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## **International Financial Centres, Office Market Rents and Volatility.**

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Colin Lizieri  
Professor of Real Estate Finance  
Real Estate & Planning  
University of Reading Business School  
Whiteknights, Reading, RG6 6AW, UK

e-mail [c.m.lizieri@reading.ac.uk](mailto:c.m.lizieri@reading.ac.uk)

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### **Abstract:**

*Despite continuing developments in information technology and the growing economic significance of the emerging Eastern European, South American and Asian economies, international financial activity remains strongly concentrated in a relatively small number of international financial centres. That concentration of financial activity requires a critical mass of office occupation and creates demand for high specification, high cost space. The demand for that space is increasingly linked to the fortunes of global capital markets. That linkage has been emphasised by developments in real estate markets, notably the development of global real estate investment, innovation in property investment vehicles and the growth of debt securitisation. The resultant interlinking of occupier, asset, debt and development markets within and across global financial centres is a source of potential volatility and risk. The paper sets out a broad conceptual model of the linkages and their implications for systemic market risk and presents preliminary empirical results that provide support for the model proposed.*

## ***1. Introduction***

This paper explores the relationship between the evolution of major international financial centres (IFCs) as part of the global capital market system, the development of office markets in those cities, real estate investment in those markets and the patterns of risk and return. Each of these aspects has, individually, been the subject of considerable research from a variety of academic traditions. Here, rather than focusing on one aspect of the relationship and conducting micro-analysis, an attempt is made to set out the interconnections between the location of financial activity, the processes operating in office markets and the volatility of real estate returns. The intention is to create a schematic model of risk in IFC office markets that can act as a springboard for subsequent empirical work.

The essential thesis examined here starts from the increasing spatial clustering of global financial business. The concentration of financial activity in a small number of major cities, acting as the coordinating centres for an interlinked international financial system has been accompanied by a redevelopment of the core office markets of those cities and a growing functional specialisation of activity in those offices as high-order financial services and the business and professional service firms that supply them have tended to drive out other users. A consequence of this process has been an interlocking of occupation, ownership and finance: firms that occupy space are the same firms that acquire offices as an investment asset (directly and indirectly) and who provide finance and funding for the creation of new office space. This interlocking creates greater potential volatility in office markets increasing the amplitude of upswings and downswings. Shocks in international financial markets are transmitted to occupier, investment and property debt markets and can reinforce any tendency to cyclical behaviour. A number of more recent trends have tended to reinforce this potential volatility: notably the growing globalisation of ownership of real estate and innovation in real estate investment vehicles and debt markets which has fragmented ownership without necessarily diversifying away risk at the overall market level.

This underlying idea was sketched out in Lizieri & Finlay (1995) and in Lizieri, Baum & Scott (2000) and is present to an extent in Leitner (1994) and Fainstein (1993). However, subsequent research seems to have veered away from an holistic focus on urban development, driven by the apparently increasing gulf between urban social science approaches and real estate economics. In particular, the cultural turn in urban geography and urban social science has seen a drift away from critical empirical work to a focus on the symbolic and political implications of urban form and a mode of analysis which produces opaque, esoteric work that is inaccessible to outsiders. Much of the work seems to have moved very far away from the policy-driven critical urban social science that underpinned the development of the world cities literature and the analyses of urban development processes in the 1980s and early 1990s. From this perspective, traditional urban economic approaches are dismissed for economism and reductionism, generally using a caricature of economic research. In terms of method, the cultural turn has brought an emphasis on textual analysis and small scale interview work, and a focus on individuals with a rejection of aggregate level analysis.

From real estate economics, the drive to more advanced quantitative techniques has led to a focus on public real estate company returns. A number of papers have examined global or regional integration issues: papers by Eichholtz and co-workers (e.g. Eichholtz *et al.*, 1998), Quann & Titman (1999), Ling and Naranjo (2002), Bond *et al.* (2003), McAllister & Lizieri (2006) for example. Results typically show the existence of a global real estate factor, some convergence, but less integration than national equity indices. Investment in REITs and property companies is, in the long run, a real estate investment, but the results of such analyses tell us little about actual investment in real estate and the extent to which building performance is affected by global rather than local and national factors. As an example, Bardham *et al.* (2008) explicitly examine real estate securities to test for the implications of global financial integration, using an “openness” variable, which is shown to be significant. The paper, published in *Real Estate Economics*, reports results from a variety of panel regressions. The *highest* adjusted  $R^2$  was 0.11 which, even given the panel nature of the analysis, calls into question the economic (if not the statistical) significance of the global integration result.

Comparative research on direct private markets is less common, hampered by data availability (with short time series at low frequency and with definitional differences hampering quantitative analysis). Exceptions include Goetzmann & Wachter (1996, 2001) and Case *et al.* (1999) although, revealingly, those much cited papers have not been published in a journal. More general work on global property cycles includes Renaud (1997) and Herring & Wachter (1999). Another strand of literature using international data is work on international portfolio diversification (for reviews, see Sirmans & Worzala, 2003; Hoesli & Lizieri, 2007). The decade has also seen further sophistication in the modelling of office market processes in individual cities but that, too, is reaching a point where sophistication is becoming the enemy of understanding. There have been comparatively few cross-national return or rent models and those that have typically rely on aggregate macro-economic demand variables to explain variation.

This paper does not attempt to conduct detailed econometric or statistical analysis of office market performance in international financial centres. However, in contrast to some recent urban literature, it does not seek to deny the relevance and over-riding importance of the economic in determining both global and local outcomes and of an analytic, empirical approach. Rather, it seeks to set out a framework for understanding that market performance, based both on the development of global capital markets and on micro-level research into the functioning of office markets, backed, where feasible, with empirical evidence. The paper starts with a discussion of the development of international financial centres, then considers office market processes within those IFCs. Next, we consider the impact of innovation in investment vehicles and in patterns of ownership on those processes and on volatility and risk. Section five presents some preliminary empirical findings. Finally potential research and policy directions are discussed.

## **2. International Financial Centres**

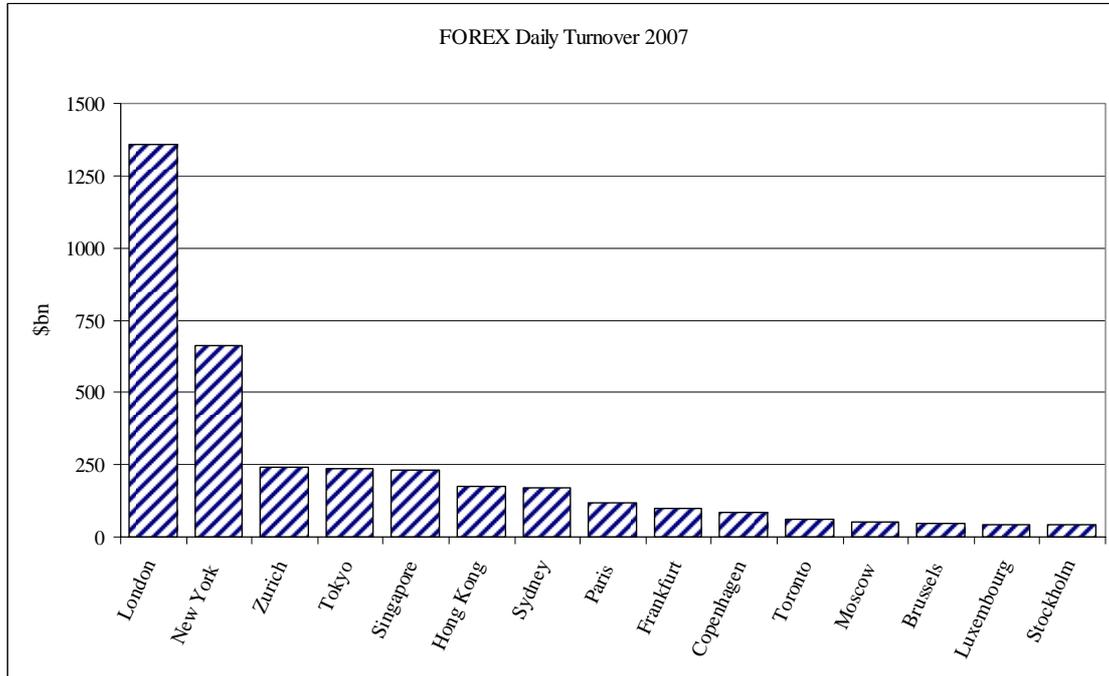
Since the 1980s, a body of work has attempted to map and explain the development of a global urban hierarchy and the key role of a limited number of key cities in coordinating and controlling an international network of flows of capital, goods and workers: world or global cities (Friedman, 1986, Sassen, 1991). A key function of world cities is to act as a centre for financial activity. But what makes a city a financial centre, rather than a centre for the provision of services, part of which are financial? Kindelberger provides an early but comprehensive definition of the attributes and functions of a financial centre:

