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SPATIAL CONCENTRATION IN THE FINANCIAL INDUSTRY

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ABSTRACT

This paper investigates factors that determine the spatial concentration in the financial industry. Why does the financial industry have such a high spatial concentration? The theoretical framework is based on theories from regional economics, with a focus on agglomeration effects, externalities, and the regional clustering of an industry. The positive agglomeration effects arise from access to i) specialized labor, ii) specialized suppliers, and iii) knowledge dispersion (Marshall 1920). Jacobs (1961, 1969) contributes to a discussion of the role of cities (urban economies) in terms of innovations and entrepreneurship.

The high degree of spatial concentration in the financial sector emphasizes the importance of local embeddedness, networks, face-to-face communication, knowledge spillovers, and spatial proximity for the organization of the financial industry. These factors accentuate the importance of local knowledge and the dispersion of knowledge, factors that have been thoroughly discussed and analyzed in the field of Austrian economics. Therefore, an Austrian view is included to examine the role of knowledge in the spatial concentration of financial centers. Scholars such as Hayek (1937; 1945) and Lachmann (1978 [1956]) contribute to understanding the use of knowledge in society.

Keywords: Spatial Concentration, Financial Industries, Knowledge, Information, Face-to-face communication.

JEL-Codes: B26, B53, D53.

INTRODUCTION

During the last two decades, the world has experienced increasing financial globalization, generating higher levels of industry consolidation and integration (Amel et al., 2004). The financial sector is characterized both by globalization and by spatial relationships and local embeddedness (Agnes, 2000). In 2009, the ten largest stock exchanges in the world accounted for 86 percent of the total value of shares traded (World Federation of Exchanges). This spatial concentration of the financial sector can also be seen in the Global Finance Centres Index (GFCI). The index indicates that London and New York are the two most important financial centers,¹ followed by Hong Kong, Singapore, and Zurich. A similar spatial concentration of the financial sector is evident on the national level.

Another important development is the role of information and communication technology (ICT). The financial industry is completely dependent on ICT platforms and digital networks for its communication. In many instances, ICT development has had centrifugal effects on the location of firms and households. However, the industry's increasing spatial concentration shows that the effect has been different in the financial industry. Sophisticated ICT platforms make it possible to disseminate information worldwide in (almost) real time. In addition, increasing regulatory demands have forced firms to disclose detailed, regular, and dependable information; the amount of available information relevant to the financial industry has for this reason sky-rocketed in the last decade. The financial industry faces more opaque institutional structures and heavier governmental regulation than at any time in the past (Levine, 2004). The opaque institutional framework and government regulation are two more explanatory factors in the analysis of regional concentration in the financial industry.

Based on these observations, I investigate factors that determine the level of spatial concentration in the financial industry. Why does the financial industry have such a high level

of spatial concentration? The theoretical framework is based on theories from regional economics, with a focus on agglomeration effects, externalities, and the regional clustering of industry. The positive agglomeration effects arise from access to i) specialized labor, ii) specialized suppliers, and iii) knowledge dispersion (Marshall, 1920). Jane Jacobs (1961; 1969) contributes to a discussion of the role of cities (urban economies) in terms of innovations and entrepreneurship. Jacobs (1969) argues that diversified urban economies are the best environments for innovative and entrepreneurial behavior. A similar argument can be found in Audretsch (1998), Malmberg and Maskell (2002), and Storper and Venables (2004). These studies show that the role of knowledge can explain why innovative activities benefit from co-location, which enhances the positive agglomeration effects for firms located in the same region.

The high degree of spatial concentration in the financial sector illustrates the importance of local embeddedness, networks, face-to-face communication, knowledge spillovers, and spatial proximity for the organization of the industry. These factors highlight the importance of local knowledge and the dispersion of knowledge—factors that have been thoroughly discussed and analyzed in the field of Austrian economics. Therefore, an Austrian view is included to examine the role of knowledge in the spatial concentration of financial centers. Economists such as Friedrich Hayek (1937; 1945) and Ludwig Lachmann (1956) contribute to our understanding of the economic role of knowledge.

Following Storper and Venables (2004), the concept of knowledge can be divided into two groups; i) specialized/private knowledge and ii) ubiquitous/transparent knowledge. In turn, specialized/private knowledge can be divided into two sub-categories; ia) tacit and ib) codified. This analysis focuses on the role of private knowledge including the sub-categories tacit and codified knowledge, respectively. The categorization is in line with Hayek's (1937; 1945) and Michael Polanyi's (1966) approaches.

