

Hierarchical Tendencies of Capital Markets Among International Financial Centers

JESSIE P.H. POON

ABSTRACT The dramatic evolution of global finance in the last three decades has seen intensified competition among the world's major cities to become prominent control centers of global financial flows. This paper examines the spatial organization and evolution of capital markets in forty-three world cities from 1980 to 1998. It finds evidence of the strengthening of hierarchical tendencies among world financial and capital cities as they search for ways to differentiate between themselves through financial concentration and productivity. The results also indicate a trend towards the dominance of London and New York in this financial hierarchy, and that top tier cities tend to be characterized by significantly lower levels of market and share concentrations, share trading value, and risks. Finally, important differences in ownership patterns between the capital markets are detected for the top cities of the hierarchy.

Introduction

Since Friedmann's (1986) seminal work, proselytization of "world cities" as the major heuristic device for thinking about the global economic system has captured the interest of many scholars. The world and global city literature advance the notion that as economic production intensifies worldwide, only a few cities are able to coordinate and control complex, particularly producer-oriented functions, such as financial functions, that support the expansion and construction of the world economy (King 1989; Clark 1996; Knox 1995; Sassen 2001). Alongside the world city hypothesis, a second strand of literature has developed which views world cities as epicenters of global financial transactions (Reed 1981; Goldberg et al. 1988; McGahey et al. 1990). Both literatures are not mutually exclusive. A central theme surrounding the two literatures has been the primary dominance of London, New York, and Tokyo (henceforth "Big-3") in the global city system, which Ben Edwards in *The Economist* (1998) has called "capitals of capital." However, though the three cities are alleged to be unrivaled in their positions as value-creating centers in the design and delivery of financial services, their preeminence also thrives on a network of financial centers that supports the broadening and deepening of the international capital

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market. Indeed competition between world financial centers has intensified in the last two decades as many policy-makers search for ways to upgrade their own national centers *viz* the global hierarchy [see Latter (2001) on Hong Kong, Clementi (2001) on London, and Lee (2001) on Singapore].

The emergence of world cities as centers of capital has been largely encouraged by a trend of devolution in global finance and supported by technological and electronic expediency. In the five years between 1992 and 1997 alone, net issues of international debt securities quadrupled from \$149.9 billion to \$595.9 billion (Bank for International Settlements 1998). Internationalization has been most dramatic in international bonds, which account for over 90 percent of the global securities market. Increase in financial activities is explained by the rapid expansion of transnational corporate (TNC) activities, the industrial development of emerging economies as well as financial deregulation and the relaxation of capital controls among countries. According to Sassen (2001), world, particularly global, cities are primary agents in the production of financial services. These services provide TNCs with the necessary capabilities to conduct their global operations. In viewing world cities as central production sites of complex financial activities, supply-driven factors underscoring the construction of the global urban system have emerged as popular explanations in the formation of international financial centers.

This paper has two objectives: first, it examines the spatial organization and evolution of capital markets in world cities from 1980 to 1998. Second, it investigates the nature of capital markets in these cities. The world cities literature¹ has focused much more on advanced producer services such as legal and accounting than on financial services (Beaverstock 1996; Beaverstock et al. 1999; Taylor and Walker 2001), Sassen's (2001) book being the exception, although Sassen is much more interested in the "practice" of global control through financial activities. Further, Budd (1995) has argued that it is less problematic to configure the global urban system in terms of international financial transactions than advanced producer services, the latter of which is more difficult to define. But the literature on international financial centers tends to emphasize largely banking activities. Yet competition between world cities is predicted to be most intense in capital and securities markets ("Rise and Fall" *The Economist* 32:3 1992). Internationalization of equity markets has been encouraged by a disintermediation of money and finance (Thrift and Leyshon 1998), and the introduction of mass information by the financial industry (Leyshon 2000). This paper will focus on the spatial distribution and structure of capital markets *viz* stock markets in forty-three cities, the majority of which have been identified by the literature to be world cities. In the next section, the formation of international and world financial centers will be discussed. This is followed by an analysis of the spatial distribution of the financial centers. Finally, a summary of the findings and potential shortcomings of the paper are provided in the conclusion.

World Cities and International Financial Centers

According to the world cities literature, the global urban landscape is dominated by a small number of cities that are distinguished by their higher order functions of control and

coordination of global economic flows. These cities are pivotally arranged in a hierarchical network of trade, investment, financial, and even government transactions, and are responsible for creating value up and down the global economic chain (Friedmann 1986; Smith and Timberlake 1995; Clark 1996; Taylor 1997). Proponents of world cities broadly agree that the existence of a sophisticated financial complex is a prerequisite for the formation of a world city. Furthermore, within the world city hierarchy, a separate global league, comprising New York, London, and Tokyo, may be distinguished. Global, as opposed to world, cities have been extensively investigated by Sassen (1999; 2001). The Big-3 are accorded “global” as opposed to “world” status because they are said to be central sites in the making of the global financial market. Clearly, Sassen is more interested in formation of global cities from the supply dimension, emphasizing the production-oriented base of finance rather than the more conventional description of cities as sites of consumption where financial services are seen to be secondary outputs from staple sectors such as manufacturing. In particular, Sassen argues that the internationalization of the global marketplace in recent decades is largely associated with the emergence of a market for equities. Unlike international portfolio investment in the past, *securitization* of financial markets today is driven by institutional investors and the increased cross-border activities of transnational corporations. Function, not population size, and finance (and advanced producer services) rather than manufacturing, favor the formation of world cities (Simon 1995; Clark 1996).