*Financial centers are needed not only to balance through time the savings and investments of individual entrepreneurs and to transfer financial capital from savers to investors, but also to effect payments and to transfer savings between places. Banking and financial centers perform a medium of exchange functions and an inter-spatial store-of-value function. Single payments between separate points in a country are made most efficiently through a center and both seasonal and long-run surpluses and deficits of financial services are bested matched in a center. Furthermore, the specialized functions of international payments and foreign lending or borrowing are typically best performed at one central place that is also [in most instances] the specialized center for domestic interregional payments. [Kindelberger, 1974, p6.]*

Further, what makes a financial centre an “*international*” financial centre? Reed (1980) argued that international centres just evolve from, and extend, national financial centres as finance becomes more global in nature. An international financial centre (IFC) will have a greater concentration of cross-border activity than a domestic financial centre, but it is not clear where the boundary lies or whether it is the scale or the proportion of international activity that is critical (for example Tokyo in the modern era, or New York historically were dominated by domestic transactions and capital). It is possible to identify IFC indicators and attributes: global ranking in financial activities, headquarters of major multinational financial firms, the presence of foreign financial services firms in the city. Research, though, generally leave the definition open and focuses on the activities and characteristics of the leading cities of finance, judged by activity levels: a financial hierarchy to mirror the world urban hierarchy. A starting point for analysis, then, is a consideration of the extent to which financial activity is concentrated in cities.

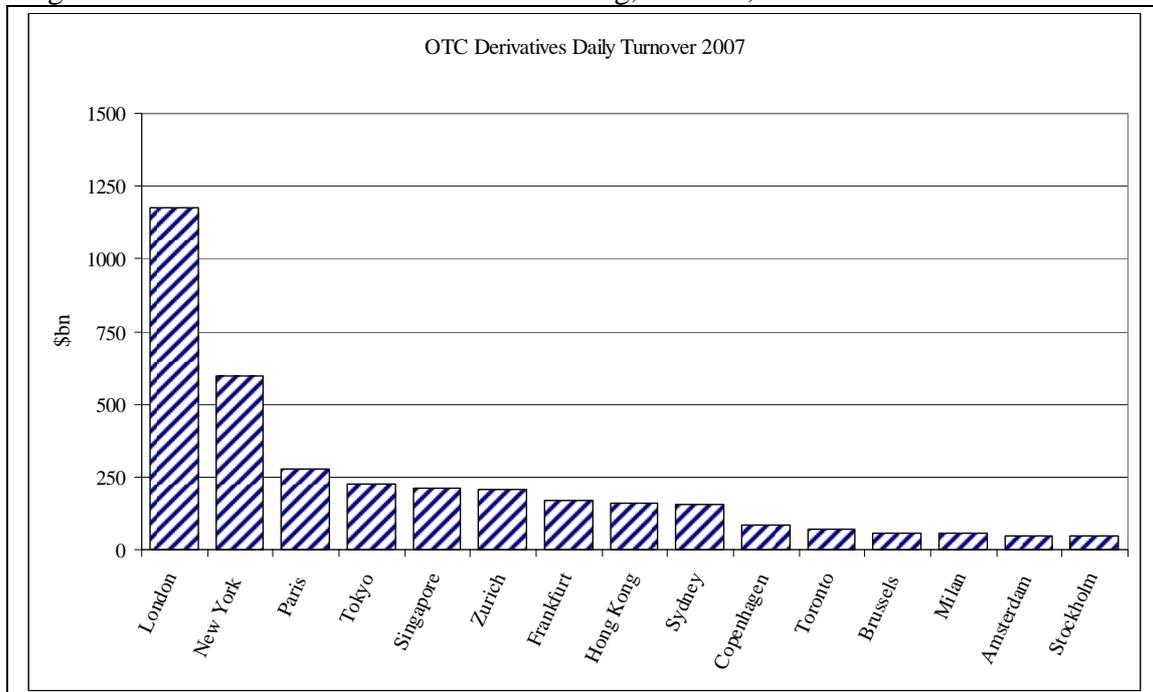
The figures below provide a brief illustration of the extent to which financial activity is concentrated in a small number of centres. 85% of foreign exchange activity takes place in just ten centres. London and New York alone have a share in excess of 50% of trades. The top ten centres have a 63% market share of over the counter derivatives trades – with the top ten being the same as for forex transactions. The top ten countries captured a near 80% share of international debt issuance in 2007, with 60% of issuance in just five countries – with only the US likely to have activity significantly spread over more than one centre. Other measures of concentration tell very much the same story: global financial activity is heavily concentrated in a small number of cities, with the same cities dominating market share. Some cities have niche dominance in particular activities (Zurich, Geneva, Chicago being examples), others (London, New York) are highly ranked in most business areas.

Figure 1: Foreign Exchange Activity by Volume, 2007



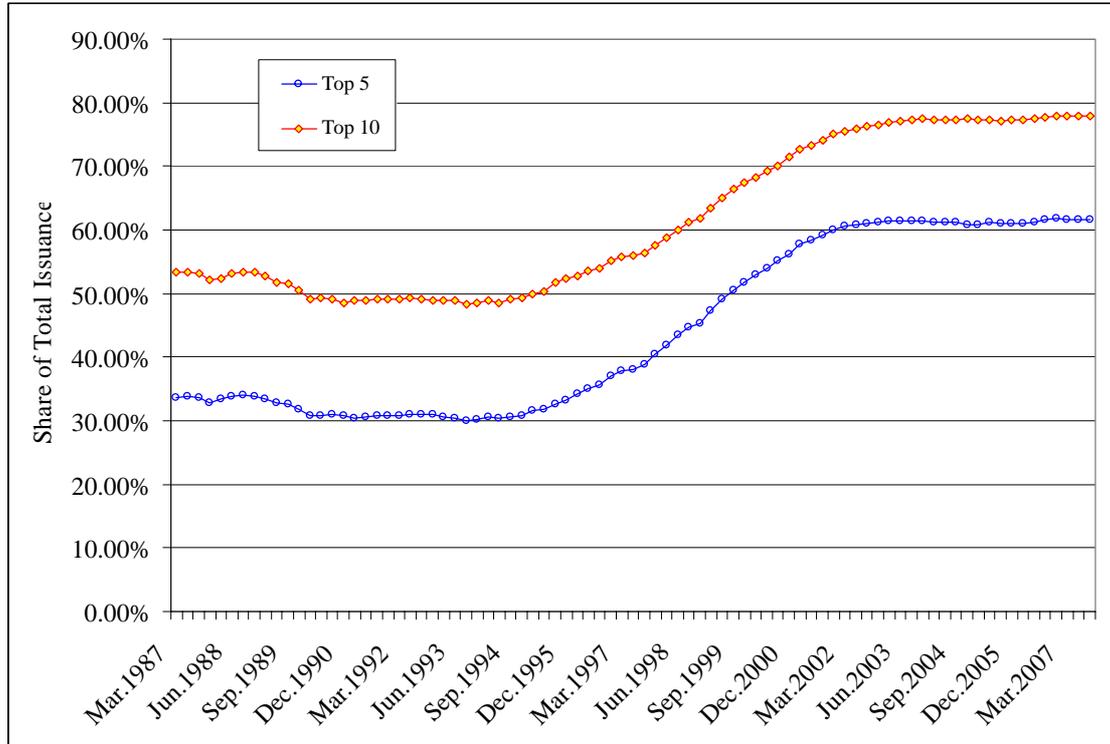
Source: Adapted from BIS (2007)

