. In particular, the West End appears to be far more influenced than the City by its lagged

rents, both in terms of the variability of the series and in terms of shocks. This is possibly a feature of the enhanced supply constraints under which the market operates.

The discussion now turns to the relative impact of the other series included in the VECM model. As one would expect, as the lag length is increased the relative importance of the fundamental demand drivers increases. For both submarkets the primary demand side variable in terms of its impact is GDP. It is of interest that with employment and industrial production the relative influence of these variables differs in the two markets. With regard to the West End, employment plays a more prominent role with respect to both the variance decomposition and impulse response findings. In contrast, for the City market industrial production has a more influential placing. Although in neither case do the series vie with GDP, the figures show the importance of the underlying demand drivers and the differences between the two markets. To illustrate this, whilst industrial production has a maximum variance decomposition figure of 14.16% for the City, for the West End it is only 0.90%. In contrast, while the maximum employment figure for the City is 4.08%, it is 7.51% for the West End. One possible reason behind this is the nature of employment in the two markets. While employment within the City is obviously service sector and specifically financial services based, the nature of the economic activity in the square mile is quite distinct. The importance of the overall economic health of the country will possibly come more into play in the City environment. In contrast, the employment series used may more accurately reflect the broader service sector employment base of the West End.

{Exhibits 4 and 5}

The importance of the financial markets to the City office market was obviously a key rationale behind the inclusion of both the FTSE 100 and stock market turnover in the model. However, the results reveal the interesting finding that the West End is highly influenced by the FTSE 100 both in terms of shocks and variability of rents. While in both cases the respective figures are smaller than with the City, the influence of the capital markets on the West End market cannot be ignored. At its peak, over 10% of the variability of West End rents can be attributed to the FTSE, while the impact of shocks in the FTSE on rents is not only relatively high, in the 5% region, but also quite sustained. The findings are highly intuitive and support the findings of papers such as Tuluca et al. (2000) in that the conventional analysis of contemporaneous relationships can mask the linkages between private real estate and the capital markets. Obviously, for a market as closely linked as the City of London, this issue is more evident. The increasing nature of the

responses for both markets is consistent with the different basis of valuation in the two assets. More importantly, stock prices appear to incorporate market expectations to a greater degree than real estate. The fact that the impulse response figures are broadly similar for both the City and the West End would imply the impact upon rents is not necessarily being driven by the direct influence of stock market performance on occupier's corporate performance. Rather, the response is possibly originating from expectations about future economic conditions and performance. The variance decomposition findings, in Exhibit 4, do however show a difference between the two, with the stock market accounting for a higher proportion of the variation in City rents than with the West End. The peak figure with respect to the City is 32.51% with respect to a lag length of 5. In contrast the highest figure for the West End is 10.46% at 7 lags with only lagged West End rents and GDP commanding a higher proportional influence.

The second measure of the capital markets, stock market turnover, is far less influential for both submarkets. Turnover was included in the models as a possible measure of corporate activity on the part of the financial institutions, the key source of tenants in the City of London market. Turnover does appear to capture some of this influence as the variance decomposition figures for the City are consistently higher than for the West End. However, where the stock market does make an impact, this is illustrated more in terms of performance. This would support the view that the expectations component in stock prices may be providing valuable information relevant to the private real estate market. It should be made clear that in this sense we are not per se referring to expectations about the performance of real estate specifically. Rather, the expectations contained in stock prices generally relate to broader economic and financial concerns as well as corporate performance. Given that we are modeling rental values this can then feed through in terms of future occupational demand. As noted earlier in the paper the use of rental rather than capital values emphasizes the different nature of valuation in the real estate and capital markets.

The final set of variables (Treasury Bills, Term Spread and Default Spread) can also be viewed as providing expectations about future economic performance. With respect to the variance decomposition findings, the City is more influenced by these three, which is intuitive given the nature of the underlying economic function of the square mile. However, compared to the impact of GDP, the FTSE and lagged city rents, the contribution is marginal. On an aggregate level they can be considered to explain just over 12% of the variation in City rents at a twelve quarter lag. For the West End, the figures are lower with an aggregate figure of just higher than 4% at a lag

length of 12. Further, it is noticeable that in regard to the City impulse response figures, the sign of the impact for both Treasury Bills and the Term Spread is not the anticipated negative sign. A rising term spread would indicate that there is an expectation of increasing short-term interest rates. Therefore, it would be expected that shocks in both this variable, as well as interest rates themselves, would lead to a negative response in rents. It is possible that if capital values were considered, more intuitive findings would be found. Despite these findings, the results in respect to the default spread are of interest. A positive shift in the default spread would indicate that investors are growing increasingly concerned over credit issues, thus implying that they anticipate worsening economic conditions over the medium term. This would suggest a negative response in rents to a shock in the default spread. This is what is observed, with the response in the City market becoming increasingly negative over the twelve lags.

{Exhibits 6 and 7}

The default-spread findings are of particular interest when the analysis is extended through to the second quarter of 2009. Given the nature of the economic climate in the UK since 2007, the possible importance of a variable such as the default spread could increase in importance when more recent data is included into the analysis. Exhibits 6 and 7 report the variance decomposition and impulse response results for the extended sample. Overall the findings are broadly similar to those observed through to 2004 in that lagged rents and GDP are highly important in both submarkets and with both forms of analysis. Similarly, for the West End market employment also plays an important role while the performance of the stock market is far more influential in the City, although it still plays a role in the West End.