In a separate but related line of inquiry, a number of researchers have been interested in the nature of international financial centers, for example, Reed (1981), Kindleberger (1974), Goldberg et al. (1988), McGahey et al. (1990), Yoon (1989), Choi et al. (1986), Abraham et al. 1994, and O’HUallachain (1994). Like the world cities literature, these studies largely attribute the economics of financial concentration to scale economies. The task of financial and capital centers is to mediate between surpluses and deficits of financial savings that are best matched in a central place. Geographical centrality of financial activities is even more important in interregional or international exchanges because of the advantages of scale economies. The economic underpinnings of economies of scale suggest that concentration of a number of financial institutions and capital in one city facilitates transactions between buyers and sellers, namely borrowers and investors. Increasing returns are derived from financial firms’ abilities to share costs among numerous customers and differentiated markets. Clustering develops so that firms and agents in the capital market can reduce high transaction costs (e.g., high risk of investment) through continuous exchange of information (Kindleberger 1974; Gehrig 1998). Scale economies in international financial centers are largely associated with improvements in information flows, which in turn bring about the competitive pricing of financial instruments and services. Sunk costs for financial institutions also tend to be relatively high (e.g., start-up costs, training of labor) as are embedded relationships between securities issuers and clients, which render investment and securities firms relatively spatially immobile. Hence only when there is significant deterioration in the environment will firms be motivated to relocate in the financial center. Groups of markets also tend to be closely interrelated thereby

favoring a process of co-location (Davis 1990). All this creates a virtuous circle of financial knowledge as enhanced flows of information increase potential accessibility to large pools of capital, which in turn attract TNCs and their headquarters.

Besides scale economies, conditions that favor the formation of a financial and capital center relate to stable financial and currency systems: broad and deep markets such as long and short-term markets, options, commodities and futures markets; an efficient infrastructure that allows efficacious clearing options and monetary transactions; and skilled human capital (consultants, lawyers, accountants, etc.).

International financial centers typically originate as national centers that subsequently assume regional status from a rise in demand to service international capital transactions arising from increased international trade. Such growth requires that national centers expand their financial market activities to include their regional neighbors (Reed 1981). Many international financial centers, therefore, attain their international stature by operating at two levels of regionalism—sub and supra-national. In addition, super financial centers like London, New York, and Tokyo are distinctive because of the size of their financial markets as well as their abilities to amass a complex informational base that allows them to exploit the asymmetry of information globally. When the U.S. imposed the interest equalization tax in 1963 to address its balance of payments problems, London promptly captured the Eurobond market from New York as transaction costs increased in the latter, arising from information asymmetry between the two cities as a result of the tax policy. A relatively liberal regulatory environment coupled with high levels of transparency and liquidity in London and New York as opposed to other international financial centers further help create an information base that is readily communicated to investors.

History also explains the formation of international financial centers. London's global stature may be traced to its colonial history with its agglomeration of European merchants and financial *émigrés*. The city became an unchallenged center for foreign bonds as the pound sterling dominated international transactions in the eighteenth century. Similarly, while money-market trading in the U.S. currently favors New York, this was not always so obvious. Rather, the country's banking activities were centered in Philadelphia around 1780, and the latter was poised to become the U.S.'s first money market. However, with the opening of the Erie Canal in 1825, domestic and foreign trade began to expand rapidly in New York City. At the same time, the state of New York began floating Erie Canal bonds which attracted much European capital, while institutional infrastructure surrounding banking regulation thickened (Meyer 1991). All these precipitated a shift of financial activities from Philadelphia to the City of New York. Despite the apparent divergence in literature between that of world cities and international financial centers, there are important points of convergence. First, both literatures agree generally that world financial centers and cities are important constituents of the global economy because they act as control and management centers of financial and other economic flows. Second, both literatures favor the use of functions to study the spatial arrangement of cities, and both conclude that cities are arranged hierarchically on the global urban landscape reflecting differential surpluses at various levels of accumulation, and thereby the strength of command of func-

tions. Third, cities that have been identified by the two literatures as world cities or international financial centers overlap a great deal. Both literatures point to the Big-3 as top-tier cities in global economic exchanges, supported by smaller world cities like Paris, Frankfurt, Singapore, Hong Kong, and others. Fourth, the international financial center literature is heavily focused on one function, that is, banking activities, and may be treated as a subset rather than a separate literature from the world cities literature. The world cities literature favors a broader study of other advanced producer functions such as legal and accounting services (Beaverstock 1996; Taylor and Walker 2001); labor markets (Sassen 2001), corporate headquarters and telecommunications (Short et al. 1996); and political, educational, and cultural functions (Markusen and Gwiasda 1994) in addition to finance.

This paper collapses the two literatures and treats international financial centers as a subset of the world cities literature. The term “international” is replaced with “world” in order to capture the complex nature of international financial centers better than is currently suggested by the literature. At the same time, “capital” is also added to the description in order to broaden the financial focus of the study away from traditional banking activities to securities activities. Securities activities are undertaken not merely by commercial banks, but also by a wide range of actors such as investment banks, institutional investors, and governments. Hence, cities that dominate the international urban hierarchy will be termed “world financial and capital centers” (WFCCs).

Spatial Distribution and Organization

In this section, the spatial structure and distribution of WFCCs is analyzed. Given the discussion in the previous section, it is expected that WFCCs will likely be arranged in a hierarchical fashion on the basis that global financial integration is facilitated by a network of cities that serve as different command points in the production of financial services.