Figure 2: Over The Counter Derivatives Trading, Volume, 2007



Source: Adapted from BIS (2007)

Figure 3: Concentration: International Debt Issuance 1987-2007



Source: Adapted from BIS (2008)

Every researcher provides their own list of which are the leading cities, the rankings varying slightly, depending on the criteria used and datasets employed. Those based on survey work may carry cultural or linguistic biases. As a useful basis, Figure 4 shows the rankings of financial centres produced by Z/Yen using their “Global Competitiveness” index which weights together quantitative indicators of market share, market qualities (labour market, infrastructure, available services) and market openness (transparency, regulatory and tax structure etc.) with survey data on competitiveness as a business location<sup>1</sup>. The list contains few surprises. Paris is not ranked in the top ten (it is 14<sup>th</sup> in their list) and the inclusion of both Swiss centres (reflecting their private fund management status) may be unexpected. Tokyo – in the world city literature regularly placed alongside London and New York (and sometimes Paris) as one of the dominant true global centres - is ranked tenth, reflecting concerns about its openness to foreign businesses operating there and the continuing aftermath of the bursting of the Japanese asset price and economic bubble in the 1990s. The full list of financial centres includes offshore centres (Hamilton, Bermuda, for example) whose significance greatly exceeds their size or prominence as cities, and emerging centres such as those of the United Arab Emirates.

<sup>1</sup> It should be noted that the survey was commissioned by the Corporation of London and Z/Yen are London based.

Figure 4: Global Financial Centre Competitiveness Index

Financial Centre	Index 2007	Financial Centre	Index 2008
1. London	806	1. London	795
2. New York	787	2. New York	786
3. Hong Kong	697	3. Hong Kong	695
4. Singapore	673	4. Singapore	675
5. Zurich	666	5. Zurich	665
6. Frankfurt	649	6. Frankfurt	642
7. Geneva	645	7. Geneva	640
8. Chicago	639	8. Chicago	637
9. Sydney	636	9. Tokyo	628
10. Tokyo	625	10. Sydney	621

Source: Z/Yen (2007)

In examining trading figures for equity, bond and derivatives trading, however, it is perhaps simplistic to equate activity with the city location of the exchange. Electronic trading platforms mean that trading activity can be taking place remotely; the removal of barriers to capital flows from the 1980s onwards means that the beneficial ownership of the equities and bonds and the interest in the derivatives trades may be widely dispersed. As will be explored, there remain significant geographical factors in trading: but equally a Paris derivatives trader may be dealing in Australian stock index futures on behalf of a Middle Eastern client with her middle office based in London handling the transaction and settlement process. There has been growing concern from regulators about the existence of “dark pools”: private automated crossing systems and trading platforms that match buyers and sellers without publishing bid-offer prices. These allow institutional investors to trade large blocks of stock between each other without causing pricing effects and with anonymity. It was estimated that in the first half of 2007 as much as 10-20% of all trades of NYSE securities were through such dark pools although presumably such estimates are speculative. This sense of global dislocation is reinforced by the growing trend for mergers, acquisitions and strategic alliances in securities and derivatives exchanges, creating global trading platforms with ownership spread across IFCs. Such global activity includes the networks themselves: for example, the FLAG fibre optic cable network linking the US to Europe and onto the Middle East and South East Asia is owned by Mumbai-based Reliance, while VNSL is owned by the Tata group.

One critical question posed by the growing reliance on information technology and on virtual connections is what relevance does location have in a world of electronic capital flows? If information can be obtained readily anywhere in the world, if trades can be made anywhere in the world, why pay for expensive CBD office accommodation? Evidence of decentralisation of financial activity away from traditional downtown areas – notably from Wall Street – seemed to give credence to such a view. The observed impact of technology on financial activity, in fact, seems rather different. While the technology means that work can be anywhere, it must be *somewhere*. The location, then, will depend upon other factors associated with efficiency and profitability. For high-level financial services, the essential inputs are human capital – skilled labour – and information.

### *International Financial Centres, Office Markets and Volatility.*

This implies not decentralisation but concentration. Economies of scale, agglomeration economies, information economies, the presence of customers, clients and competitors pull activity to a small number of key locations. How important are face-to-face communications in a digital world? Firms can communicate via telephone, fax, email and increasingly, more advanced digital formats that would seem to reduce the importance of direct contacts and geographical proximity. As Ganesan *et al.* (2005) note, the idea that shared relational ties and norms of trust and reciprocity foster knowledge transfer, which, in turn, provides economic advantage for communication; that face-to-face communication is the optimal way of acquiring knowledge; and that the most valuable knowledge is tacit and not codified. For product development, creativity and innovation are vital – and the type of knowledge required here is more likely to be tacit.

It is important here to distinguish between retail and wholesale activity and between high volume, low margin and low volume, high margin activities. Retail activity may be less likely to concentrate since it relies on customer knowledge, tastes, preferences and local marketing. It is also cost-sensitive and, hence, may be displaced from major centres. The majority of call centres are, of course, for retail financial services. High volume, commoditised, wholesale activities include settlement, clearing and certain forms of trading. The tasks may be relatively standardised, are less reliant on information exchange and innovation, and generate lower profits. As a result, there may be pressure for these activities to decentralise, to seek lower cost locations.

By contrast, high value added, low volume business - corporate finance, fund management, raising capital, mergers and acquisitions, for example – rely both on information (from customers, rivals, parallel business and suppliers) and on close client contact. This leads to greater concentration, a concentration further fuelled by the need to access skilled labour. For such activities, as Gehrig (1998) has observed, information from IT sources and from face-to-face contacts are complements, not substitutes. Lombard Street Research points to the relative increase in earnings in the City of London as evidence for this “upgrading” of activity. Just as manufacturing, printing, publishing and non-financial office activities were pushed away from the City in earlier phases, so retail finance and commoditised, high-volume activities are being pushed away now. This change brings, in turn, a change in the nature of office requirements and shifts in the required space per worker that counterbalances the office intensification brought by new working practices.