The most obvious difference in the results in the extended analysis is the enhanced role of the default spread. With respect to the variance decomposition findings, the default spread accounts for a far higher proportion of the variation in rents than it did previously. This is particularly so in the case of the City, with 10.84% of the variation attributed to the spread at a lag length of 11. In the case of the West End, while the figures are smaller at a peak 6.14% for 12 lags, they are still considerably higher than in the initial analysis. The impulse response findings also confirm this finding. This suggests that a shock to the default spread has a far larger and sustained impact upon rents in both markets, and again the impact is more evident in the Square Mile. Exhibits 8 and 9 graphically compare the findings for the two markets and two sample periods for the variance decomposition and impulse response results for the default spread. These findings incorporating the period through to 2009 are not only intuitive given the nature of the economic

and financial crisis of the last few years, but they are also consistent with the previously reported findings with regard to the stock market. The initial results indicated that the impact of the stock market was not just related to the economic base of the City but, importantly, were also providing information in the form of expectations about future economic performance. This argument is supported by the fact that the West End is also highly influenced by the FTSE. As previously noted, the reason why the default spread was included in the analysis was related to the ability to interpret it as a measure of expectations about future economic performance. In this case a widening default spread would imply more negative expectations about future economic performance due to the impact upon corporate credit worthiness. Given the nature of the events since 2007 it is perhaps not surprising that the default spread would appear to be highly effective at capturing the growing negative sentiment and expectations concerning economic conditions. This is because it captures not only the change in sentiment, but also the direct impact of the financial crisis in terms of the fixed income market and impact it had upon spreads.

{Exhibits 8 and 9}

**5: Conclusions**

This paper has considered the relationship between rental values and number of key demand side and financial variables in the context of the two key office markets in London. The use of a VECM framework allows a different form of analysis than is commonly adopted in the modeling of rents. The results illustrate the importance of each market's lagged rents and key demand drivers. However, the analysis also highlights the importance of financial variables, not only on the City of London market but also the West End. The FTSE100 plays an important role in terms of both the impact of shocks upon rents and also with respect to the variance decomposition results. The fact that these findings are not just limited to the City market implies that the impact of the stock market is not just limited to the effect on corporate occupiers. Importantly, it implies that the expectations element concerning future economic performance contained in stock market performance is a key element influencing rents in both markets. This view is also supported by the key role that the default spread plays, particularly in the analysis that incorporates the recent financial crisis.

**References**

Farrelly, K. & Sanderson, B. (2005). Modeling Regime Shifts in the City of London Office Rental Cycle, *Journal of Property Research*, **22**, 325-344.

Gregory, A.W. (1994). Testing for Cointegraiton in Linear Quadratic Models, *Journal of Business & Economic Statistics*, **12**, 347-360.

Harvey, C. (1991). The World Price of Covariance Risk, *Journal of Finance,* **46**, 111–157.

Hendershott, P., Lizieri, C. & MacGregor, B. (2010). Asymmetric Adjustment in the City of London Office Market, *Journal of Real Estate Finance & Economics*, forthcoming.

Hendershott, P., Lizieri, C. & Matysiak, G. (1999). The Workings of the London Office Market, *Real Estate Economics*, **27**, 265-387.

Hendershott, P., MacGregor, B. & Tse, R. (2002). Estimation of the Rental Adjustment Process, *Real Estate Economics*, **30**, 165-183.

Lee, M.L. & Chiang, K. (2004). Substitutability Between Equity REITs and Mortgage REITs, *Journal of Real Estate Research*, **26**, 96-113.

Ling, D.C. & Naranjo, A. (1997). Economic Risk Factors and Commercial Real Estate Returns, *Journal of Real Estate Finance and Economics*, **15**, 283-307.

Ling, D.C. & Naranjo, A. (1999). The Integration of Commercial Real Estate Markets and Stock Markets, *Real Estate Economics*, **27**, 483-516.

Lizieri, C., Baum, A. & Scott, P. (2000). Ownership, Occupation and Risk: A View of the City of London Office Market, *Urban Studies*, **37**, 1109–1129.

Quan, D. & Titman, S. (1999). Do Real Estate Prices and Stock Prices Move Together ? An International Comparison, *Real Estate Economics,* **27**, 183-208.

Seck, D. (1996). The Substitutability of Real Estate Assets, *Real Estate Economics*, **24**, 75-95.

Stevenson, S. (2007). Exploring the Intra-Metropolitan Dynamics of the London Office Market, *Journal of Real Estate Portfolio Management*, **13**, 93-98.

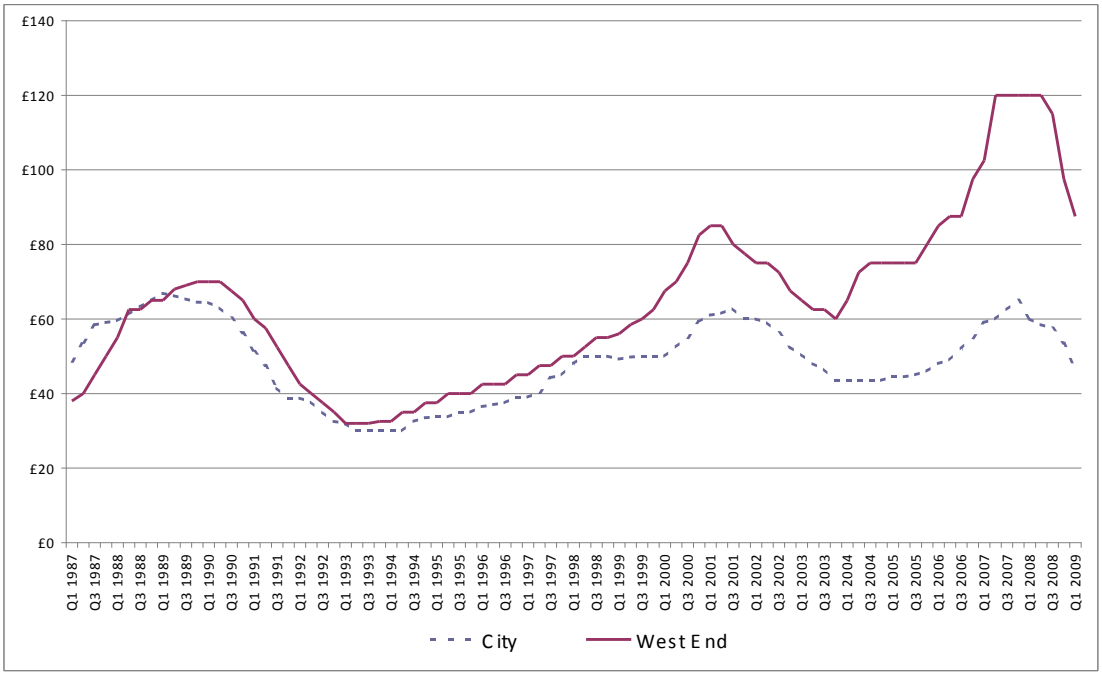
Stevenson, S. & McGrath, O. (2003). A Comparison of Alternative Rental Forecasting Models: Empirical Tests on the London Office Market, *Journal of Property Research*, **20**, 235-260.