Studies on world and financial cities are generally hampered by the lack of data that allow for sensible international comparisons (Short et al. 1996; Taylor 1999). Short and his colleagues have observed that most financial data are collected at a national rather than an international level, and when they are international, they are rarely at the city level. Data on the character of exchange markets is collated from two sources, namely, publications by the Bank for International Settlements (BIS) in Basel, Switzerland, and Meridian Securities’s *World Stock Exchange Fact Book 2000*. BIS tends to publish country-level data, leaving *World Stock Exchange Fact Book 2000* as the primary source of historical urban data on securities for the analysis below. The earliest year for which reasonable data exists for all forty-three cities is 1980, and the most recent, 1998. Even then, complete data is available for only a few dimensions or indicators. This is not surprising given that financial integration only intensified in the last ten to fifteen years with the emergence of several markets in developing countries. In most cases, the major stock exchange is located in the country’s national or capital city. Only in three instances were competing cities found nationally, namely, Canada (Toronto/Montreal),² Spain (Barcelona/Madrid), and Brazil (Rio de Janeiro/Sao Paulo). In each of the cases, the city with the larger stock

exchange (indicated by market capitalization) was selected as the WFCC for that country. This is reasonable considering that differences in market capitalization between competing cities are rather large. For example, while Montreal has been historically more important than Toronto in Canada's capital market, since the 1970s, Toronto's position as the national host of Canada's major stock exchange has surpassed that of Montreal. This may be seen readily in the fact that in 1998, Toronto's market capitalization was 1.5 times larger than that of Montreal. The final list of forty-three cities compares favorably with those found in Reed (1981) and Friedmann (1986) (see Appendix 1).

Methodology. Cluster analysis was used to examine the spatial organization of WFCCs. Cluster analysis has become a popular taxonomic tool for classifying cities (e.g., Reed 1981; Hill et al. 1998; Stimson et al. 2001). There are no dependent or independent variables in cluster analysis. It is a procedure that allows distinct groups within a population to be identified, in this case, the forty-three cities (Everitt 1993). More specifically, the agglomerative hierarchical cluster analysis was used to analyze the underlying structure of WFCCs. Based on the literature discussed earlier, there is reason to expect that the global equity market is likely to be disproportionately concentrated in the Big-3 and supported by a number of smaller regional capital centers, hence justifying the use of hierarchical techniques. The agglomerative hierarchical method consists of a series of fusions of individual cities into "clusters" based on some distance measure. In this case, the distance measure is based on the centroid method. While Ward's hierarchical method has been popularly applied elsewhere in studies on cities, it was found that the centroid method was more satisfactory because of significant outliers and differences in cluster size in this data (Everitt 1993).

Relatively good data may be found for five descriptors of the stock markets for 1980, 1990, and 1998: market capitalization, value of shares traded, number of shares traded, number of companies (foreign and domestic) listed, and dividend yield (Table 1). Other descriptors such as market and share concentrations do not exist for many cities in 1980 and 1990. Furthermore, the number of world cities that host stock exchanges is not very large. Unless sample size is relatively large relative to the number of variables, interpre-

TABLE 1. LIST OF VARIABLES.

Variables	Units
Market capitalization (average annual, domestic, and foreign)	Constant 1999 US\$ millions
Number of listed companies (domestic and foreign)	—
Number of shares traded (domestic and foreign)	Annual figures
Value of shares traded (annual, domestic, and foreign)	Constant 1999 US\$ millions
Dividend yield	%

tation of statistics generated from the cluster analysis will be unstable. A ratio of 20 is generally recommended for a tractable set of interpretations which in this case works out to roughly two variables, namely, market capitalization and value of shares traded. Both variables are important indicators of the size of the securities market in WFCCs. Size is important because it determines the productivity of financial markets (Budd 1995). The potential inclusion of the remaining three variables was also explored; however, the eigenvalues revealed that market capitalization and value of shares traded accounted for over 95 percent of the total variance.³

Results of Cluster Analysis. To identify clusters of cities, changes in the agglomeration coefficient (Everitt 1993) were searched for, and the cubic clustering criterion (CCC) (Sarle 1983) was examined. Marked increases in the agglomeration coefficient typically indicate the delineation of clusters, which in turn indicates a large increase in total variance. Similarly, local peaks under CCC suggest cluster formation. The results were further corroborated against tree diagrams or dendrograms that are typically generated from programs (e.g., SAS) on hierarchical cluster analysis.

Figure 1 shows that three clusters of WFCCs may be found in 1980. New York and Tokyo appear to dominate the international capital market forming a distinct cluster of their own (see also Short et al. 1996). The U.S.'s money market is the largest in the world while the U.S. dollar is the most preferred currency for international transactions. New York's dominance may also be explained by the size of its domestic market and the city's

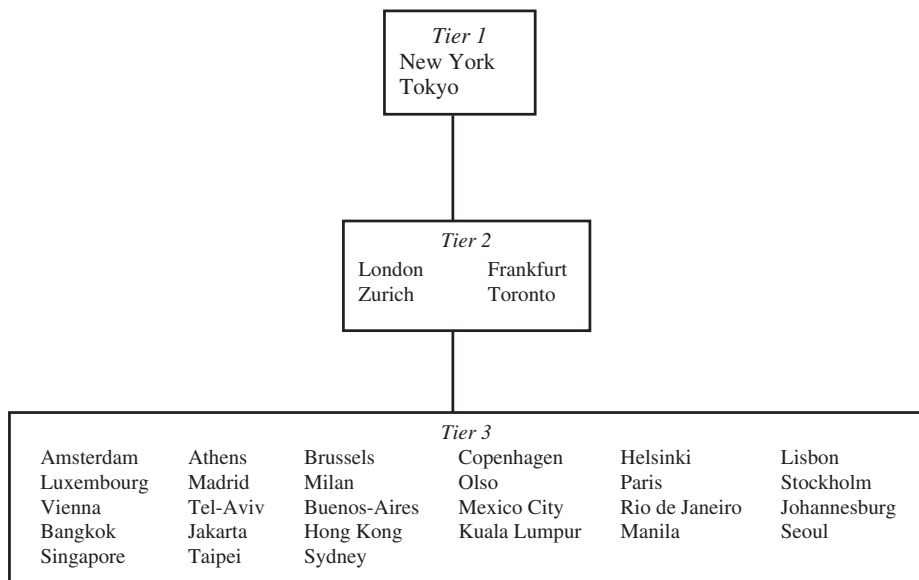


FIGURE 1. WORLD FINANCIAL AND CAPITAL CENTERS 1980.