In discussing the development of international financial centres, some sense of history is necessary. In the “new international finance system” literature, an impression is given that global links and networks of interconnected cities are new phenomena, with the development of the Eurodollar markets and the breakdown of the Bretton Woods agreement seen as the watershed and progress in information technologies as the engine of change. This is far from true and, for all the discussions of the decline of Genoa or of Amsterdam, the striking feature of any history of the development of financial centres is continuity, not change (see for example Cassis, 2006, for a comprehensive review). Cassis’s work reveals the strong linkages between the banking and finance centres of cities in the eighteenth and nineteenth centuries, the extent of international financial trade

(for example, the simultaneous placement of government and private debt securities on multiple markets) and the search for international arbitrage opportunities. There are striking resonances of more recent events: the 1890 Barings Crisis which created a liquidity crisis in London with contagion effects around the world coming from problems with its Argentinean land bonds, secured on mortgages that ceased to perform and used as collateral for lending activity.

In part, though, this is a European (and, increasingly, an American) history, with Asian centres either playing a domestic role or connected to the Western economies through imperial linkages (see Reed, 1980 for an early analysis of the evolution of Asian financial centres). Thus Japan remained closed to trade until the development of the Treaty Ports from 1859. Nonetheless, much Asian development relied on Western finance. For example, the development of the Chinese railway system was driven by bonds and loans raised and sold in European markets, secured on, *inter alia*, customs and other tax income, denominated in gold, silver, sterling, francs and yen. Loans were often raised through syndication by banks from different nations, with HSBC, Barings and Deutsche Asiatische Bank prominent. The emergence of the “new” international finance system from the 1960s, then, really marks more of a return to the eighteenth and nineteenth century structure, albeit a return that has been greatly facilitated by technology and the evolution of developed economies. Even here, it is worth recalling that commercial telegraph services were available from the 1830s, the first trans-Atlantic cable was laid in 1850 and, by the 1870s, there were cable links from Britain to India and onto Australia. Commercial tickertape for stock prices was available from the 1860s. Technological developments are thus more a question of scale (bandwidth, speed and reliability) than a radical break from the past.

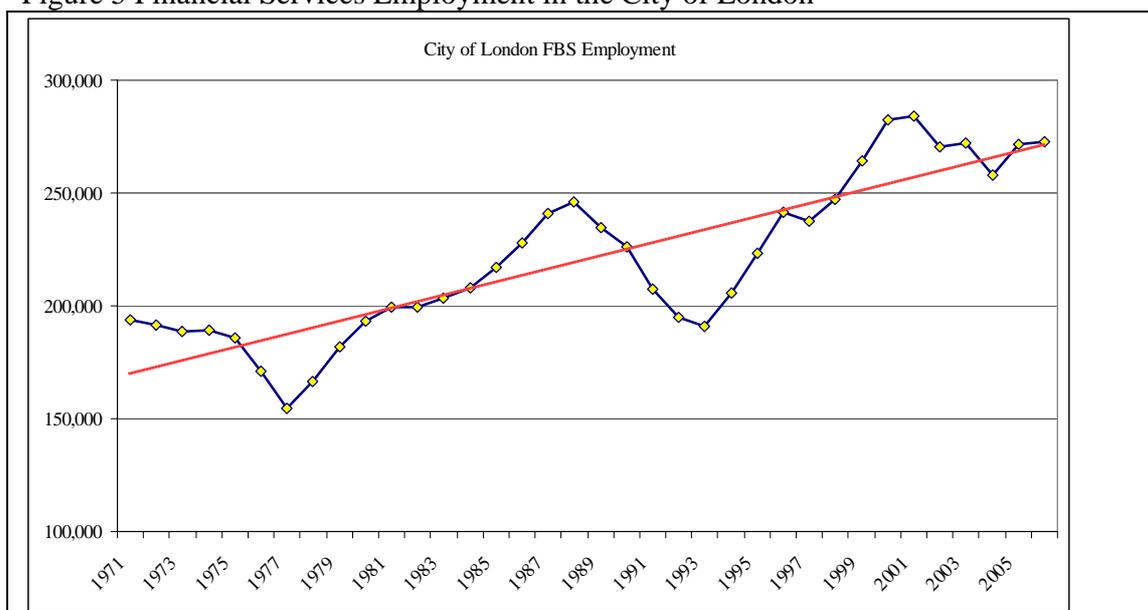
The continuing dominant role played by a small number of cities in the global financial system – international financial centres – then, can be attributed to an historically contingent and path-dependent process linked to geo-political and economic factors. The ability of a city to compete for a large share of international financial market activity can be related to scale – the depth and breadth of its capital and labour markets – and to diversity in the range of specialist financial services and associated advanced producer services present in a city. The key role played by knowledge spillovers, by the development of trust relationships and by innovation limits the impact of developments in information technology and telematics in reducing the importance of geography.

Economic analysis of the competitiveness of IFCs has largely ignored real estate as an issue, beyond occasional use of indicators of total occupation cost. Real estate is seen as a derived demand that will appear in response to the needs of financial services firms. In the urban social science literature, real estate plays a larger role: as part of the physical and symbolic restructuring of the city, to make concrete its new role in global capital markets. But to some extent, the real estate market in IFCs must have a direct role to play in creating and preserving financial advantage. The quantity and quality of the existing office stock and the market’s ability to produce new stock appropriate for global financial firms forms part of the attributes of an IFC and cannot simply be assumed away.

### 3. Real Estate in IFCs

Economic analysis of office markets has developed considerably and the connection between the occupier, investment and development markets is recognised in dynamic implementations of models of property market systems such as DiPasquale and Wheaton's (1992) four quadrant model. In these models, demand for space as a factor of production translates into occupational demand; rents result from the interplay of supply and demand. Investors acquire property assets, discounting future rental income at a risk adjusted rate to produce a capital value; supply of space is driven by the relationship between the price of space in the asset market and the cost of producing that space. While this describes an equilibrium, no serious model denies adjustment processes that result from demand fluctuations and short-term inelasticity of supply<sup>2</sup>. With a positive demand shock and fixed supply, real rents in the market may rise above their equilibrium level due to "excess" demand, while a negative demand shock may result in vacancies rising above their natural level, driving rents down. In the longer term, however, supply will adjust to the changes in demand.

Figure 5 Financial Services Employment in the City of London



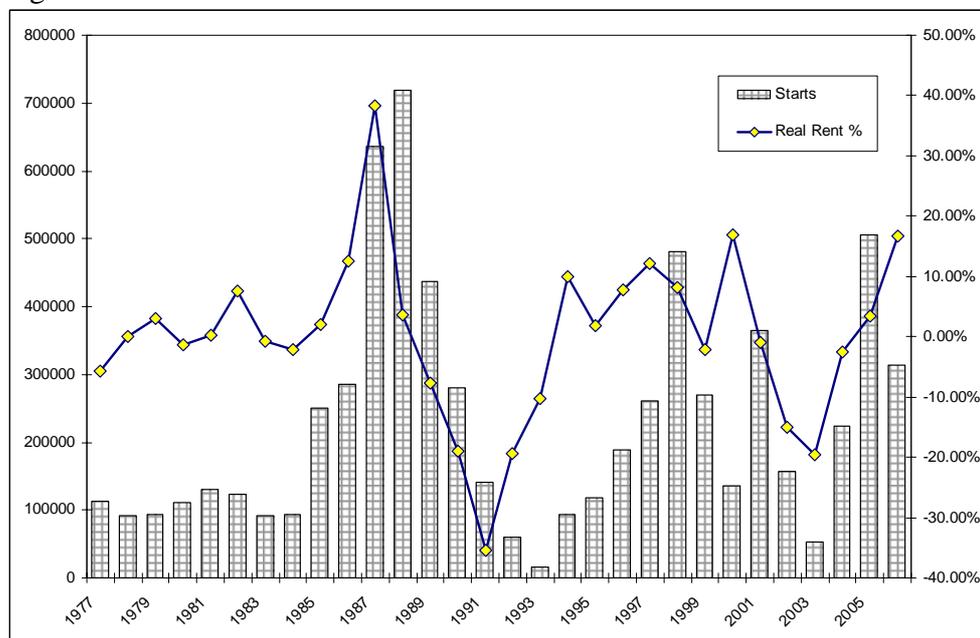
Source: Adapted from GLA

Figure 5 shows the growth in financial and business service employment in the City of London from 1971 to 2007. Trend growth is around 1% per annum, but that trend is masked by fluctuations, with periods of rapid growth followed by sharp declines. Supply should broadly match that trend growth – but must also replace stock that has reached the end of its economic life. Thus, taking a fairly standard estimate of the depreciation rate of around 2.5%, one might expect stock to increase at around 3.5% per annum to account for growth in demand and obsolescence. Over the last thirty years, the average floorspace