The rest of this chapter is structured as follows. Section two provides an overview of the characteristics and spatial locations of financial industries and centers. I discuss the causes of the spatial concentration of the financial sector, followed in section three by a discussion of why the financial sector is more spatially concentrated than most other sectors. This section also provides a theoretical framework, focusing on agglomeration economies and the importance of knowledge flows. The framework is based on spatial economics, new economic geography and Austrian economics. Section four discusses the Hayekian knowledge problem and the role of tacit knowledge. The final section applies these concepts to the financial industry.

FINANCIAL CENTERS

The level of financial development is a key factor influencing long-term economic growth. A high level of financial development allows for the effective diversification of risk and allocation of capital, which, in the long run, improve the growth prospects of an economy. Schumpeter (1911) was one of the first to highlight the importance of financial development as a determinant of economic growth. Recent empirical work supports this relationship (see Beck and Levine, 2002; Levine, 2004; Mishkin, 2007). For example, Levine (2004) summarizes the empirical evidence on financial development and economic growth and states that “the level of financial development is a good predictor of future rates of economic growth, capital accumulation and technological change” (Levine, 1997, p.689).² Thus stock and forward markets spread knowledge about market expectations of factors and changes that are important for economic development (Lachmann, 1978).

Generally, a financial center is a city where financial activities are concentrated. Financial service firms only serve customers within the city and in adjacent areas. Despite the

development of information technology during the last decades, contemporary definitions of financial centers have a clear spatial component. For example, Gehrig (2000, p. 416) defines financial centers “as geographical locations with agglomerations of branches and subsidiaries of banks and other financial intermediaries in narrowly defined regions.” It is difficult to define financial centers more precisely, due to the vast diversity of the existing definitions. Kindleberger (1974) is one of the pioneers in research on financial centers. Prior to his research, discussions of banking innovation and financial intermediation or deepening lacked a spatial dimension. Kindleberger defines a financial center in the following way:

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 financial savings between places. Banking and financial centers perform a medium of exchange function and an inter-spatial store-of-value function ... [T]he 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. (Kindleberger, 1974, p. 6)

The hierarchical structure of the financial sector is another important characteristic of financial centers. Reed (1981) identifies five distinctive categories. The first three are centers that serves i) the immediate surroundings, such as the city, the county, and the province, ii) an area larger than the immediate surroundings but smaller than the nation, and iii) the nation. Categories four and five include international dimensions. The fourth category encompasses financial centers that provide national as well as international services to contiguous countries and are often referred to as regional international centers. Finally, in the last group (category

five) we find global financial centers, which serve customers around the globe. Goldberg, Helsley, and Levi (1988, p. 83) summarize the characteristics of international financial centers as “major urban concentrations of financial services with a large portion of those services directed toward international financial transactions. They are also leading domestic centers for financial services in their own countries.”

Using this typology, category five includes London, New York, and Hong Kong—the global centers that coordinate global markets. Category four (regional international centers) includes cities such as Amsterdam, Frankfurt, Luxembourg, Milan, Paris, Sydney, Taipei, Tokyo, Toronto, and Zurich. It is important to note that there is increasing competition between financial centers, mainly because policy-makers aspire to upgrade their national financial center to an international center (see, for example, Latter, 2001 for Hong Kong and Lee, 2001 for Singapore).

Poon (2003) uses cluster analysis to show that the hierarchical structure of the financial centers strengthened between 1980 and 1998. During this period, there was also increasing dominance by London and New York as global financial centers (GFC).³ These two financial centers are still ranked first and second among the 75 largest centers in the world. Hong Kong is ranked as number three and Singapore as number four.

Table 13.1 presents the five key areas of competitiveness (people, business environment, market access, infrastructure, and general competitiveness). The top four centers are strongly competitive in each of the five areas. Sydney and Toronto are among the lowest ranked (within the top ten centers) in all areas.

Table 13.1: The Ten Largest Global Financial Centers

Rank and city	Rating	Sub-indices					
		People	Business environment	Market access	Infrastructure	General competitiveness	
1	London	775	London	London	London	London	London
2	New York	769	New York	New York	New York	New York	New York
3	Hong Kong	759	Hong Kong	Hong Kong	Hong Kong	Hong Kong	Hong Kong
4	Singapore	722	Singapore	Singapore	Singapore	Singapore	Singapore
5	Shanghai	694	Shanghai	Chicago	Shanghai	Tokyo	Tokyo
5	Tokyo	694	Tokyo	Tokyo	Tokyo	Chicago	Shanghai
7	Chicago	673	Chicago	Shanghai	Zurich	Zurich	Chicago
8	Zurich	665	Zurich	Zurich	Chicago	Shanghai	Sydney
9	Geneva	659	Geneva	Toronto	Toronto	Geneva	Zurich
10	Sydney	658	Toronto	Sydney	Sydney	Sydney	Toronto
10	Toronto	658	Sydney	Geneva	Geneva	Toronto	Geneva

Source: Yeandle (2011).