Source: World Stock Exchange Fact Book 2000.

location as the preferred base for multinational corporate activities in the country, the latter of which have in turn attracted a large number of investment banks that perform the underwriting of securities in the primary market, or act as brokers for customers in the secondary market. In Tokyo's case, the city may be one of eight markets that exist in Japan. However, Tokyo's securities exchange also handles over 80 percent of Japan's trading volume. Unlike its U.S. counterpart, Tokyo's emergence is fairly recent, occurring only after 1970 when it began to issue yen-denominated bonds. Tokyo's rise may be explained by a steady liberalization process of its domestic financial markets beginning in 1974. Until then, no Japanese security firm could purchase foreign securities. Likewise, no foreign firm could purchase a Japanese financial asset. To manage a rising yen, Japanese institutions were permitted to purchase foreign securities in 1978. This, and the relaxation of the Foreign Exchange and Foreign Trade control, resulted in a marked rise in short term capital movements. At the same time, the yen became increasingly internationalized while controls on foreigners' portfolio investments in Japan were largely abolished (Gultekin et al. 1989; Lincoln 1998).

Below New York and Tokyo lies a second cluster consisting of the cities of London, Frankfurt, Toronto, and Zurich. All other WFCCs form the third and final cluster. Figure 1 reveals a relatively shallow international capital market system in the sense that a large number of smaller WFCCs, from Amsterdam and Paris in Europe to Singapore and Hong Kong in Asia, appear to be relatively indistinguishable, creating a broad-based hierarchy for 1980. While London's historical stature as an international financial center is well-documented, it failed to make it to the tier 1 cluster comprising New York and Tokyo. Part of the explanation lies in the existence of capital controls in the period before 1980 in Britain. These controls were only abandoned in 1979 with the abolition of exchange controls, followed by the "Big Bang" in 1986. Hence before 1979, investors in Britain were restricted to the investment dollar market for their foreign investment activities. With the relaxation of exchange controls, investors now have unrestricted access to the foreign exchange market in London for their outward portfolio investment (Eng et al. 1995). Similarly, the Big Bang created London's International Stock Exchange while ending fixed commissions and the monopoly of stock transactions by brokers and jobbers. London's Big Bang was followed by a series of liberalizations including the repeal of several EU tax initiatives. These liberalizations, as will be seen below, had a certain degree of success in restoring and reinstating London's historical stature as a global capital center in subsequent years.

Alongside London, the three cities of Toronto, Frankfurt, and Zurich are also important WFCCs. Frankfurt's position, not unlike Tokyo's, has been aided by the increasing dominance of Germany in world trade and investment, while in Zurich, traditionally an important financial and banking center, leading Swiss banks hold and manage large blocks of shares listed on the city's stock exchange (Rybczynski 1994). Toronto's importance, on the other hand, is derived from its hinterland's vast natural resources and minerals as well as large blocks of shares (particularly in oil, mining, and agriculture) that are held by American firms.

Turning to 1990, a rather different picture emerges altogether (Figure 2). London is now assigned alongside New York and Tokyo to tier 1, while second tier Frankfurt and Toronto are joined by Paris and Taipei, with Zurich being assigned to a lower tier. Indeed the WFCC hierarchy appears to have deepened as tier 3 cities in 1980 split into two separate groups in 1990. It would seem that by this stage, capital markets in WFCCs such as Singapore, Hong Kong, Amsterdam, Sydney, and Brussels, have grown rapidly, placing them ahead of their counterparts like Athens, Helsinki, Buenos Aires, and others. Meanwhile, Taipei has become a major second tier capital center—a result of Taiwan’s role as a new net supplier of funds—while over 90 percent of all trading in listed securities in France is now conducted out of Paris (Lloyd 1991). 1990 thus saw the emergence of the Big-3 in the global system of WFCCs, supported by three lower tiers of cities.

The emergence of the Big-3 suggests that as the capital market expands globally, it is characterized by a simultaneous process of centrifugalization and spatial differentiation, which in turn promotes a deepening of the WFCC hierarchy. This is further seen in 1998.

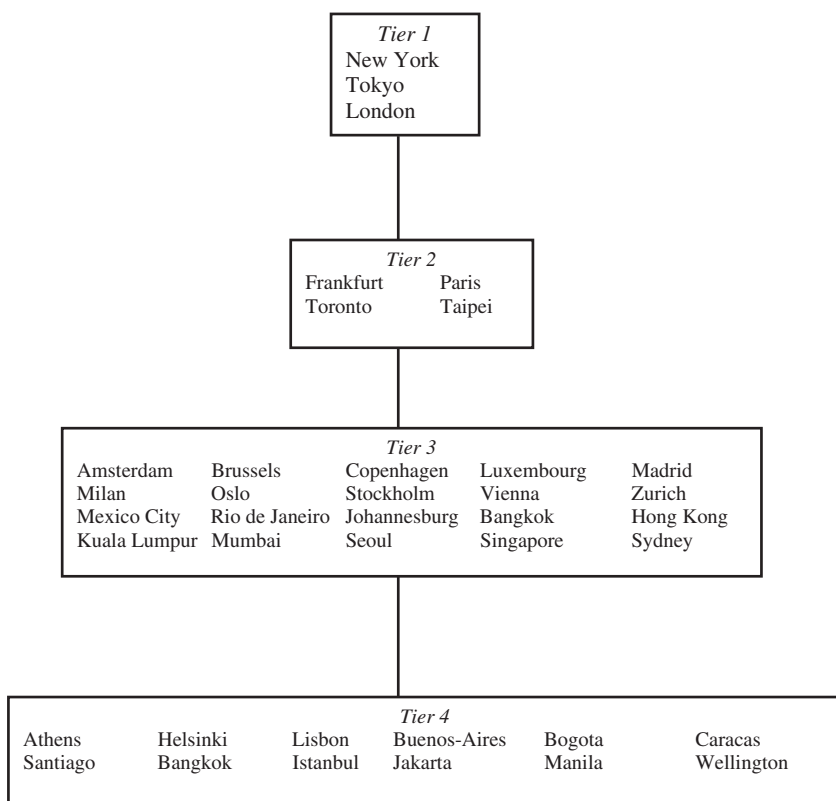


FIGURE 2. WORLD FINANCIAL AND CAPITAL CENTERS 1990.