<sup>2</sup> For example Wheaton (1987), Wheaton *et al.* (1997), Hendershott *et al.* (1999), Hendershott *et al.* (2002), Barras (2005)

completed in the City of London as a percentage of the existing stock is, indeed, around 3.5%. However, as Figure 6 makes clear, there is no smooth supply of space but rather periods of intense building activity surrounded by periods of inactivity. Moreover, construction starts appear to lag real increases in rent. If the fluctuations in demand allied to short term inelasticity in supply might be expected to produce rental fluctuations, this pronounced building 'cycle' is likely to result in extreme swings in rents and capital values in office markets. The alternating pattern of high and low construction, with concomitant fluctuations in rents and prices, is observed in history (as in Hoyt's (1933) classic *One Hundred Years of Land Values in Chicago*, and in the office markets of world cities and financial centres in the modern era. Moreover, the boom-bust cycles appear increasingly coordinated across many major cities.

Figure 6: Office Construction and Real Rents



Source: Author, from Corporation of London, CBRE, ONS.

The behaviour of developers (and those that finance development) in overbuilding and in building beyond rental peaks has been taken as evidence that office market models that implicitly assume rational behaviour must be invalid. If developer responses do not conform to an efficient market model, then, by implication, behavioural and institutional approaches analysing individual actors within the development process may offer a richer explanatory framework. Much of the urban social science literature on the redevelopment and restructuring of world cities has been in this critical, institutional vein, with a strong focus on the role of individuals in shaping urban outcomes. The best research (for example Fainstein, 1994) remains aware of the structural economic forces that shape cities and that produce similar outcomes in markets with very different institutional structures (in her case, London and New York). Other research lionises or, more usually, demonises the developer and the coalitions and networks around the development industry, with outcomes resulting somehow from animal spirits.

However, it is not necessary to assume irrational developer behaviour in order to generate development cycles. A developing body of work seeks to combine real options models and game theory to explain the behaviour of economic agents in the development process. These models focus on the decisions of individual actors – generally the developer – when faced with future uncertainty and volatility. The aggregation of those individual decisions and the strategies that they adopt produce a model for how markets behave which can be mapped onto observed empirical outcomes. Again, necessarily, such models take the overall economic and political environment as a given but provide a much more nuanced and complex explanatory framework for developer behaviour. The essential element of a real option is that it is irreversible. A developer owns a site in a city. She can develop (or redevelop) now – but she has the option to wait. Given that she faces uncertainty – as to the length of the construction period and the costs of construction but, most critically, about the rental and capital values that will be achievable on completion and on the length of time taken to find a buyer. That uncertainty gives the option to wait a positive value. Once the decision to develop is taken, it cannot be reversed<sup>3</sup>.

For an individual (monopolistic) firm, this means that the present value of the completed development must exceed the costs by a factor equivalent to the option value of waiting. For a competitive market with free entry, uncertainty and irreversibility increases the costs of investing relative to not investing so, once again, developers demand higher current price to long run average cost ratios to justify development, and must account for competitor behaviour. A number of implications follow from this. The first is that development starts are likely to be bunched – developers do not develop until the threshold prices that overcome the cost of building *and* the value of waiting are reached, but then rush to develop in the face of competition and new entrants. Second, adjustment processes are likely to be asymmetric – for example, negative demand shocks will decrease rents and prices (since there is no supply side adjustment), but positive demand shocks shift the supply curve, albeit with a lag<sup>4</sup>. Third, these tendencies will be more pronounced in volatile markets. Sivitanidou and Sivitanides provide some empirical support for these ideas for US office markets, although they note that economic fundamentals dominate the option effects in the majority of cities.

Perhaps the most complete formulation of a game theoretic approach is set out in Grenadier (1996). Grenadier sets out to explain why development appears to be clustered and why developers appear to develop into recessions, in the face of declining occupational demand and building values. His model seeks to understand developer behaviour when faced with competition from other developers and lags in delivering space to the market given the time taken to construct. A developer may own an existing building that is generating rent. S/he has the option to redevelop the building incurring costs and loss of rental income but generating potentially higher rents on completion.

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<sup>3</sup> In practice, since development is a lengthy process split into stages, a developer has a series of options. In recessions, a development may be mothballed, with construction costs saved, awaiting a more favourable economic environment. The developer may have used debt, has maintenance and security expenditure and faces property taxes, and has to remain solvent while awaiting an upturn, so this is no costless option.

<sup>4</sup> In the longer term, stock *can* be withdrawn, through change of use, abandonment or demolition.

Other developers are in a similar position. Developers can observe signals about occupational demand changes, rents, prices and costs. The action of one developer affects the returns of the other. If one commences development and a second waits, then, on completion, the leader captures the higher rents, the follower suffering a loss of rental income or tenants. However, the leader has lost rental income and incurred costs during the development phase. What strategy should the developers follow? Grenadier shows that this depends on the starting conditions in the market, on the volatility of demand and on the time to construct. Development cascades – with developers rushing to develop simultaneously – occur in particular where the volatility of demand is high. The volatility increases the option value of waiting – but once the conditions favour development, all developers race to build. Developers also are prone to build “defensively” when demand signals falter, for fear of being shut out of the market if competitors do build. This helps to explain continued building after rental growth peaks have been reached.

Grenadier’s model is theoretical in nature but nonetheless captures many of the features observed in commercial real estate development in developed capitalist economies. In particular, it helps to identify the types of market which will be most prone to development cascades and “over-building” in response to demand signals. Since the model involves exercise of real options, volatility is a key variable – here, volatility of occupational demand over the long run trend growth. Grenadier suggests that demand volatility will be most pronounced in specialised urban markets, where the fundamental demand drivers are common to a high proportion of occupiers. By contrast, diversified markets will be less prone to volatility-induced development cascades, since differences in business cycles, product-life cycles and underlying economic fundamentals will smooth out demand shocks. He also shows where there are long lags between starts and completions, a market is prone to development cascades in falling markets, and that the more entry barriers there are, the greater the risk of overbuilding.

From this, it follows that the CBD office markets of most established international financial centres are likely to be prone to development cascades, to periods of intense building amid more general low activity levels. First, there is strong specialisation of activity in the core market. Office space is occupied by global financial firms and professional business service firms linked to financial activity. Demand for space and ability to pay high rents are, hence, locked into the performance of global financial markets which are both volatile and prone to shocks. Second, the complexities of building in a heavily developed market – problems of site assembly, pre-existing transport and utilities infrastructure, planning issues – are layered onto the demand for large, technologically sophisticated buildings to create long lags between project initiation and completion of development<sup>5</sup>. Finally, high land values, linked to the size of buildings and cost of construction, allied with the need to access debt and equity finance create significant entry barriers for new and smaller firms.