Over the last four years there has been a convergence in ranking among the top three GFCs, and today, there is no significant difference among them in terms of general ranking. It is interesting to note, however, the dominance of London in many sub-sectors: it has 37 percent of the foreign exchange markets and 46 percent of the over-the-counter (OTC) market. In addition, the London Stock Exchange is the largest in the world in the number of listed firms; it also leads several other rankings, such as equity options and electronic trading in global energy markets (Cooper, 2011). Yeandle (2011) reports that London is the highest-ranked GFC in the following industry sectors: asset management; government and regulatory; professional services and wealth management; and private banking. New York is the highest-ranked center in banking and ranks second in asset management; government and regulatory; and professional services and wealth management.

Although the top centers are likely to retain their dominant positions, there is increasing competition, especially from Asia. In the GFCI9 (2010), eight Asian financial cities are listed among the 20 largest centers, compared with only three Asian centers in the GFCI1 (2007). Furthermore, several Asian centers (Shanghai, Seoul, Hong Kong, and Beijing) are ranked highest in a survey of the financial cities that will become more significant in the coming years. These Asian cities are also the most attractive locations for new branches or offices. A breakdown of the GFCI shows that Asian financial centers are in the top three in the industry sectors of asset management (Hong Kong, rank 3), banking (Hong Kong, rank 2), government and regulatory (Singapore, rank 2), insurance (Shanghai, rank 2) and professional services and wealth management (Hong Kong, rank 3) (Yeandle 2011).

FINANCIAL CENTERS AND REGIONAL CONCENTRATION

The contemporary rate of urbanization is the highest in world history, with more than half of the world's population living in cities in 2008 (United Nations Population Fund). Following this rapid urbanization, an extensive body of research on cities has developed (e.g., Jacobs, 1961; 1969; Andersson, 1985; Glaeser, Kolko, and Saiz, 2001; Florida, 2002).

Questions of firm location and regional concentration have been investigated since the late nineteenth century, focusing variously on transportation costs, labor costs, and agglomeration effects. Within this literature, cities are often analyzed as the equilibrium outcome of an ongoing process of centripetal agglomeration forces and centrifugal dispersion forces (Huriot and Thisse, 2000). It was however not until the early 1990s that spatial considerations were included in mainstream economic theories (Fujita, Krugman, and Venables, 1999). Much of the previous negligence was caused by technical difficulties in both

the theoretical and econometric analysis (Krugman, 1998a; 1998b). Theories of city formation and their role in economic development can also be found in the research of, among many others, Jacobs (1969; 1984) and Florida (2002). Both authors argue that cities are centers where innovations are stimulated and that this tendency leads to economic growth on the national level in the long run. Jacobs (1984) even argues that the causation runs from economic productivity in cities to national economic growth, not the other way around.

Cities—a Jacobsian approach

Jacobs defines a city as “a settlement that consistently generates its economic growth from its own local economy” (Jacobs, 1969, p. 262). In line with the Austrian approach, Jacobs defines the development of cities as a spontaneous order where the process is “self-ordering, self-sustaining, and self-regulating” (Ikeda, 2004, p. 253). In particular, Jacobs (1969, p. 122) contends that “[c]ities are settlements where much new work is added to older work and that this new work multiplies and diversifies a city’s division of labor.”

Jacobs’s (1961; 1969) analysis is based on the idea that interacting people are the promoters of cities and, in the long run, of economic prosperity. The interactions take place on the streets, in public places and in other arenas where people meet on a daily basis; these interactions form the building blocks of social order and development. Cities are vital to economic life because they are the primary arenas for its development and expansion—a process fueled by two forms of energy: innovation and import replacement. Innovations are essentially human insights whereas import replacements represent a society’s capability to adapt imitations. Jacobs (1984, p. 193) describes the benefits of cities by noting that “the usefulness of cities is that they supply contexts in which those inputs—insights and adaptations—can be successfully injected into everyday economic life.” Jacobs’s use of a

methodologically individualist approach has many similarities with Austrian economics in that both believe that economic prosperity and development are generated by the interactions between individuals (Ikeda, 2004).

Knowledge spillovers (human capital externalities) generate entrepreneurship, innovation, and creativity—important factors that drive economic growth. Open and diverse cities attract individuals with diverse backgrounds, fostering entrepreneurship and innovations in the process. According to Kirznerian theory entrepreneurship is, in essence, about “alertness”: “a tendency for an individual to discover what would be profitable to him/her if he/she were to discover it” (Sautet, 2000, p. 60). However, there is no spatial dimension in Kirzner’s theory (1973) of entrepreneurship, and Andersson (2005) argues that the theory is incomplete without this dimension. The choice of location is, in itself, an act of entrepreneurship, because different profit opportunities are attributed to different locations. Andersson (2005) further notes that location may affect an individual’s level of alertness; individuals located in “buzz-cities” (see below) have a higher probability of success compared with others. In line with this argument, we should expect the level of entrepreneurship (or the probability of entrepreneurship) to be much higher in London and New York than in other financial centers, since both London and New York provide environments that facilitate and improve alertness.