Tuluca, S.A., Myer, F.C.N. & Webb, J. (2000). Dynamics of Private and Public Real Estate Markets, *Journal of Real Estate Finance and Economics*, **21**, 279-296.

Wheaton, W.C., Torto, R.G. & Evans, P. (1997). The Cyclic Behavior of the Greater London Office Market, *Journal of Real Estate Finance and Economics*, **15**, 77-92.

# Exhibits

**Exhibit 1: Nominal City of London and West End Rents**




Notes: Exhibit 1 the rental values for the City of London and West End of London markets. The figures are quoted on a per square foot basis and are reported in nominal terms.

## Exhibit 2: Johansen Cointegration Results

| Hypothesized Number of Cointegrating Equations | Trace | Maximum Eigenvalue |
|---|---|---|
| **Panel A: City of London** | | |
| None | 425.6484*** | 136.2293*** |
| At Most 1 | 289.4192*** | 87.7981*** |
| At Most 2 | 201.6211*** | 58.7518*** |
| At Most 3 | 142.8693*** | 52.0898*** |
| At Most 4 | 90.7795*** | 31.4750* |
| At Most 5 | 59.3045*** | 24.7658 |
| At Most 6 | 34.5387** | 21.2226** |
| At Most 7 | 13.3161 | 13.2481* |
| At Most 8 | 0.0008 | 0.0679 |
| **Panel A: West End** | | |
| None | 328.5212**** | 88.3338*** |
| At Most 1 | 240.1874*** | 66.9285*** |
| At Most 2 | 173.2589*** | 44.8633* |
| At Most 3 | 128.3955*** | 39.8879* |
| At Most 4 | 88.5076*** | 31.3292* |
| At Most 5 | 57.1784*** | 24.5001 |
| At Most 6 | 32.6783** | 21.1553** |
| At Most 7 | 11.5230 | 10.0405 |
| At Most 8 | 1.4826 | 1.4826 |

Notes: Exhibit 2 displays the trace and maximum eigenvalue test statistics for the Johansen cointegration tests. The tests are conducted with the rental series in question and the eight explanatory variables. * indicates significance at a 10% level, ** at a 5% level and *** at a 1% level.

## Exhibit 3: Block Exogeneity Wald Tests

| | 1987-2004 | | 1987-2009 | |
|---|---|---|---|---|
| | **Chi-Sq** | **p value** | **Chi-Sq** | **p value** |
| **Panel A: City of London** | | | | |
| Employment | 7.3827 | 0.1170 | 6.1378 | 0.1891 |
| GDP | 13.4708 | 0.0092 | 4.8199 | 0.3063 |
| Industrial Production | 1.0241 | 0.9061 | 1.4363 | 0.8379 |
| Stock Market | 11.7912 | 0.0190 | 8.9841 | 0.0615 |
| Stock Market Turnover | 3.7191 | 0.4454 | 2.3557 | 0.6707 |
| Treasury Bills | 8.7363 | 0.0680 | 1.3008 | 0.8612 |
| Term Spread | 6.0266 | 0.1972 | 2.2792 | 0.6846 |
| Default Spread | 7.3596 | 0.1181 | 2.9418 | 0.5676 |
| All Variables | 53.9964 | 0.0089 | 46.7129 | 0.0450 |
| **Panel B: West End** | | | | |
| Employment | 4.0890 | 0.3941 | 3.6606 | 0.4539 |
| GDP | 6.1240 | 0.1901 | 0.8765 | 0.9279 |
| Industrial Production | 2.5154 | 0.6419 | 2.7659 | 0.5977 |
| Stock Market | 2.3332 | 0.6747 | 4.2250 | 0.3764 |
| Stock Market Turnover | 10.2451 | 0.0365 | 1.2494 | 0.8699 |
| Treasury Bills | 12.0199 | 0.0172 | 2.8947 | 0.5756 |
| Term Spread | 4.4082 | 0.3536 | 0.8940 | 0.9254 |
| Default Spread | 3.9575 | 0.4118 | 1.6524 | 0.7993 |
| All Variables | 55.8019 | 0.0057 | 37.4670 | 0.2326 |

Notes: Exhibit 3 reports the Wald tests for each variable for the two different sub-markets and time-periods.