Centralization through hierarchical tendencies among the cities, for instance, increased markedly by 1998 in the top tiers (Figure 3), with the cluster analysis identifying some seven groups of cities for the year. Increased hierarchical tendencies were also paralleled by fragmentation and differentiation among top tier clusters, with New York and London breaking away from Tokyo. Tokyo is now in a separate cluster with Frankfurt, indicating

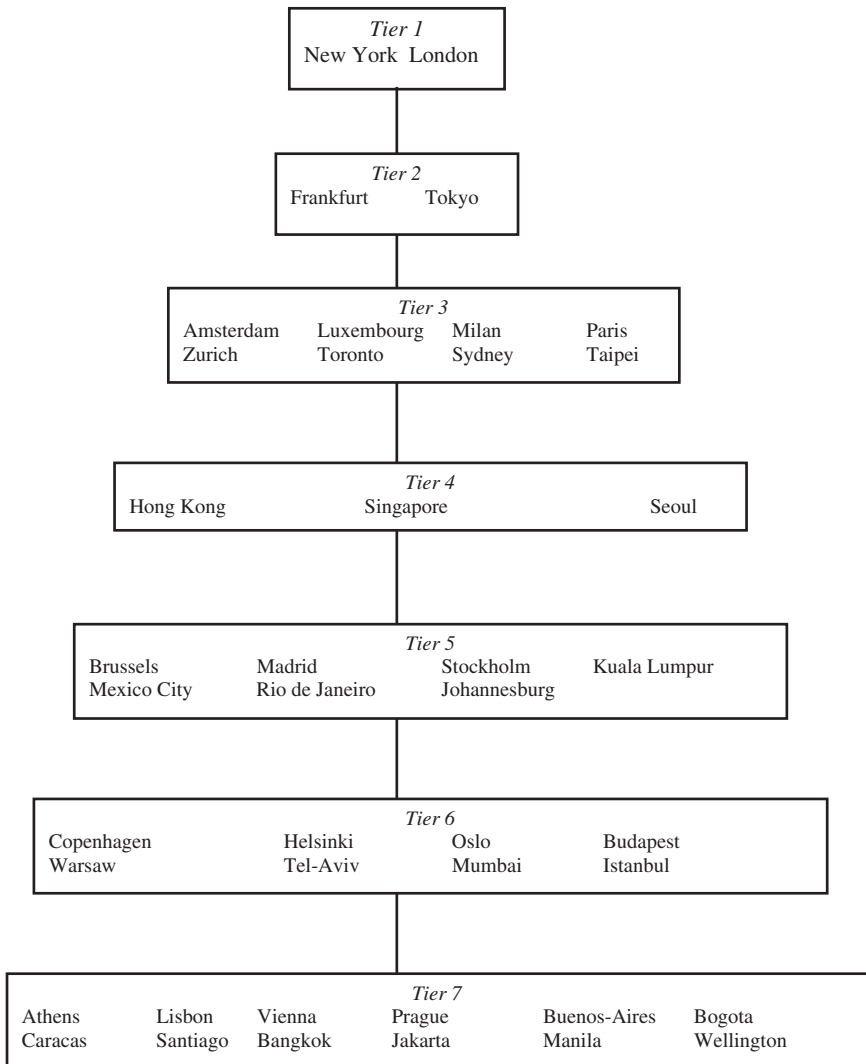


FIGURE 3. WORLD FINANCIAL AND CAPITAL CENTERS 1998.

that Frankfurt has consolidated its position among cities in continental Europe, while Tokyo's previous dominance over London in 1980 appears to be evaporating.

London's reinstatement as a first tier city largely parallels its consolidation of regional dominance in Europe in the 1990s as a center of international bonds and foreign exchange. Regional access to the city from Europe is much less, requiring between one to two hours by air, compared to Tokyo where travel can take up to six hours between the city and other regional capitals. The city of London also benefits from a spatial concentration of financially related firms and activities. For example, an abundant supply of requisite professional services like legal and accounting services and other interrelated activities (e.g., mortgage-based securities) has provided important support to the financial industry (Beaverstock 1996; Beaverstock et al. 1999), creating what Pryke and Lee (1995) have called "thick market externalities."

Fragmentation, too, is found among middle tier cities. Hong Kong, Singapore, and Seoul are increasingly distinguished from cities like Brussels, Madrid, Stockholm, Kuala Lumpur, Mexico City, Rio de Janeiro, and Johannesburg. However, they still trail major WFCCs like Amsterdam, Zurich, Toronto, Taipei, Sydney, and Paris. Such a trend points to the consolidation and strengthening of regional positions among some non Big-3 WFCCs, indicating that the spatial division of labor has also intensified. While a more refined division of labor may have resulted from increased global financial integration and potential convergence among WFCCs, the analysis also indicates that the success of the upper tier cities depends on the peripheralization of the bottom tier cities. In comparing Figures 1, 2, and 3, for example, WFCCs like Athens, Caracas, Santiago, Bangkok, Jakarta, Manila, Bogota, Buenos Aires, and Lisbon have not been able to strengthen their position from 1980, compared to the cities of Hong Kong, Singapore, and Seoul. The success of the latter reflects their recent accumulation of industrial and economic wealth, although cities in the former group also constitute recent emerging markets with much shorter histories of financial liberalization. Nevertheless, Figure 3 shows that some cities have been more successful in repositioning themselves more favorably than others in the global equity markets.