The inflow of a diverse and specialized workforce also attracts firms to a region, which, in turn, generates a diversified supply of services and commercial facilities to households. Cities facilitate both expected and unexpected meetings at formal, informal, and chance meeting places.⁴ Labor mobility is yet another important source of knowledge spillovers in the financial industry. Agglomerations in the financial industry are associated with diversified labor markets consisting of highly skilled workers; these markets benefit both financial firms and finance professionals. Whereas individuals working in the industry have

access to a large and diversified labor market that is suited to their requirements, firms in the cluster also benefit because they have access to a diversified labor force with industry-specific skills. The higher level of skilled labor increases the nominal wages, which is a real cost for the firms. Figure 13.1 shows how the cumulative process of agglomeration may work.

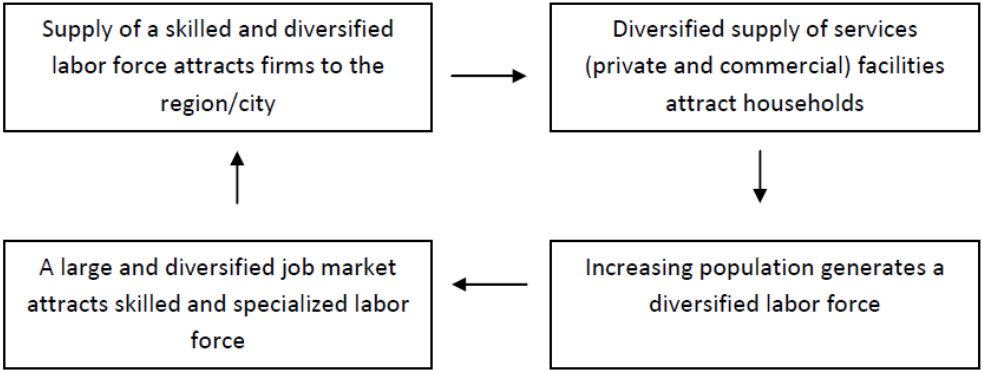


Figure 13.1: The cumulative process of agglomeration

According to the new economic geography (NEG), the positive agglomeration effects that benefit firms are a result of lower trading costs and nominal wages due to being in the proximity of a large market. Individuals benefit from the co-location of firms by having access to a larger and more diverse labor market, to greater product variety and to higher real wages. Costs associated with agglomeration effects are often referred to as congestion costs, which are caused by higher levels of competition (Krugman, 1991; Fujita, 1993; Venables, 1996).

The agglomerative milieu affects both the supply and the demand sides of the agglomeration process. The supply side consists of factors such as the willingness and ability to innovate and become an entrepreneur. The demand side consists of factors such as purchasing power and market size. Given the size of the city (the regional market), one can expect both the demand and supply factors to impact the innovation process positively.

Externalities and agglomeration effects

Jacobs (1969, 1984) presents a dynamic view of cities and argues that cities provide a beneficial environment for interaction between individuals, which, in turn, generates knowledge spillovers, innovations, and economic growth. In the literature on economic growth, externalities—especially knowledge externalities—are viewed as the primary driver of economic development (Romer, 1986; Lucas, 1988). For example, Lucas (1988) highlights the importance of human capital externalities and knowledge spillover effects in promoting positive agglomerative effects and economic growth. Because spatial proximity is important for the transmission of knowledge one should expect stronger positive effects of knowledge spillovers in cities (Glaeser et al., 1992).

Glaeser et al. (1992) discuss three different theories that address technological externalities⁵: i) Marshall-Arrow-Romer (MAR), ii) Porter (1990), and iii) Jacobs (1969). These theories are relevant because they can be used to understand how cities form and why they grow; they are also relevant for understanding clustering in the financial industry. According to the MAR approach, cities grow because industrial concentration enables knowledge spillovers between firms in the same industry. Marshall (1920) uses increasing returns to scale as a prominent determinant of co-location. His analysis distinguishes between external and internal scale economies. Internal scale economies refer to scale effects that arise due to the level of production within a firm, whereas the size of the external market determines the magnitude of external scale economies. That is, firms gain both from internal and external economies of scale when they co-locate in a region. The causes of Marshallian externalities can be summarized in the following way:

(1) mass production (the so-called internal economies that are similar to scale economies ... (2) the formation of a highly specialized labor force and the production of new ideas, both based on the accumulation of human capital and face-to face communications, (3) the availability of specialized input services, and (4) the existence of modern infrastructures. (Fujita and Thisse, 2000, p. 10)

In line with Schumpeter (1942), the MAR approach advocates *local monopoly* instead of *local competition* because local monopoly allows the innovator to internalize externalities. Porter (1990) agrees that growth is stimulated by the geographical concentration of an industry. However, Porter argues that local competition, not local monopolies, fosters economic growth. The third theory (Jacobs, 1969), which focuses on technological externalities, differs from the previous two by arguing that economic growth stems from diversity: the cross-fertilization of different geographically proximate industries that generates innovations and economic growth (Glaeser et al., 1992).

Industrial agglomeration and the role of knowledge

Over the last decades there has been tremendous development in the ICT sector. Together with globalization, the sophisticated digital communication systems that are available today have increased the importance of innovative and knowledge-based activities. These types of activities are also sensitive to distance; hence, new knowledge activities benefit from co-location (Audretsch, 1998).

Malmberg and Maskell (2002) use knowledge as an explanatory variable to elucidate the superior innovative and economic performance of co-located firms. This knowledge-based theory rests on the assumption that agglomeration leads to lower costs by providing i) the

ability to share costs with other firms in the same cluster, ii) access to specialized labor, thus reducing the search costs for specialized skills, and iii) geographical proximity, which lowers the costs of interaction and inter-firm transactions. These mechanisms—related to knowledge and learning flows—occur within the cluster because of geographical proximity. Malmberg and Maskell (ibid.) argue that this exchange takes place through horizontal integration. Horizontally located firms generate knowledge and learning processes that lead to superior economic growth, as compared with single or network firms located at disparate geographical locations. The reason is that geographical proximity leads to superior *observability* and *comparability*.

First, by observing competitors' behavior, firms in adjacent industries can gain new knowledge. This happens more easily for co-located firms because the effort level is much lower compared with firms in disparate locations. Second, geographically co-located firms share the same conditions, opportunities, and threats, which make comparisons among firms more reliable. Various firms' strengths and weakness are more clearly detected when they operate in a similar environment. In other words, the co-location of firms increases the knowledge of how to improve production as well as the incentives to do so. Vertical agglomeration factors relate to the supply of knowledge and learning in the form of skilled and specialized labor and suppliers. These factors generate a greater degree of diversity because firms must diversify their products in order to prevail in the competition with other firms who have products in the same category (Malmberg and Maskell, 2002; Cook et al., 2007).

Tacit knowledge is the underlying cause of both horizontal and vertical agglomeration effects. The co-location of firms enhances the ability to generate and disperse tacit knowledge, a process that explains the superior economic performance among co-located

firms (Gertler, 2003). The concept of tacit knowledge is closely connected to Hayek's analysis of the role of knowledge in society, to which we turn next.

Hayek's knowledge problem and tacit knowledge

Polanyi (1966) distinguishes between codified and tacit knowledge. Whereas codified (or explicit) knowledge can be expressed and communicated through symbols (written language), tacit knowledge is "a personal form of knowledge, which individuals only can obtain from direct experience in a given domain" (Augier and Thanning Vendelø, 1999, p. 254). Tacit knowledge can only be transferred through social interaction, for example through conversation, imitation, and observation. This type of knowledge is difficult to communicate; thus its generation and dissemination benefit significantly from geographical proximity, especially "when such proximity is coupled with contextual homogeneity or 'common culture' that exists in agglomerations" (Cook et al., 2007, p. 1327). In economic geography, tacit knowledge is often discussed in terms of face-to-face contact. For example, Storper and Venables (2004, Table 1) highlight four effects of face-to-face communication (alternatively, tacit knowledge): i) efficient communication, ii) enhanced trust and incentives in relationships, iii) improved screening and socialization, and iv) extra effort and motivation.

The importance of knowledge and its tacit characteristics are discussed thoroughly in Hayek's work. According to Hayek (1945), decentralized knowledge is the fundamental problem for social coordination; knowledge in a society is dispersed among a multitude of individuals. Contrary to the assumptions of modern neoclassical economics, information does not float freely among the members of any society. Information is discontinuous and is never costless. Therefore, the great problem of society is not the allocation of given resources but "the utilization of knowledge not given to anyone in its totality" (Hayek, 1945, p. 520).