## Exhibit 4: Variance Decomposition, 1987-2004

| | Rents | Employment | GDP | Industrial Production | FTSE | Stock Market Turnover | Treasury Bills | Term Spread | Default Spread |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: City of London** | | | | | | | | | |
| Lag 1 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lag 2 | 79.30 | 4.08 | 4.75 | 0.66 | 3.30 | 4.39 | 0.26 | 1.40 | 1.86 |
| Lag 3 | 50.12 | 2.75 | 16.27 | 2.52 | 16.12 | 6.96 | 2.98 | 1.00 | 1.28 |
| Lag 4 | 31.79 | 2.19 | 20.77 | 4.43 | 30.62 | 5.68 | 3.19 | 0.61 | 0.73 |
| Lag 5 | 21.21 | 1.58 | 28.52 | 5.91 | 32.51 | 5.55 | 3.63 | 0.40 | 0.68 |
| Lag 6 | 14.96 | 1.65 | 35.19 | 7.96 | 30.66 | 4.21 | 3.24 | 0.80 | 1.35 |
| Lag 7 | 10.80 | 2.01 | 38.67 | 10.18 | 27.65 | 3.92 | 2.40 | 1.70 | 2.67 |
| Lag 8 | 8.32 | 2.52 | 40.35 | 12.65 | 23.93 | 3.84 | 1.88 | 3.18 | 3.32 |
| Lag 9 | 6.92 | 2.54 | 43.29 | 13.51 | 21.37 | 3.19 | 1.75 | 3.69 | 3.74 |
| Lag 10 | 6.13 | 2.41 | 45.52 | 13.91 | 19.25 | 2.82 | 1.96 | 3.88 | 4.12 |
| Lag 11 | 5.91 | 2.06 | 46.86 | 13.93 | 17.56 | 2.75 | 2.32 | 4.13 | 4.49 |
| Lag 12 | 5.87 | 1.75 | 47.45 | 14.16 | 16.23 | 2.65 | 2.60 | 4.48 | 4.81 |
| **Panel B: West End** | | | | | | | | | |
| Lag 1 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lag 2 | 96.14 | 1.37 | 1.25 | 0.14 | 0.45 | 0.10 | 0.00 | 0.12 | 0.43 |
| Lag 3 | 81.36 | 3.49 | 8.55 | 0.54 | 4.06 | 0.06 | 0.02 | 1.66 | 0.26 |
| Lag 4 | 70.85 | 4.65 | 14.20 | 0.34 | 6.05 | 0.57 | 0.88 | 1.33 | 1.12 |
| Lag 5 | 64.76 | 5.50 | 15.96 | 0.22 | 8.89 | 0.35 | 1.44 | 1.27 | 1.60 |
| Lag 6 | 60.46 | 6.61 | 17.75 | 0.24 | 10.35 | 0.28 | 1.49 | 1.14 | 1.68 |
| Lag 7 | 58.46 | 7.51 | 19.30 | 0.39 | 10.46 | 0.26 | 1.31 | 0.98 | 1.34 |
| Lag 8 | 57.10 | 7.44 | 21.34 | 0.57 | 10.21 | 0.32 | 1.06 | 0.91 | 1.05 |
| Lag 9 | 56.44 | 6.88 | 22.71 | 0.78 | 10.13 | 0.35 | 0.87 | 0.92 | 0.91 |
| Lag 10 | 55.85 | 6.22 | 23.93 | 0.90 | 9.96 | 0.41 | 0.82 | 0.94 | 0.97 |
| Lag 11 | 54.93 | 5.46 | 25.00 | 0.91 | 9.90 | 0.53 | 0.95 | 1.08 | 1.23 |
| Lag 12 | 53.95 | 4.66 | 26.00 | 0.82 | 9.87 | 0.64 | 1.13 | 1.36 | 1.58 |

Notes: Exhibit 4 reports the variance decomposition results with respect to the City of London and West End markets for the period 1987 to 2004. The results with respect to each variable are interpreted as the percentage of the variation in the respective rental series that can be attributed to the variable in question at the specified lag.

## Exhibit 5: Impulse Response, 1987-2004

| | Rents | Employment | GDP | Industrial Production | FTSE | Stock Market Turnover | Treasury Bills | Term Spread | Default Spread |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: City of London** | | | | | | | | | |
| Lag 1 | 0.0441 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Lag 2 | 0.0332 | 0.0125 | 0.0135 | 0.0050 | 0.0113 | -0.0130 | 0.0031 | -0.0073 | 0.0085 |
| Lag 3 | 0.0213 | 0.0060 | 0.0309 | 0.0123 | 0.0316 | -0.0178 | 0.0141 | -0.0040 | 0.0042 |
| Lag 4 | 0.0271 | 0.0100 | 0.0404 | 0.0204 | 0.0544 | -0.0165 | 0.0147 | -0.0033 | -0.0028 |
| Lag 5 | 0.0313 | 0.0099 | 0.0652 | 0.0294 | 0.0626 | -0.0246 | 0.0216 | 0.0042 | -0.0084 |
| Lag 6 | 0.0289 | 0.0166 | 0.0850 | 0.0420 | 0.0664 | -0.0184 | 0.0204 | 0.0149 | -0.0194 |
| Lag 7 | 0.0225 | 0.0235 | 0.0961 | 0.0544 | 0.0662 | -0.0261 | 0.0122 | 0.0266 | -0.0328 |
| Lag 8 | 0.0277 | 0.0317 | 0.1098 | 0.0704 | 0.0655 | -0.0316 | 0.0142 | 0.0420 | -0.0361 |
| Lag 9 | 0.0306 | 0.0286 | 0.1272 | 0.0706 | 0.0667 | -0.0208 | 0.0208 | 0.0401 | -0.0393 |
| Lag 10 | 0.0364 | 0.0271 | 0.1396 | 0.0749 | 0.0676 | -0.0246 | 0.0312 | 0.0407 | -0.0445 |
| Lag 11 | 0.0462 | 0.0177 | 0.1474 | 0.0766 | 0.0687 | -0.0321 | 0.0392 | 0.0460 | -0.0496 |
| Lag 12 | 0.0504 | 0.0132 | 0.1495 | 0.0823 | 0.0679 | -0.0315 | 0.0415 | 0.0520 | -0.0526 |
| **Panel B: West End** | | | | | | | | | |
| Lag 1 | 0.0616 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Lag 2 | 0.0631 | 0.0105 | 0.0101 | 0.0033 | 0.0060 | -0.0029 | 0.0001 | 0.0032 | -0.0059 |
| Lag 3 | 0.0870 | 0.0234 | 0.0389 | 0.0095 | 0.0270 | 0.0018 | -0.0019 | 0.0174 | 0.0037 |
| Lag 4 | 0.1030 | 0.0323 | 0.0599 | 0.0048 | 0.0381 | 0.0140 | -0.0178 | 0.0132 | 0.0191 |
| Lag 5 | 0.1112 | 0.0394 | 0.0651 | 0.0027 | 0.0552 | -0.0011 | -0.0230 | 0.0163 | 0.0231 |
| Lag 6 | 0.1142 | 0.0486 | 0.0750 | -0.0083 | 0.0594 | -0.0054 | -0.0203 | 0.0146 | 0.0220 |
| Lag 7 | 0.1202 | 0.0533 | 0.0815 | -0.0154 | 0.0546 | -0.0074 | -0.0145 | 0.0115 | 0.0089 |
| Lag 8 | 0.1272 | 0.0471 | 0.0945 | -0.0195 | 0.0537 | -0.0128 | -0.0070 | 0.0146 | 0.0005 |
| Lag 9 | 0.1334 | 0.0385 | 0.0975 | -0.0237 | 0.0570 | -0.0130 | 0.0036 | 0.0180 | -0.0105 |
| Lag 10 | 0.1390 | 0.0333 | 0.1044 | -0.0233 | 0.0576 | -0.0157 | 0.0146 | 0.0192 | -0.0214 |
| Lag 11 | 0.1443 | 0.0255 | 0.1124 | -0.0202 | 0.0632 | -0.0218 | 0.0261 | 0.0273 | -0.0327 |
| Lag 12 | 0.1507 | 0.0109 | 0.1213 | -0.0125 | 0.0673 | -0.0238 | 0.0312 | 0.0366 | -0.0405 |

Notes: Exhibit 5 reports the impulse response results with respect to the City of London and West End markets for the period 1987 to 2004. The results with respect to each variable show the impact of a shock in the variable in question to the respective rental series.