Figures 1 to 3 point to a trend of greater concentration of capital among a few mega world cities, namely the Big-3 and increasingly, Frankfurt as well. In Frankfurt's case, Germany's financial markets were highly regulated up to the 1980s. A series of financial liberalizations have since taken place, beginning with the abolition of taxation on exchange turnovers in 1991. The introduction of the electronic trading system, XETRA, and the German new market index (NEMAX), the latter of which is traded exclusively in Frankfurt rather than exchanges in other German cities, all contributed to a marked increase in market capitalization and turnover in the 1990s (Bordlein 2002).

At the same time, increased concentration at the top of the global urban system has also seen the diffusion of capital down the hierarchy thereby creating an important group of world regional centers in middle tiers. New York is the only city that consistently presides over the hierarchy. Warf (2000) notes that New York's preeminent position in global finance is sustained by its ability to move large amounts of money and information rapidly

through innovative use of a sophisticated international telecommunications network. Further, the New York stock exchange (NYSE) relies on considerable spatial stability in the city's financial district, at least in the period examined, as this encourages integration between information technology and financial transactions (Longcore and Rees 1996). Domestically, unlike Frankfurt where federalist politics have resulted in greater regional competition among Germany's financial centers (Bordlein 2002), NYSE has remained largely the U.S.'s exchange monopoly, driven in part by the presence of a number of institutional investors, a concentration of firms that are engaged in the production of investment strategies, innovations in equity products, and the development of new derivative assets. A more liquid and computerized exchange in the form of NASDAQ has not diminished NYSE's size either even though trading volume in NASDAQ has exceeded that of NYSE's in some years during the 1990s. However, NASDAQ also remains the preferred market for smaller, often technology-oriented firms compared to NYSE (Corwin and Harris 2001).

Tokyo appears to be losing some ground to London, the latter of which now has the largest foreign exchange (forex) market in the world and the oldest and most sophisticated money market. Indeed, since the deregulation that took place in the 1980s, London's forex volume has grown to nearly twice that of New York's and three times that of Tokyo's. The Japanese financial system is also configured rather differently from that of the U.S. Historically, a sizeable proportion of capital was tied to land and real estate transactions up to 1997 when the country and the rest of Asia experienced a crisis in the financial sector that spread to other sectors as well. Corporations also depend much more on banks as their primary source of capital. The weaknesses of these two factors became apparent during the 1997 Asian financial crisis. As the yen rose in the 1990s, this did not result in price inflation. Instead, Japan experienced asset inflation. This in turn created considerable speculation on the stock market. When the financial crisis hit the Asian region, Japan's financial markets suffered important losses arising from decreased asset value among many firms whose loans also quickly became non-performing. This, and the marked fall in real estate prices, had a significant adverse effect on the country's capital markets (Lincoln 1998). Its fourth largest securities house, Yamaichi Securities, for instance, went into liquidation in 1997. Meanwhile, deregulation in other Asian WFCCs like Hong Kong and Singapore has seen greater competition among the WFCCs in the Asia Pacific, arising from the relocation of many securities firms to these cities.

Functional classification of clusters according to size thus indicates a deepening of the WFCC hierarchy. However, while the analysis has shed light on the changing spatial organization of WFCCs, capital markets among the cities are not necessarily constituted in a uniform manner (Markusen and Gwiasda 1994; Budd 1995; Hill and Kim 2000). Rather, the integration of global finance through a hierarchical network of WFCCs has been facilitated by a deepening in the spatial division of labor in the financial sector. Hence striking features of WFCCs are their systematic differences rather than similarities in capital markets, and the increased ability among a few cities to reposition themselves favorably in the global financial network by exploiting and constructing comparative advantages on the global marketplace.

To understand some of these differences, we turn to analysis of variance (anova) (Table 2). The number of clusters was compressed from seven to five in order to satisfy tests of homogeneity and to remedy small cell problems. Hence New York, London, Tokyo, and Frankfurt were grouped into the same cluster (tier 1). Similarly, tier 4 cities (Hong Kong, Singapore, and Seoul) were collapsed with those in tier 5 (Brussels, Madrid, Stockholm, Kuala Lumpur, Mexico City, Rio de Janeiro, and Johannesburg) to form tier 3. This implies that cities in tiers 6 and 7 in Figure 3 have now been regrouped as tiers 4 and 5 respectively. Analysis of variance on the five groups of cities was performed for the following variables: market concentration, trading value concentration, company size, dividend yield, and risk rating.

Market and trading value concentrations are important because they provide an indication of the number of companies and stocks that dominate the capital market in question. In Amsterdam for example, much of the trading in shares covers just one company and stock: namely, the Royal Dutch Petroleum, suggesting that despite its WFCC status, the city's capital market is relatively underdeveloped. In contrast, market and trading value concentrations in London and New York show a broader and more democratic spread among several companies and stocks, indicating the greater depth of capital markets in the two cities. These distinctions are important as they shed light on why top tier cities may be in a class of their own. Risk rating has also been included because it provides an important indication of the investment climate in the cities in terms of entry and exit restrictions as well as levels of transparency, all of which facilitate or inhibit transactions in the capital markets. The closer the rating is to 100, the lower the risks associated with portfolio investment in the country. Risk rating here is provided by the World Bank which based the index on twenty-two components of risks.

The anova results in Table 2 reveal a striking pattern: tier 1 cities, comprising New York, London, Tokyo, and Frankfurt, are consistently distinguished from the lower four tiers in terms of (1) lower market concentration, (2) larger average company size, (3) lower trading value concentration, and (4) lower risk rating. Lower risks are also associated with second tier cities where the average mean of 82 is not that different from the rating of 90 among the first tier cities. Other than this, the means are generally markedly different for many variables describing tier 1 cities, and confirmed by the Duncan test. No significant differences, on the other hand, may be found for dividend yield. It would seem from Table 2 that capital markets of mega-WFCCs are much less concentrated among a few companies and stocks. While lower tier cities like Hong Kong are widely regarded as important financial cities, Hong Kong's capital market is also overwhelmingly dominated by ten companies (68 percent) suggesting a much shallower capital market.