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<sup>5</sup> Wang & Zhou (2000) suggest that markets with a large existing inventory should be less prone to overbuilding shocks (as new supply may be a smaller percentage of current stock). However, their model (a two stage model, with first an individual development decision and, second, a collusive rent fixing game that can preserve high vacancy rates) again predicts that large offices will be more prone to cyclical overbuilding, even with rational strategic decisions by developers at stage one.

Grenadier's model, then, points to the likelihood of pronounced development cycles in IFCs – *with no need for any assumption of irrational behaviour on the part of developers*. That is not to say that developers do not behave irrationally, nor that the market system produces optimal long run outcomes: just that irrationality is not a necessary condition for the existence of development cycles and that individual strategic behaviour, in aggregate may result in cycles and building booms. Furthermore, as will be argued below, with developer, investor and occupier behaviour intertwined within and across financial centre office markets, potential risk and volatility may become magnified.

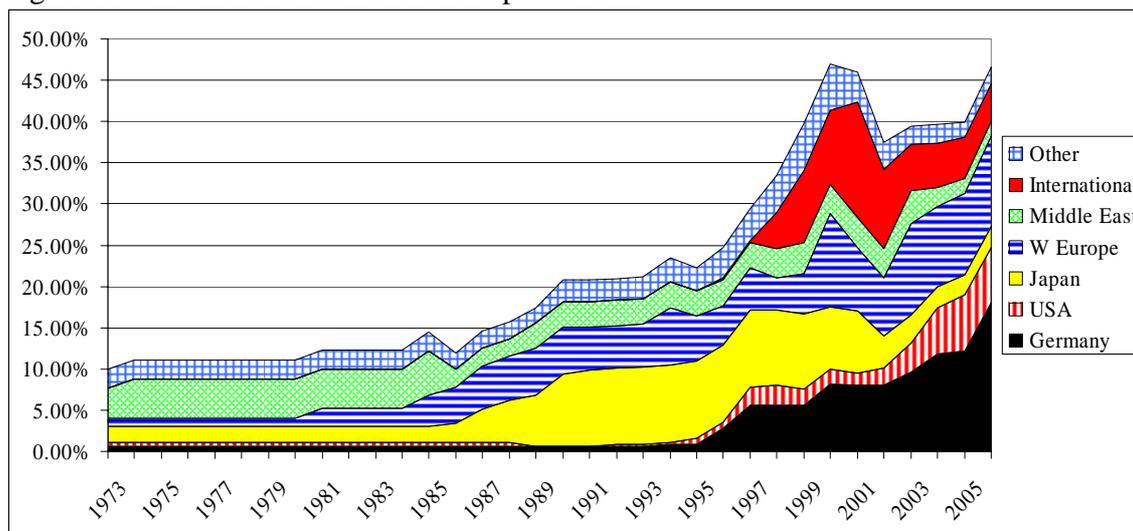
#### **4. Ownership, Innovation and Risk**

Despite the volatility that seems to be inherent in IFC office markets, they have been a prime target for real estate investors. Historically, real estate investment has been largely local, domestic, focussed. The large buildings and high price per square metre of Class A office space in the centres of world cities also acted as a barrier, excluding smaller investors. Nonetheless, major city office buildings took a large share of professional and institutional investors' real estate portfolios. Over the last twenty years, a series of innovations have transformed the nature of real estate investment markets and changed the patterns of ownership and exposure to real estate. The main features of this transformation have been the growth of global real estate investment; the development of new property investment vehicles that allow many more investors to gain exposure to commercial real estate as an asset; and the transformation of property debt markets through securitisation. The combination of these three areas of change have potentially profound implications for IFC office markets.

While ownership of non-domestic real estate for strategic reasons is a well-established feature of international markets, global holding of real estate for investment purposes is a comparatively recent phenomenon. As noted in Lizieri & Finlay (1995), advisors began directing clients towards international portfolios only from the mid-1980s, with the early literature dominated by suggested investment in major office markets. Global direct portfolios, though, only really became a standard feature of investment portfolios from the second half of the 1990s. An indication of the extent of global ownership can be seen from the results of the *Who Owns the City?* study of the London office market (Lizieri & Kutsch, 2006). Detailed analysis of a database of London offices reveals the shift in ownership over time. Until the mid-1980s, international ownership remained remarkably stable, at between 10% and 15% - mainly consisting of long established owner-occupying banks. The proportion of non-UK ownership began to increase in parallel to financial deregulation across the late 1980s, reaches 25% in the second half of the 1990s and, by the end of the study period exceeds 45%. Within that overall increase, waves of non-UK investment can be seen: notably Japanese investment in the 1980s, German investment in the second half of the 1990s and the significant appearance of "international investment" – acquisition of offices by funds with equity investment from a diverse mix of nationalities and investor types (figure 7).

It is difficult to obtain comparable figures for other markets but evidence of the increase in global real estate capital flows suggest that London was not unique in experiencing a globalisation in ownership. Property Funds Research’s (2008) survey of Global Fund managers reports that, of the 107 funds surveyed (with over €trillion of property assets under management), 38% had 10% or more of their assets spread across more than one continental region.

Figure 7: International Office Ownership in London



Source: Lizieri & Kutsch (2006)

That growth in international ownership in the City of London has been accompanied by a shift in the nature of ownership (figure 8) as “traditional” landlords – the public sector, endowments, the City livery companies and similar historic owners – have been replaced by more financially oriented investor-owners with more intensive asset management strategies. Between 1975 and 2005, traditional ownership fell from over a third of office space to less than 10% while private equity, other financial and other forms of ownership doubled to over 41%. This understates the extent of the change, since the apparently stable 20-25% share held by property companies masks a shift to a more highly geared, actively managed strategy over the period.

Figure 8. City of London Office Ownership by Organisation

	1975	1980	1985	1990	1995	2000	2005
“Traditional”	36%	33%	25%	19%	15%	7%	7%
Institutional	24%	27%	37%	37%	38%	34%	28%
Property Company	20%	20%	15%	20%	25%	26%	24%
Private Equity Vehicle	0%	0%	0%	0%	1%	6%	14%
Other Financial	16%	17%	19%	19%	16%	22%	20%
Other	4%	4%	4%	6%	5%	5%	7%

Source: Lizieri & Kutsch (2006), University of Reading Database

The shift in the nature of ownership has been accompanied by a wave of innovations in real estate investment vehicles (for an early review, see Lizieri & Ward, 2004, for more recent analysis, Baum, 2008). In particular, 1995-2005 saw the rapid growth of private real estate equity vehicles, which pooled together equity capital from investors, raised debt and used the capital to acquire real estate assets. The vehicles ranged from relatively simple limited partnership structures used to provide a tax-efficient structure for joint ventures to complex layered corporate structures, often based in tax havens, which allowed many investors to gain exposure to commercial real estate. At the end of 2007, INREV recorded details of 476 private funds in Europe, with a gross asset value of €36billion: despite slowing activity in 2007 in the aftermath of the Credit Crunch, NAV had grown at 14% per annum from 2000. Baum (2008) suggests that the value of unlisted real estate funds in Europe grew at 10% per annum between 1997 and 2007, with explosive, if more recent, growth seen in Asian and emerging markets.