To describe the organization of society Hayek uses the word “planning,” by which he means the way that society allocates resources. This allocation involves a complex decision process by multiple interrelated individuals as well as planning decisions that are based on the type of knowledge that—generally speaking—is not transmitted to the planner from its source. Hayek describes this process and its importance for society in the following way:

The various ways in which the knowledge on which people base their plans is communicated to them is the crucial problem for any theory explaining the economic process. And the problem of what is the best way of utilizing knowledge initially dispersed among all the people is at least one of the main problems of economic policy—or of designing an efficient economic system. (Hayek, 1945, p. 520)

In a market economy, “economic planning” is performed by thousands or millions of firms and individuals, whereas in a centrally planned economy, a small group of individuals does most of the planning. The main challenge for a society is to allocate the dispersed knowledge in the best possible way so that the members of the society can proceed with their plans. Hayek (1937; 1945; 1948) argues that a market economy is the system that generates the highest level of wealth. Market prices distill and disseminate local knowledge in a way that benefits individual market participants, each of whom combines their own unique knowledge with the generally available knowledge that the price system conveys (see also Mises, 1922).

Hayek (1945) notes that there are different types of knowledge; some types of knowledge (for example scientific knowledge) are more likely to be found among authorities or special groups of individuals (experts), whereas other types of knowledge are more likely to be dispersed among individuals (tacit knowledge). Hayek especially emphasizes “the knowledge of the particular circumstances of time and place” (Hayek, 1945, p. 521). This

refers to knowledge about people, local conditions, and special circumstances. For example, a specific firm may have knowledge about a more effective production system, or a specific arbitrageur may have knowledge about a particular type of profitable transaction. It is important to note that both the firm and the arbitrageur use their special knowledge of the particularities of unique time-place combinations in their pursuit of profits.

Hayek (1945) further notes that all economic problems arise from change. Therefore, the economic problem of society is the problem of adapting to economic change. The most suitable individual to address this problem is one who is knowledgeable about particular conditions with respect to both time and place. To meet this requirement, Hayek advocates the decentralization of planning, as opposed to a system with top-down planning. A fundamental aspect of agglomeration economies and the creation of cities is the role of *dispersed* knowledge. In the next section, I therefore discuss the role of knowledge flows in the financial sector.

The price system as a mechanism for knowledge dissemination

Hayek (1945, p. 526) views the price system as “a mechanism for communicating information”. In systems where knowledge is dispersed across individuals, prices can act as a coordinating entity. To make adequate decisions, each individual needs knowledge about the state of the art and about changes in the economy so that the individual decisions fit into the larger economic pattern. The fundamental question concerns how knowledge can be spread in a complex system, so that each actor accesses only relevant information that is important for *his or her* planning. This is a fundamental issue because individuals are solely interested in changes in the relative importance of factors that affect *their* planning. The numerical values that are assigned by the price system to commodities and factors of production are exactly the

type of knowledge that is valuable to firms and households. That is, the price system only provides essential information to market participants. In this sense, the price system facilitates “a division of labor but also a coordinated utilization of resources based on an equally divided knowledge” (Hayek, 1945, p. 528).

The price system works to coordinate the expectations and plans of different individuals. This process does not always work smoothly. It can be affected by countervailing forces, such as price inflexibility (or economic inertia), time lags, and interpretation issues. However, if the economy is allowed to develop without political interventions, markets will develop institutions that protect the coordinating forces of the price system. The stock market and forward markets are two such examples (Lachmann, 1956).

The price system and expectations

Implicit in the above discussion about the price system as a “network of communication” is that the knowledge generated by the price system is based on past—rather than future—events. This deficiency is mitigated by forward and stock markets, in which knowledge about individuals’ expectations concerning the future are spread. Whereas the forward market is quite restricted with respect to both traded goods and time intervals, the stock market deals with “continuous futures.” By investing in the stock of a firm, the individual simultaneously expresses her expectations about the dividends of the specific firm as well as of all alternative investments that are forgone by the investor in order to buy shares in the specific firm. In this way, the stock market is seen as an instrument for bringing long-term expectations into consistency, like the price system in any other market. However, in the future and stock markets, a temporal aspect is included (Lachmann, 1956). Thus, forward and stock prices spread market opinions (rather than facts) about an uncertain future.

The stock market is seen by many economists as the most important market and also as an important economic indicator since it “in its relative valuation of the various yield streams reflects, in a suitable ‘objectified’ form, articulate expectations of all those who wish to express them” (Lachmann, 1956, p. 68). The stock market not only aligns individual expectations; it also works to bring forth economic growth through the constant revaluation of capital. The constant revaluation of capital signals—to both the capital owners and the managers—the opinion of the market regarding the firm-specific use of capital in production. Capital owners and managers who do not act in accordance with market opinion will be replaced by more productive entrepreneurs in the long run. That is, the stock market is a prime distributor of knowledge in society.