Other differences among WFCCs are also presented in Tables 3 and 4. In Table 3, the distribution of debt issuance is shown for 1998 and 1999. Developed countries are responsible for nearly 85 percent of total net issues, most of which are in the form of bonds and notes. Financial institutions are the major actors although the share of corporate issuers increased by some 8 percent, from 21 to 29 percent, from 1998 to 1999. New York's preeminence is derived from the U.S.'s dominance in international debt securities, both

TABLE 2. ANALYSIS OF VARIANCE RESULTS FOR CITY CLUSTERS AND TIERS, 1998.

Descriptors of stock market	City clusters/tiers					Difference in means ¹	F statistic ²
	Tier 1 (mean)	Tier 2 (mean)	Tier 3 (mean)	Tier 4 (mean)	Tier 5 (mean)		
Market concentration (% share of top ten companies)	21.2	42.4	47.6	57.5	59.9	Tier 1 > tiers 2 to 5	3.03**
Company size (\$1999)	1902.2	804.9	689.9	348.6	195.8	Tier 1 > tiers 2 to 5	5.97***
Dividend yield (%)	1.63	2.19	3.2	2.0	2.5	No difference	0.96
Trading value concentration (% share of top ten stocks)	22.0	51.7	57.2	63.8	65.0	Tiers 2 to 5 > tier 1	4.06***
Risk rating (100 = no risk)	89.9	81.8	63.9	63.7	55.2	Tiers 1 and 2 > tiers 3 to 5	4.55***

¹ Based on the Duncan test.

² F statistics are based on type III sums of squares.

Sources: *World Stock Exchange Fact Book*, 2000; *World Development Indicators* 2000.

TABLE 3. MAIN FEATURES OF NET ISSUANCE IN INTERNATIONAL DEBT SECURITIES MARKETS.

	1998 Billions \$	Share	1999 Billions \$	Share
Total net issues	681.5		1225.2	
Money market	9.8	1.5	68.6	5.6
Bonds and notes	671.1	98.5	1156.5	94.4
Geographical distribution				
Developed countries	575.3	84.4	1149.3	93.8
Offshore centers	10.0	1.5	15.7	1.3
Other countries	40.2	5.9	35.5	2.9
International institutions	56.0	8.2	24.7	2.0
Issuers				
Financial institutions	370.0	59.2	658.9	54.9
Corporate issuers	133.2	21.3	352.7	29.4
Central government	35.6	5.7	37.6	3.1
State agencies and others	86.7	13.8	151.2	12.6

Source: Bank for International Settlements Quarterly Review: International Banking and Financial Market Developments, June 2000, Bank for International Settlements.

in terms of its financial and corporate institutions as well as its government and state agencies. Beyond the U.S., the picture is a little more complex. Corporate issuers are important for the United Kingdom (U.K.) as well as France and Germany, but not for Japan. Rather, the major issuers in Japan are its financial institutions. Indeed Tokyo's distinct political economy has led some scholars to argue that the city does not fit the world or global city hypothesis. Unlike London or New York, the city is much more producer- than service-oriented, and its international stature is derived more from Japanese corporations' ability to generate sales from abroad than the city's ability to attract global investment (Hill and Kim 2000). Its capital markets are characterized by substantial cross-ownership between keiretsu-like companies where a network of relationships between lenders and borrowers is held together by a "main bank." Further, share ownership is dominated by financial rather than corporate institutions. This last point will be further elaborated below.

Financial institutions also play an important role in the issues of debt securities in Germany and France. Like Japan, businesses are traditionally financed by bank credits. There is no distinction between commercial and investment banks in Germany for example, nor are American-styled public stock brokerages found. Furthermore, there are

TABLE 4. OWNERSHIP OF INVESTORS, 1996.

Ownership	New York	London	Tokyo	Frankfurt ¹	Taipei	Sydney	Milan ¹
Industrial/commercial companies	—	1.4	27.2	42.4	18.4	11.3	12.9
Banks	2.3	0.5	41.1	9.7	4.5	3.2	
Mutual funds/investment trusts/other funds	14.8	10.1	2.2	4.2	1.7	—	12.9
Pension/insurance	28.6	48.1	—	4.8	—	24.9	—
Individuals/households/ non-profit organization	47.7	20.7	19.2	16.8	56.5	23.0	15.5
Foreign	6.1	15.9	10.2	16.6	8.7	31.7	14.4
Government/public sector	—	0.1	0.3	5.5	6.0	0.1	40.7

All figures are based on distribution of domestic market value except for Milan and Hong Kong which are based on total trading value.

¹ Figures are for 1992.

Source: *World Stock Exchange Fact Book*, 2000; *World Development Indicators* 2000.

no restrictions on bank activities in securities trading unlike the U.S. The dominance of financial institutions as issuers of securities (“universal banks”) may be explained by the fact that German investors and corporations tend to favor low risk assets like bank bonds or fixed interest bank loans (Bordlein 2002). In the case of state and government issuers, U.S. tops the list of countries because of its highly valued treasury bonds. In contrast, state and government agencies are unimportant issuers for the U.K., Hong Kong, and Australia.

Finally, investor ownership patterns of seven cities are further described in Table 4. No comparable data may be found for other major WFCCs such as Hong Kong, Paris, or Amsterdam. Table 4 again shows striking differences in the nature of capital markets among the cities. Equity investment in New York is predominantly in the hands of individuals and households. This is also true for Taipei. In contrast, pension funds and insurance companies are major investors in London’s market. Table 4 also confirms the importance of banks as major holders of shares in Tokyo, and industries in the case of Frankfurt. In Milan, concentration of trading is among a few firms while government-owned companies hold vast amounts of securities, hence the high level of share ownership among government agencies. In contrast, Sydney’s market is characterized by significant foreign ownership. That the cities’ ownership patterns are so strikingly different reflects national political economies such as the influence of the state in Italy and Japan, the importance of universal banks in Germany and Switzerland, and the role of stock brokerages in the U.S.