Three factors are significant for an understanding of IFC office markets. First, the existence of private direct real estate vehicles breaks down entry barriers for smaller investors and for international investors who are able to build diversified global direct exposure to real estate – either through individual placements in vehicles or through use of a fund of funds structure. Second, and linked, the growth of private equity investment vehicles effectively fragments the ownership of real estate. Third, most of the vehicles have capital structures containing substantial amounts of debt: particularly those funds with a value-added or opportunity investment style. Expected returns for geared vehicles are higher than the expected returns for the underlying real estate: but that higher return is to compensate for the enhanced volatility brought by leverage. Hence investors gain in rising markets but are more vulnerable to downward shocks, increasing the overall risk of real estate. Furthermore – as clearly demonstrated in the 2007-8 downturn - the liquidity of private vehicles varies considerably over the property cycle. Offsetting this exposure, investors are better able to diversify their property portfolios – both within national boundaries and globally – and, with the range of investment styles and gearing levels available, can fine tune their target risk and return. This does assume, however, that investors are aware of the risks implicit in particular investment vehicle structures.

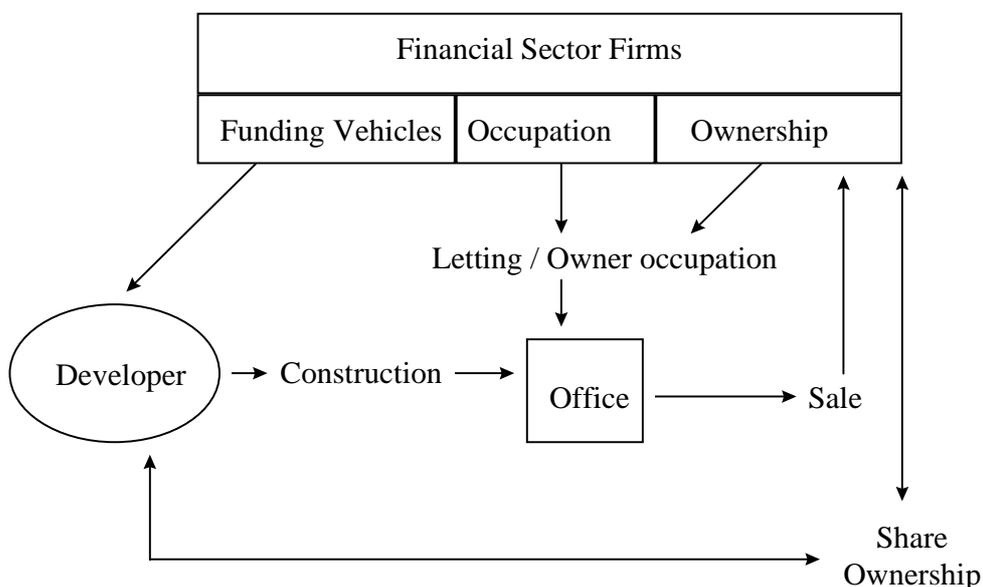
The rise of private equity real estate investment vehicles has been paralleled by innovation in real estate debt and the growth of real estate debt securitisation. Commercial mortgage backed securitisation emerged in the United States in the late 1980s and in Europe in the second half of the 1990s. Many banks moved from conventional property lending practices to a business model based on an exit via securitisation. Decisions on lending were increasingly driven by the appropriateness of the proposed loan for inclusion in a mortgage pool for securitisation, while apparently enhanced balance sheet liquidity may have led to a relaxation of due diligence standards. Securitisation also created new sources for commercial real estate lending as investment banks established mortgage origination conduits or arranged for clients to by-pass conventional loan structures and raise debt directly in the capital markets. This competition for conventional lenders from new providers, disintermediation and asset backed securitisation may, once again, have eroded due diligence standards as banks were under pressure to maintain market share.

As with the growth of property investment funds, debt securitisation spreads the exposure to real estate debt. This has efficiency benefits, allowing greater diversification. The tranche structure allows different investor groups to select lower risk-lower expected return or high risk-high expected return portfolios of securities. But that diversification and spread of exposure links more firms to risk from the underlying real estate and debt markets. CMBS purchasers include institutional investors buying securities for their investment portfolios; banks seeking capital assets to meet solvency requirements and for collateral for operational borrowing; retail bond investment funds; hedge funds and many other financial institutions. Moreover, that ownership is international in nature. This became evident in the aftermath of the US sub-prime mortgage “crisis” and credit crunch starting in 2007, as it quickly became evident that bank and financial firm exposure to US residential mortgages through mortgage backed securities, collateralised debt obligations and structured investment vehicles was widespread and international. Thus an initially localised residential mortgage problem had significant global contagion effects and contributed to the fall in capital values in commercial real estate markets – echoing the 1890 Barings crisis.

Lizieri *et al.* (2000) argue that the distinction between the funding of real estate development, ownership of real estate as an investment and occupational of property has become blurred. They describe an integration of property and financial markets (see figure 9) and argue that this integration can create systemic risk as shocks in one area of the property market are transmitted throughout the system. This can be seen most clearly in IFC office markets. The size and complexity of developments demand complex finance and funding arrangements provided by the major banks, finance houses and institutional investors. Those same financial firms are the *occupiers* of space in IFC office markets, as owners or, more generally, as tenants. Thus rents and capital values are linked to the fortunes of international financial firms and their demand for space. And it is those same firms that invest in the buildings in IFCs – directly by acquisition for their investment portfolios, indirectly through investment in funds acquiring buildings, by holding shares of the major property companies owning the buildings or by investing in the securitised debt products whose underlying cashflow and security is based on the office buildings. Those investments are significant parts of the asset base of the financial firms and act as collateral for their operational activities including property lending. Thus the occupier, supply and investment markets are locked together.

The developments described above increase that lockstep. Globalisation of financial activity has led to increasing functional specialisation in IFCs, with many domestic focused firms squeezed out of the occupier market by international financial service or linked professional service firms. Globalisation of ownership has meant that professional investors based in one IFC typically have exposure to real estate assets in other IFCs. Innovations in real estate investment make it easier to acquire a global real estate portfolio, with capital from a range of investors pooled to acquire prime real estate assets. Greater use of debt in these vehicles, facilitated by debt securitisation and capital market lending, has increased the gearing, and hence implicit volatility, of real estate. Finally, purchase of debt securities by financial firms brings further exposure to real estate risk.

Figure 9: Integrated Property-Finance Market Relationships



Source: Lizieri et al. (2000).

This process of lockstep is important in the context of the volatility of global capital markets: it seems likely rental volatility and supply volatility are likely to be high in IFCs relative to other markets. In IFC office markets, demand for space is driven by the employment needs of financial firms, which in turn is driven by the behaviour of international financial markets. Demand shocks are thus likely to occur in a coordinated fashion across the major global financial capitals. The integration of occupational, asset and development markets means that demand shocks (positive or negative) are reinforced. A downturn in global capital markets reduces financial firms' demand for space putting downward pressure on rents. This affects capital values and returns, with implications for the performance of their investment portfolios. Falling rents and capital values and rising vacancy rates put pressure on borrowers, increase the risk of debt instruments and depress the value of debt securities held as an asset and used as collateral. This affects the profitability of financial firms and hence depresses their demand for space. Fainstein cites the implications on demand for space in the New York office market of the 1991 merger of Chemical Bank and Manufacturers Hannover, driven by their exposure to under-performing real estate returns. Eighteen years later, the fall of Bear Stearns, in part through exposure to mortgage backed securities and structured real estate debt products, may have similar implications and there is emerging evidence of financial firms shedding space or putting moves on hold in many financial capitals in the wake of the 2008 credit crunch. The converse applies to positive shocks driven by booming capital markets. Larger firms based in financial centres capture greater market share and seek to expand, placing upward pressure on rents; rising property prices enhance asset values and encourage lending and development, with the additional activity enhancing short term profitability. By implication, this suggests that the amplitude of cyclical fluctuations in international financial centres will be higher and peaks and troughs will be coincident.