KNOWLEDGE FLOWS IN THE FINANCIAL INDUSTRY

We have discussed different types of knowledge. A commonality in both types of theories—spatial and Austrian—is the importance of tacit or local knowledge for social order and economic development. Both codified and tacit knowledge exist in the financial industry. The combination of the development of the ICT sector and increasing regulatory requirements suggests that the magnitude of the codified knowledge—such as share prices, annual reports, quarterly reports, and other standardized financial statements—has increased tremendously over the last decades. With the help of the ICT sector, the codified information can be disseminated across the globe, almost in real time. Much of this knowledge is by itself not distance-sensitive; with only this type of knowledge, the financial industry would probably be much less concentrated in space. Instead, it is the existence of tacit knowledge that makes it crucial for firms in the financial industry to cluster in a small number of cities.

Tacit knowledge and the role of face-to-face communication

Tacit knowledge is subjective and depends on the cognitive scheme of the recipient (Hayek, 1948). Thus the dissemination of tacit knowledge requires routines and interaction among individuals and firms. Firms and individuals in the same industry or in related industries for this reason develop a common culture as well as cognitive schemes that facilitate knowledge networks. Tacit knowledge is context-based and it is interpreted in the specific environment in which it takes place (Augier and Thanning Vendelø, 1999).

Codified knowledge and tacit knowledge are explicitly differentiated to highlight that it is the distribution of tacit or non-codified knowledge that is the most important explanatory factor for the high level of regional concentration in the financial industry (Audretsch, 1998; Cook et al., 2007). The nature of tacit knowledge means that it is disseminated between firms and individual via face-to-face contacts. The effective allocation of tacit knowledge is especially important in knowledge-intensive and innovative industries. In these types of industries, knowledge about the latest innovations and changes as well as specialized know-how from practice and mistakes is what really matters.

Storper and Venables (2004) model the importance of face-to-face communication in the urban economy. They argue that face-to-face contacts are highly efficient as “a means of overcoming coordination and incentive problems in uncertain environments; a key element of socialization that in turn allows people to be candidates for membership of ‘in-groups’ and to stay in such groups; and a direct source of psychological motivation” (Storper and Venables 2004, p. 365). Storper and Venables label these effects “*buzz*” and hypothesize that, in combination, they are super-additive and generate increasing returns for participating firms and individuals. In buzz environments, high-ability individuals interact and cooperate with one another, generating a platform for discussion of complex ideas and problems. To fully

reap the benefit of the buzz environment, firms (individuals) need to be co-located; participating only occasionally does not generate the same advantages.⁶ Storper and Venables (2004, p. 365) conclude by arguing that “people in buzz environment should be highly productive.”

It is common for cities with this buzz environment to have many industry-specific networks that interact. Storper and Venables highlight, for example, the cross-interaction between higher education, finance, and government. Individuals working in these industries form powerful networks that enable both informal and formal meeting platforms for social and business purposes. The notion that cities provide platforms for interaction across various networks is in line with Jacobs’s theory of cities, in which diversity plays a central role for economic growth. The buzz environment is also effective for spreading knowledge, both within specific industries and across networks that connect different industries. Hence face-to-face communication and buzz environments are directly related to Hayek’s notion of knowledge and knowledge dispersion (see above).

The agglomeration effects in buzz cities are generated by classical agglomeration sources, such as i) specialized labor, ii) specialized suppliers, and iii) knowledge dispersion (Marshall, 1920), as well as by interactive knowledge and information-based activities. These may include the following:

- (a) creative and cultural functions (including industries linked to this, such as fashion, design and the arts);
- (b) finance and business services;
- (c) science, technology and high technology and research; and
- (d) power and influence (government, headquarters, trade associations, and international agencies). (Storper and Venables, 2004, pp. 365-366)

The combination of professional and social networks makes it possible for buzz cities to attract skilled and specialized labor and to generate an environment in which “critical problems of coordination in the modern economy are resolved through F2F contact” (Storper and Venables, 2004, p. 366).

Table 13.2 presents an overview of how different types of knowledge are used in the coordination of various industries and milieus. The table relates the type of knowledge to the requirement for spatial proximity. Starting from the left, we see that in markets where knowledge is “ubiquitous and transparent” (for example trade in basic manufactured goods and commodities) there is a low (or zero) requirement for spatial proximity. To the left, we find industries where knowledge is “specialized and private,” and this includes both tacit and codified knowledge. Industries that are dependent on private and specialized but codified knowledge, such as cars and chemicals, usually have a low requirement for proximity. These industries often operate in stable environments. The requirement for co-location increases for industries in which knowledge is codified but the environment is more fluid or flexible. Within these industries organized networks usually exist to match partners on a project-by-project basis. Face-to-face contact in these environments is more important; one can in this case lower transaction cost by implementing effective monitoring of both market and contractual relations within specific projects. For industries where tacit knowledge determines coordination, geographical proximity is of crucial importance for both stable and flexible environments. Knowledge-intensive and innovative industries are most often found in these categories.