## Exhibit 6: Variance Decomposition, 1987-2009

| | Rents | Employment | GDP | Industrial Production | FTSE | Stock Market Turnover | Treasury Bills | Term Spread | Default Spread |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: City of London** | | | | | | | | | |
| Lag 1 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lag 2 | 89.68 | 0.05 | 1.38 | 2.26 | 2.39 | 0.96 | 1.20 | 1.66 | 0.43 |
| Lag 3 | 80.01 | 0.55 | 2.72 | 3.66 | 7.03 | 1.35 | 1.11 | 2.15 | 1.41 |
| Lag 4 | 72.81 | 0.35 | 5.03 | 2.58 | 13.59 | 1.06 | 0.68 | 2.47 | 1.43 |
| Lag 5 | 63.42 | 0.24 | 10.44 | 1.79 | 16.71 | 0.84 | 0.98 | 3.26 | 2.32 |
| Lag 6 | 55.20 | 0.15 | 15.10 | 1.33 | 17.42 | 0.52 | 2.36 | 3.30 | 4.62 |
| Lag 7 | 48.95 | 0.11 | 19.28 | 0.97 | 18.38 | 0.38 | 2.40 | 3.27 | 6.25 |
| Lag 8 | 43.79 | 0.10 | 22.95 | 0.78 | 19.38 | 0.35 | 2.32 | 2.97 | 7.36 |
| Lag 9 | 38.33 | 0.14 | 26.57 | 1.06 | 19.67 | 0.28 | 2.57 | 2.40 | 8.99 |
| Lag 10 | 32.75 | 0.18 | 30.08 | 1.87 | 19.73 | 0.26 | 2.99 | 1.95 | 10.20 |
| Lag 11 | 27.46 | 0.16 | 33.15 | 3.30 | 19.78 | 0.24 | 3.26 | 1.82 | 10.84 |
| Lag 12 | 23.27 | 0.18 | 35.27 | 5.21 | 19.85 | 0.21 | 3.23 | 2.07 | 10.71 |
| **Panel B: West End** | | | | | | | | | |
| Lag 1 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lag 2 | 93.79 | 2.26 | 0.01 | 0.02 | 0.00 | 0.03 | 3.31 | 0.01 | 0.57 |
| Lag 3 | 90.58 | 3.70 | 0.55 | 0.12 | 0.99 | 0.44 | 1.67 | 0.26 | 1.68 |
| Lag 4 | 87.66 | 5.18 | 2.03 | 0.42 | 1.98 | 0.35 | 0.99 | 0.34 | 1.06 |
| Lag 5 | 83.32 | 6.53 | 3.91 | 0.28 | 3.35 | 0.39 | 0.92 | 0.56 | 0.73 |
| Lag 6 | 78.62 | 8.02 | 5.78 | 0.21 | 4.36 | 0.69 | 0.70 | 0.83 | 0.80 |
| Lag 7 | 73.64 | 10.40 | 7.51 | 0.17 | 5.01 | 0.81 | 0.53 | 0.90 | 1.02 |
| Lag 8 | 68.52 | 11.95 | 10.01 | 0.13 | 5.42 | 0.82 | 0.43 | 1.09 | 1.63 |
| Lag 9 | 64.39 | 12.92 | 11.91 | 0.12 | 5.51 | 0.79 | 0.41 | 1.19 | 2.78 |
| Lag 10 | 60.49 | 13.82 | 13.96 | 0.10 | 5.41 | 0.76 | 0.39 | 1.23 | 3.84 |
| Lag 11 | 56.83 | 14.53 | 15.88 | 0.09 | 5.29 | 0.73 | 0.55 | 1.27 | 4.84 |
| Lag 12 | 53.51 | 14.73 | 17.81 | 0.09 | 5.09 | 0.67 | 0.71 | 1.26 | 6.14 |