Conclusion

Many commentators agree that national cities that are also internationally or globally oriented have a substantial financial sector in their urban economies. Competition between world cities has intensified as financial capital emerges as a key component in the global economy, and as cities jostle for a prominent place in the world’s matrix of economic exchanges and flows.

On the global arena, Tokyo, London, and New York are battling to be the premier center of global finance. In Europe, deregulation has quickened, with several cities attempting to emulate London’s 1986 Big Bang. Frankfurt, for example, has undertaken significant reforms in a bid to out-compete Paris in continental Europe (Fischer 1997). Innovations and derivative markets are becoming less and less the monopoly of London, while the deutschmark is now a key European currency. Meanwhile, Vienna is aiming to be the financial center for Central and Eastern European companies (Haddock 1999).

Similarly in Asia, governments have initiated regulatory changes that favor more efficient capital markets. Japan’s Big Bang in 1998 proposes to remove limitations on entry into the securities and banking business, and to liberalize fees and commissions that are collected by brokers. The government has also revised its foreign exchange law to allow freer trading of foreign currencies. Meanwhile, Singapore is building a critical mass of skilled financial workers by wooing investment bankers and fund managers to the city. In

all of the cases, the major objective is to try and stem the flow of activities migrating to other world financial centers (Walter 1998).

This paper has examined the spatial evolution of world cities as centers of capital from 1980 to 1998. The analysis indicates that over the period examined, WFCCs are interconnected via a system of vertical relationships that deepened significantly over time. In 1980, only three vertical layers or tiers of cities may be identified. This increased to seven by 1998. Two major trends describe the increased hierarchical tendencies and differentiation among the cities. First, London emerged over Tokyo during this period to share the premier position with New York. While Tokyo remains a top-league capital center, impacts of the 1998 reforms are yet to be seen. Second, intensified competition and industrial development among middle to lower tier cities have resulted in greater spatial differentiation, with some cities becoming more peripheralized than others.

Capital markets in top tier cities like London, Tokyo, Frankfurt, and New York are also less concentrated among a few companies, and trading of stocks is spread over a larger number of corporations and companies. Tokyo and Frankfurt's markets tend to be driven by coalitions in the form of banking and industrial groups, while New York's market is predominantly in the hands of individuals and households. A significant proportion of Sydney's market is foreign-owned, while government and state agencies dominate in the case of Milan. London's market, on the other hand, reflects the influence of institutional investors. The analysis would seem to indicate that cities are exploiting comparative advantages that support the trend of increased spatial hierarchical tendencies and differentiation.

Two issues, however, remain. First, the financial upheavals of the late 1990s have brought into question whether the liberal market model of financial activities is tenable in the long run. Clark (1997) contends that such a model focuses overwhelmingly on increasing financial transactions at the expense of governance of financial agents, including that of trading standards. Cities that recognize and respond to systematic weaknesses underlying poor financial practices and governance among financial institutions will likely challenge present patterns of the global hierarchy. Beaverstock and his colleagues (2000) further suggest that as cities develop denser networks of financial relations between them, this requires a de-centered as opposed to a hierarchical conceptualization of financial cities. Second, the paper has focused on the size of capital markets in tracing the spatial evolution of WFCCs. Using this function to define WFCCs, notable cities like Singapore and Hong Kong do not compare favorably with many European cities because of their small national economies. Yet the two cities are major and important financial entrepôts in Asia, and host more Multinational Corporations (MNCs) than some higher tier European cities. But as Knox (1995) has pointed out, understanding of the spatial structure of world cities depends on the function used, and according to Sassen (2001), production of financial services is a central function in these cities. In broadening the scope of global finance to the exchange markets, this paper has sought to address Reed's (1981) complaint some twenty years ago that bank activities provide only a partial understanding of how centers of finance and capital operate.

APPENDIX 1. LIST OF CITIES.

Amsterdam	Johannesburg	Sao Paolo
Athens	Kuala Lumpur	Santiago
Bangkok	Lisbon	Singapore
Barcelona	London	Stockholm
Bogota	Luxembourg	Sydney
Brussels	Madrid	Taipei
Budapest	Manila	Tel-Aviv
Buenos Aires	Mexico City	Tokyo
Caracas	Milan	Toronto
Copenhagen	Montreal	Vienna
Frankfurt	Mumbai	Warsaw
Helsinki	New York	Wellington
Hong Kong	Oslo	Zurich
Istanbul	Paris	
Jakarta	Prague	

NOTES

1. Despite widespread use of "world city" to describe a global system of cities, the concept is by no means unambiguous nor uncontested (Knox 1995; Markusen 1999; Hill and Kim 2000; Yeoh 1999). In this paper, the notion of world cities is useful to the extent that it helps identify the population of world and capital centers. This follows from Sassen's (2001) argument that no city can achieve international or global status unless it has a significant financial sector in its regional or metropolitan economy.
2. In most parts of the world, usually one city dominates in finance and the national capital market. This is true even for the U.S. where New York presides over more specialized cities like Chicago. But in rare instances like Canada, both Montreal and Toronto tend to share important primary functions partly because of the development of distinct regional hinterlands. Competition, too, exists between Sydney and Melbourne. However, Sydney also has a much stronger producer service sector while the metropolitan economy of Melbourne is relatively oriented to industrial production.
3. A common procedure for verifying the appropriateness of variables used here is the discriminant analysis (see Reed 1981; Hill et al. 1998). Given the relatively small number of observations relative to the number of variables (five), interpretation of the discriminant function-variable correlations as well as standardized coefficients is unstable and should therefore be done cautiously. Nevertheless, the results do point to the importance of market capitalization and value of shares traded as a distinct discriminant function *viz* the other three variables.

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