## **5. Some Empirical Evidence**

While the intention of this paper is set out a framework for understanding real estate risk and return in IFC office markets rather than to provide detailed quantitative analysis, this section sets out some preliminary findings that provide a measure of empirical support for the ideas advanced above. The results here are more in the form of stylised facts than formal tests of hypotheses, and are bedevilled by the inevitable difficulty of collecting consistent and comparable international data series at city level, particularly in relation to private real estate markets. They are intended to give broad indications of the types of analyses that might be possible within the context of the model advanced.

Using data provided by JLL and LaSalle Investment Management, change in prime office rental values were calculated for a sample of 32 cities for the period 1990-2007. Rental changes were calculated in domestic currency to avoid the results being influenced by currency movements. The average correlation between all cities in the sample was 0.26; for 11 cities ranked in the top 15 financial centres by Y/Zen, the average correlation was 0.46. There are regional factors at play here (the correlation between US cities is 0.51, between European cities 0.35) but even with the small sample, the difference is significant at the 0.05 level. Of the 55 correlations between the eleven IFC markets, despite the small sample size, 24 are significant at the 5% level and beyond with 33 significant at 10% or beyond. New York has the highest number of significant correlation coefficients: of the non-US cities, the three with the highest average correlation are the “world alpha cities” of London, Paris and Tokyo.

Exploratory data analysis using principal components analysis on 28 of the 32 cities (those with no missing data) confirmed the Goetzmann & Wachter finding of a global real estate factor: the first component extracted explained 38% of the variation in the dataset, with 20 of the 28 cities having loadings of 0.5 or higher, including nine of the eleven high ranked IFCs – the exceptions being Hong Kong and Sydney. In general Asian cities have lower factor loadings than European and North American cities. A varimax rotation of the retained components again confirms a regional pattern, separating the US and the Asian cities more clearly. Focussing just on the eleven high ranking IFCs, the first retained factor from a PCA explains 53% of return variation, with all IFCs loading at 0.62 or higher with the exception, once again, of Hong Kong (0.495) and Sydney (0.375).

An hierarchical cluster analysis of the eleven cities (using squared Euclidean distance metric and Ward’s method) again emphasises that, over this short time period, Hong Kong and Sydney are distinct from the other IFCs, with Singapore somewhat separate, too. The other financial centres merge quickly: there is initial regional clustering (particularly for the US cities), but most cities swiftly form a single group. Overall, then, even with a very short dataset, there is evidence of a strong common factor in rental change in major global cities, and in the office markets of International Financial Centres in particular.

The model also suggests that IFCs will be more volatile. The average standard deviation of rental change for the eleven leading IFCs was 21.95%; for the remaining cities, the average standard deviation was 14.86%. Using an unequal sample t-test, the difference between the two means is statistically significant at the 5% level. The higher rental volatility, consistent with the model outlined above, is compensated by a higher mean rental growth (4.8% to 2.2%), a difference which is, as with the risk measure, statistically significant. Simple regression analysis with the standard deviation as the dependent variable shows that 61% of variation in risk is associated with the average growth rate; adding a dummy variable that identifies US cities increases the level explanation to 68%; a dummy variable identifying IFCs further increases the R<sup>2</sup> to 73%, with the coefficient on the dummy statistically significant at the 5% level. Given the short time series, it is not possible to conduct robustness tests so it is important not to overstress the significance of the results, but it does provide some indication of higher rental volatility in international financial services firms.

Figure 10: Explaining Rental Volatility in Global Cities

Risk =	0.10	+	2.26 Mean		Adjusted R <sup>2</sup> = 0.61
	(7.25**)		(6.50**)		
Risk =	0.12	+	2.26 Mean	- 0.07 US	Adjusted R <sup>2</sup> = 0.68
	(8.36**)		(7.83**)	(-3.70**)	
Risk =	0.10	+	2.00 Mean	- 0.07 US + 0.05 IFC	Adjusted R <sup>2</sup> = 0.73
	(7.25**)		(6.50**)	(-3.51**)	(2.00*)
All estimates OLSQ, Newey-West heteroscedasticity corrected coefficient estimates.					
** significant at 0.01 and beyond; * significant at 0.05 level					
Data: annual rental change 1990-2007, 32 cities.					

Given the lack of robustness of the private real estate data, a more productive line of enquiry might consider the co-movements of economic driver variables. Unfortunately, it is not easy to obtain comparable city level data that measures financial market activity linked to occupational demand. Co-movement of equity markets is a well known phenomenon. Examining low frequency stock market returns for 1990-2006, the correlation between eighteen leading markets was 0.50; for markets located in leading IFCs, this rose to 0.60. However, as noted above, for office demand, what is relevant is where trading activity takes place, making equity performance at best a fuzzy indicator. Examining BIS data for change in the volume of debt issuance over the period 1994-2007, the mean correlation between all markets surveyed by BIS is 0.19; this rises to 0.37 in markets which contain a leading IFC; to 0.48 if Hong Kong is excluded; and to 0.56 just considering debt issuance in the US, UK, Japan and Germany. Finally, preliminary analysis of growth in financial and business service employment shows a correlation of 0.68 between London and New York in the period 1990-2007, despite opposite growth trends over that period, with the two series apparently cointegrated allowing for the trend. These results do not amount to firm evidence in support of the idea of office market linkage advanced: but they are, at the least, supportive of the predictions of the model.

## **6. Summary and Conclusions**

In this paper I have attempted to draw together research on the development of international financial centres and on urban development within global cities with urban economic models of adjustment processes in office markets. Global capital markets have become both more closely integrated and more concentrated as technological developments have linked markets and allowed the largest, most sophisticated financial centres to capture a greater share of trading activity. While this is no new phenomenon, the growing concentration of the leading financial firms in international financial centres, surrounded by supporting professional and business services has had profound implications for the office markets in those cities, both creating a demand for large complex office developments and linking occupational demand with the ebb and flow of global financial markets as domestic-focussed occupiers are increasingly squeezed out of global city centres and as these centres become ever more functionally specialised.

Innovation in the organisation of commercial real estate investment and finance interacts with those broader urban trends. The development of a wide range of property investment vehicles has permitted more financial investors to gain exposure to real estate on a global basis, which both spreads exposure and fragments ownership. An overall increase in the use of debt in real estate investment funds creates additional potential volatility; that growth in debt has, in part, been enabled by developments in real estate lending, notably with the growth of debt securitisation. Investment in these debt securities provides further financial market exposure to the real estate sector and, once again, this is on a global basis, as the ripples and contagion effects from the sub-prime mortgage crisis make evident. In the office markets of international financial centres, the occupational, asset and development markets have become interlocked; global financial firms occupy the office space, provide the funding and finance for the supply of that space, invest directly and indirectly in the buildings in those cities and hold debt securities whose value and risk depend on the underlying fortunes of the real estate market.

Urban economic models based on strategic behaviour of developers, landlords and investors suggest that cyclical fluctuations will be more prevalent in markets where there are entry barriers, where there are long lags between the decision to develop and where demand drivers are undiversified and hence more prone to shocks. All of those factors apply in international financial centres and the interlocking of occupier, asset and development markets provides a feedback mechanism that is likely to increase the amplitude of market fluctuations. Moreover, the global focus of international financial centres means that demand shocks related to economic activity are increasingly likely to be coordinated globally. These implications follow from mainstream economic models of real estate and financial activity and do not require behavioural or critical assumptions. The purpose of this paper is primarily theoretical not empirical. However, results of preliminary analyses are broadly supportive of the conclusions and point the way for further research examining the linked risk and return characteristics of IFC offices.

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