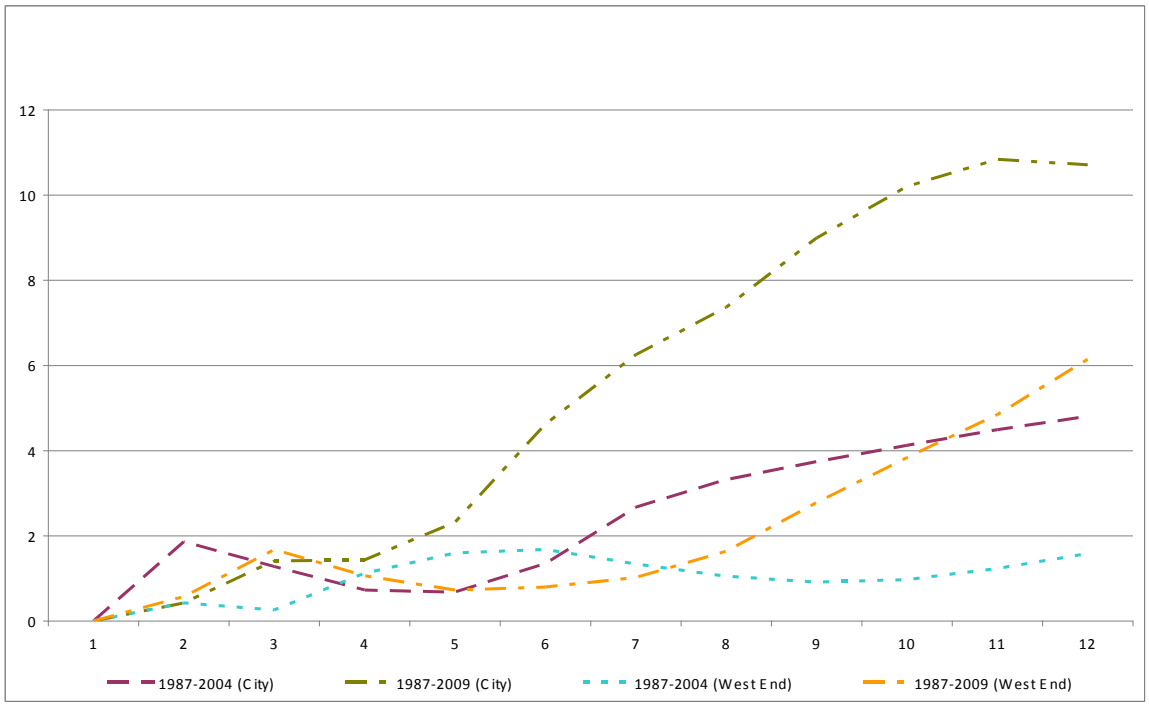
Notes: Exhibit 6 reports the variance decomposition results with respect to the City of London and West End markets for the period 1987 to 2009. The results with respect to each variable are interpreted as the percentage of the variation in the respective rental series that can be attributed to the variable in question at the specified lag.

## Exhibit 7: Impulse Response, 1987-2009

| | Rents | Employment | GDP | Industrial Production | FTSE | Stock Market Turnover | Treasury Bills | Term Spread | Default Spread |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: City of London** | | | | | | | | | |
| Lag 1 | 0.0592 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Lag 2 | 0.0743 | -0.0021 | 0.0118 | 0.0151 | 0.0155 | -0.0098 | 0.0110 | 0.0129 | -0.0066 |
| Lag 3 | 0.0763 | -0.0099 | 0.0192 | 0.0213 | 0.0326 | -0.0124 | 0.0093 | 0.0152 | -0.0148 |
| Lag 4 | 0.0900 | -0.0030 | 0.0329 | 0.0116 | 0.0546 | -0.0091 | -0.0028 | 0.0195 | -0.0138 |
| Lag 5 | 0.1058 | -0.0043 | 0.0636 | 0.0121 | 0.0687 | -0.0109 | 0.0177 | 0.0312 | -0.0282 |
| Lag 6 | 0.1203 | -0.0002 | 0.0876 | 0.0145 | 0.0797 | -0.0028 | 0.0394 | 0.0340 | -0.0531 |
| Lag 7 | 0.1091 | -0.0035 | 0.1026 | 0.0052 | 0.0859 | -0.0036 | 0.0299 | 0.0337 | -0.0605 |
| Lag 8 | 0.0937 | 0.0031 | 0.1117 | -0.0056 | 0.0892 | -0.0087 | 0.0264 | 0.0257 | -0.0626 |
| Lag 9 | 0.0853 | 0.0110 | 0.1295 | -0.0297 | 0.0928 | 0.0000 | 0.0383 | 0.0091 | -0.0794 |
| Lag 10 | 0.0670 | 0.0133 | 0.1462 | -0.0501 | 0.0977 | 0.0094 | 0.0476 | -0.0056 | -0.0854 |
| Lag 11 | 0.0303 | 0.0060 | 0.1566 | -0.0724 | 0.1011 | 0.0091 | 0.0482 | -0.0245 | -0.0844 |
| Lag 12 | -0.0095 | 0.0127 | 0.1594 | -0.0924 | 0.1047 | 0.0051 | 0.0410 | -0.0434 | -0.0735 |
| **Panel B: West End** | | | | | | | | | |
| Lag 1 | 0.0808 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Lag 2 | 0.1064 | 0.0208 | 0.0011 | 0.0017 | 0.0000 | -0.0026 | -0.0251 | -0.0013 | 0.0104 |
| Lag 3 | 0.1288 | 0.0312 | 0.0145 | 0.0066 | 0.0194 | -0.0127 | -0.0025 | 0.0098 | 0.0230 |
| Lag 4 | 0.1526 | 0.0448 | 0.0336 | 0.0152 | 0.0304 | -0.0079 | -0.0037 | 0.0113 | -0.0078 |
| Lag 5 | 0.1633 | 0.0566 | 0.0513 | 0.0028 | 0.0457 | -0.0130 | -0.0167 | 0.0185 | 0.0063 |
| Lag 6 | 0.1692 | 0.0700 | 0.0659 | 0.0029 | 0.0537 | -0.0243 | -0.0090 | 0.0251 | -0.0203 |
| Lag 7 | 0.1642 | 0.0909 | 0.0773 | 0.0050 | 0.0571 | -0.0236 | -0.0019 | 0.0226 | -0.0280 |
| Lag 8 | 0.1567 | 0.0944 | 0.0987 | -0.0004 | 0.0590 | -0.0205 | 0.0055 | 0.0300 | -0.0446 |
| Lag 9 | 0.1603 | 0.0974 | 0.1056 | 0.0047 | 0.0572 | -0.0189 | 0.0129 | 0.0302 | -0.0655 |
| Lag 10 | 0.1460 | 0.1008 | 0.1169 | -0.0001 | 0.0515 | -0.0183 | 0.0122 | 0.0281 | -0.0721 |
| Lag 11 | 0.1372 | 0.1028 | 0.1246 | 0.0051 | 0.0502 | -0.0168 | 0.0293 | 0.0288 | -0.0789 |
| Lag 12 | 0.1275 | 0.0948 | 0.1331 | 0.0053 | 0.0447 | -0.0112 | 0.0327 | 0.0261 | -0.0932 |

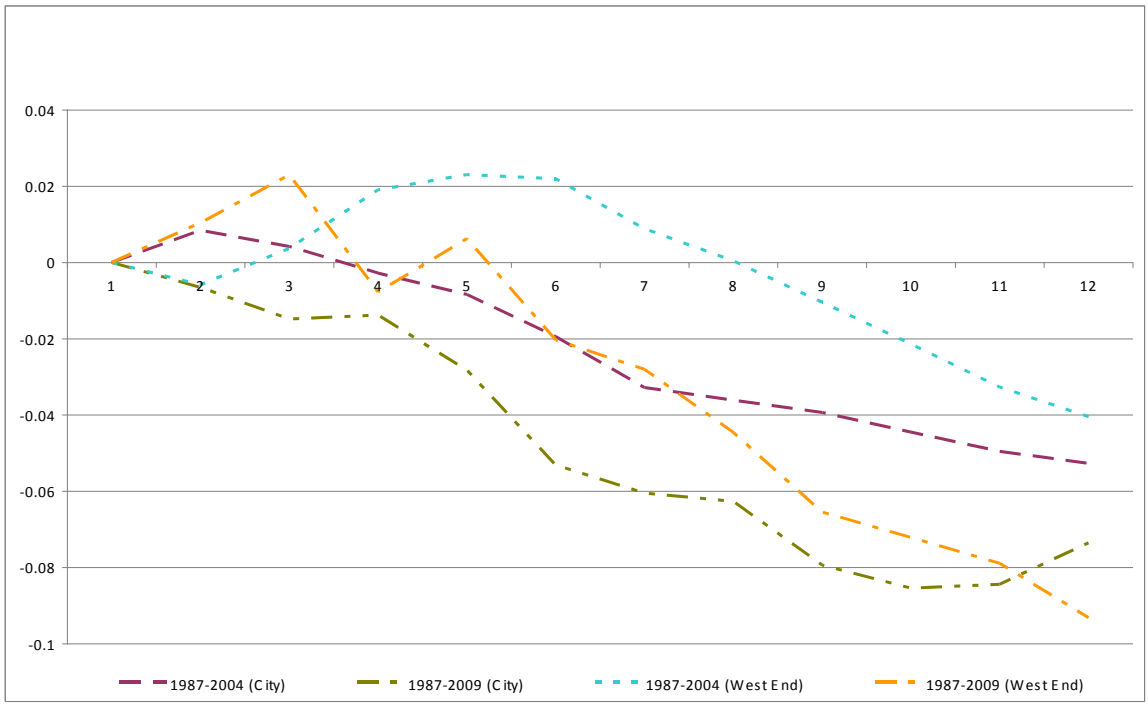
Notes: Exhibit 7 reports the impulse response results with respect to the City of London and West End markets for the period 1987 to 2009. The results with respect to each variable show the impact of a shock in the variable in question to the respective rental series.

## Exhibit 8: Variance Decomposition Results for the Default Spread




Notes: Exhibit 8 graphically displays the variance decomposition results with respect to the default spread for both time periods and for both sub-markets.

## Exhibit 9: Impulse Response Results for the Default Spread




Notes: Exhibit 9 graphically displays the impulse response results with respect to the default spread for both time periods and for both sub-markets.

# Appendix

## Exhibit A1: VECM Estimates, City of London

| | 1987-2004 | | 1987-2009 | |
|---|---|---|---|---|
| | **Coefficient** | **T-Stat** | **Coefficient** | **T-Stat** |
| Constant | 0.0175 | 0.4751 | -0.0299 | -0.8220 |
| Rents (-1) | -0.1303 | -0.7210 | 0.1611 | 1.0435 |
| Rents (-2) | -0.3071 | -1.7659 | -0.1502 | -0.9431 |
| Rents (-3) | -0.0963 | -0.6344 | 0.1522 | 0.9279 |
| Rents (-4) | -0.1598 | -1.2539 | -0.1974 | -1.2271 |
| Employment (-1) | -0.4213 | -0.1216 | 0.6459 | 0.2717 |
| Employment (-2) | -2.0277 | -0.5856 | -2.1385 | -0.9339 |
| Employment (-3) | 2.6279 | 0.8813 | 1.7638 | 0.8249 |
| Employment (-4) | 3.3261 | 1.4048 | -0.2080 | -0.1031 |
| GDP (-1) | 0.5642 | 1.4386 | 0.1980 | 0.4074 |
| GDP (-2) | 0.7939 | 1.5770 | -0.6104 | -1.2577 |
| GDP (-3) | 0.3067 | 0.7118 | -0.6133 | -1.3570 |
| GDP (-4) | 0.6742 | 1.9163 | -0.1264 | -0.2743 |
| Industrial Production (-1) | 0.3303 | 0.4028 | 0.0837 | 0.1287 |
| Industrial Production (-2) | -0.4551 | -0.6037 | 0.5387 | 0.8114 |
| Industrial Production (-3) | 0.1257 | 0.1479 | 0.1261 | 0.1821 |
| Industrial Production (-4) | 0.2070 | 0.2760 | 0.6089 | 0.7879 |
| FTSE (-1) | -0.2722 | -2.5310 | -0.0571 | -0.5752 |
| FTSE (-2) | -0.1132 | -1.2079 | -0.0188 | -0.2237 |
| FTSE (-3) | 0.0045 | 0.0697 | 0.0873 | 1.2709 |
| FTSE (-4) | 0.0167 | 0.3058 | 0.0127 | 0.2101 |
| Stock Market Turnover (-1) | 0.2092 | 1.9200 | -0.1156 | -1.2965 |
| Stock Market Turnover (-2) | 0.1226 | 1.250 | -0.1148 | -1.2383 |
| Stock Market Turnover (-3) | 0.0826 | 0.9447 | -0.0855 | -0.9983 |
| Stock Market Turnover (-4) | 0.0728 | 0.8734 | -0.0690 | -0.7955 |
| Treasury Bills (-1) | -0.0578 | -0.2085 | 0.0184 | 0.0726 |
| Treasury Bills (-2) | 0.1739 | 0.8008 | -0.1036 | -0.4758 |
| Treasury Bills (-3) | 0.2019 | 0.9687 | 0.0058 | 0.0306 |
| Treasury Bills (-4) | 0.6412 | 2.9401 | 0.1559 | 0.9225 |
| Term Spread (-1) | -0.0531 | -1.7073 | -0.0055 | -0.1915 |
| Term Spread (-2) | -0.0315 | -1.3465 | -0.0336 | -1.2793 |
| Term Spread (-3) | -0.0377 | -1.6539 | -0.0206 | -0.7731 |
| Term Spread (-4) | 0.0048 | 0.1740 | 0.0063 | 0.2418 |
| Default Spread (-1) | -0.1335 | -2.1977 | -0.0084 | -0.1780 |
| Default Spread (-2) | -0.1210 | -2.2060 | 0.0162 | 0.3241 |
| Default Spread (-3) | -0.0485 | -0.9915 | 0.0158 | 0.3568 |
| Default Spread (-4) | 0.0067 | 0.1649 | 0.0027 | 0.0615 |
| Error-Correction Term 1 | -0.2815 | -1.7560 | -0.0865 | -0.9484 |
| Error-Correction Term 2 | 5.4448 | 2.7355 | 0.3963 | 0.4532 |
| Error-Correction Term 3 | 0.4019 | 2.5978 | 0.2324 | 1.4888 |
| Error-Correction Term 4 | 0.0032 | 0.0049 | -0.1885 | -0.4860 |
| Adjusted R-Squared | 0.7471 | | 0.5666 | |

## Exhibit A2: VECM Estimates, West End

| | 1987-2004 | | 1987-2009 | |
|---|---|---|---|---|
| | **Coefficient** | **T-Stat** | **Coefficient** | **T-Stat** |
| Constant | -0.0517 | -1.2363 | -0.0099 | -0.2928 |
| Rents (-1) | 0.1437 | 0.8772 | 0.3734 | 2.1536 |
| Rents (-2) | 0.2805 | 1.5691 | 0.3039 | 1.7202 |
| Rents (-3) | 0.0225 | 0.1268 | -0.0930 | -0.5915 |
| Rents (-4) | -0.1373 | -0.8023 | -0.0779 | -0.4747 |
| Employment (-1) | 0.7453 | 0.1721 | 2.0483 | 0.6716 |
| Employment (-2) | 5.1821 | 1.1427 | 4.4194 | 1.4285 |
| Employment (-3) | 5.1143 | 1.4671 | 0.2999 | 0.1014 |
| Employment (-4) | 2.6787 | 0.9692 | 1.0459 | 0.3917 |
| GDP (-1) | 0.0621 | 0.1179 | -0.4444 | -0.7918 |
| GDP (-2) | 1.0879 | 1.8961 | 0.2067 | 0.3207 |
| GDP (-3) | 0.5361 | 1.1105 | 0.2915 | 0.5297 |
| GDP (-4) | -0.6692 | -1.3288 | -0.1570 | -0.2994 |
| Industrial Production (-1) | 0.5458 | 0.5705 | 1.1379 | 1.3609 |
| Industrial Production (-2) | -0.7714 | -0.7546 | 0.3776 | 0.4239 |
| Industrial Production (-3) | -1.0118 | -1.0084 | 0.4945 | 0.5561 |
| Industrial Production (-4) | 0.1298 | 0.1366 | -0.3037 | -0.3099 |
| FTSE (-1) | -0.0117 | -0.1669 | 0.0076 | 0.0820 |
| FTSE (-2) | 0.0983 | 1.4298 | 0.0795 | 0.9159 |
| FTSE (-3) | 0.0210 | 0.3159 | -0.0742 | -0.9575 |
| FTSE (-4) | 0.0417 | 0.6028 | 0.0499 | 0.6638 |
| Stock Market Turnover (-1) | 0.1989 | 1.0869 | -0.0065 | -0.049 |
| Stock Market Turnover (-2) | 0.3708 | 2.2691 | 0.0715 | 0.5812 |
| Stock Market Turnover (-3) | 0.2200 | 1.4110 | 0.0791 | 0.7164 |
| Stock Market Turnover (-4) | -0.0812 | -0.6004 | -0.0368 | -0.3086 |
| Treasury Bills (-1) | 0.1159 | 0.3493 | -0.3976 | -1.1813 |
| Treasury Bills (-2) | 0.7729 | 3.2207 | 0.3368 | 1.1209 |
| Treasury Bills (-3) | 0.1048 | 0.4069 | -0.0139 | -0.0521 |
| Treasury Bills (-4) | 0.1130 | 0.4388 | 0.2672 | 0.1178 |
| Term Spread (-1) | 0.0008 | 0.0240 | -0.0079 | -0.2250 |
| Term Spread (-2) | 0.0574 | 2.0471 | 0.0080 | 0.2491 |
| Term Spread (-3) | -0.0041 | -0.1417 | -0.0247 | -0.8283 |
| Term Spread (-4) | -0.0032 | -0.0987 | 0.0119 | 0.4147 |
| Default Spread (-1) | -0.0929 | -1.3619 | -0.0444 | -0.6297 |
| Default Spread (-2) | 0.0035 | 0.0543 | -0.0779 | -1.1408 |
| Default Spread (-3) | 0.0546 | 0.9360 | -0.0669 | -1.0333 |
| Default Spread (-4) | 0.0309 | 0.5978 | -0.0291 | -0.4986 |
| Error-Correction Term 1 | -0.1889 | -1.9953 | -0.1131 | -1.1616 |
| Error-Correction Term 2 | 2.8229 | 1.2768 | 2.4229 | 1.2297 |
| Adjusted R-Squared | 0.6277 | | 0.4297 | |

## Endnotes:

[1] In addition to the City and West End markets there are also the smaller submarkets of Midtown and Docklands.

[2] Lizieri et al. (2000) report that 87% of occupiers in the City of London market are firms within the FIRE, business and professional services sectors

[3] VAR models have been used in a variety of real estate specific studies such as Seck (1996) and Lee & Chiang (2004). The approach adopted in these papers was in the context of examining whether assets are substitutable. Stevenson & McGrath (2003) use a Bayesian VAR model in a forecasting context in their examination of the City of London office market.

[4] It is noticeable that the coefficients across the two samples do differ at times. The most probable reason behind this is the extent of the movement in the markets in the period in the extended sample.