Table 13.2: Modes of coordination

Coordination environment	Knowledge used in coordination		
	Specialized/private		Ubiquitous/transparent
	Tacit	Codified	
Stable	Bureaucracy/firms Specialized networks for search/matching (HIGH) <i>Financial services</i>	Bureaucracy/firms (LOW) <i>Car industry (mass production)</i>	Markets (LOW) <i>Basic manufactured inputs or services</i>
Fluid	Buzz (HIGH) <i>Politics; arts; entertainment; science; high tech; advanced finance</i>	Organized networks for search/matching (MEDIUM) <i>Aerospace; pharmaceuticals</i>	Markets (LOW) <i>Commodities (e.g., oil)</i>

Source: Adapted from Storper and Venables, 2004, Table 3.

Note: **HIGH**, **MEDIUM**, and **LOW** indicate the relative importance of spatial proximity.

Centrifugal and centripetal forces in the financial industry

There seems to be wide agreement that the spatial location of the financial industry is affected by both centrifugal and centripetal forces. Kindleberger (1974) contends that it is mainly scale economies arising from the organization of financial markets that generate centripetal forces in the industry. Conversely, localized information, different time zones, and regulations represent major centrifugal forces. The vital point here is the role and characteristics of knowledge and information. Gehrig (2000, p. 417) suggests that “[t]rade in informationally sensitive securities is likely to be geographically concentrated at those locations where information about those securities is aggregated and communicated.” Trade in more standardized securities tends to be less spatially concentrated.

Given that complex information about investments is produced, communicated, and aggregated in financial centers, adjacent industries will also be attracted to these locations. Consequently, technological development and increased international trade support the expansion of GFCs in a longer time perspective. Firms that depend on distance-sensitive

information benefit disproportionately from agglomeration economies and will therefore tend to locate in the same regions as financial centers. In contrast, firms that trade in goods or services that are associated with distance-insensitive information tend to locate in low-cost cities.

NEG theories assume a continuing clustering and higher levels of concentration in the financial industry due to ever-increasing, distance-sensitive transaction costs (Engelen and Grote, 2009). Despite the rapid development of the ICT sector, proximity continues to be of value and facilitates rapid dissemination of knowledge among traders, analysts, and other actors. The explanation is the existence of substantial knowledge spillovers, which play an increasing role in explaining the co-location of knowledge-based activities (Audretsch, 1998). Engelen and Grote (2009) use the NEG approach to analyze the changing role of second-tier financial centers, such as Amsterdam and Frankfurt. They argue that the financial industry will continue to be pulled in by GFCs at the expense of second-tier centers.

CONCLUDING REMARKS

Over the past several decades the global financial industry, like other industries, has experienced both globalization and the development of sophisticated and complex ICT systems. This situation has improved the ability to spread codified knowledge and information to distant locations. Despite this development, the financial industry has seen an increase in geographical concentration over the same time period. GFCs such as London and New York have attained increasingly dominant positions in the industry at the expense of second-tier centers such as Amsterdam and Frankfurt. Following the rapid growth of Asia's economies, Shanghai, Hong Kong, and Seoul have however become increasingly competitive.

The explanation for the paradox of increasing access to knowledge and, in parallel, increasing geographical concentration can be found in the role of tacit knowledge and face-to-face communication. When tacit knowledge flows promote industry coordination, the consequence is that geographical proximity becomes extraordinarily beneficial. Thus the financial industry is becoming more concentrated, as is implied by theories ranging from Hayek (1945) and Jacobs (1969) to recent contributions in regional economics and economic geography.

NOTES

1 The ten most important financial centers according to the GFCI index are: London (795), New York (786), Hong Kong (695), Singapore (675), Zurich (665), Frankfurt (642), Geneva (640), Chicago (637), Tokyo (628) and Sydney (621) (GFCI ratings within brackets).

2 See, for example, King and Levine (1993) and Levine (2004) for discussions and empirical evidence on the importance of financial development to economic growth.

3 The Global Financial Index (GFCI) is based on two sources; i) external indices and ii) financial center assessment. The financial center assessment is based on an ongoing survey directed to “international financial services professionals.” The respondents answer questions and assess centers that they are familiar with. There are many different factors that affect the competitiveness of a financial center. The GFCI focuses on five areas that are of special interest: people, business environment, infrastructure, market access, and general competitiveness. See Yeandle (2011, p. 332) for a detailed description of the survey.

4 See Saxenian (1990) and Kiriakos (2011) for excellent analyses of the importance of “being there.” Saxenian analyzes the knowledge effects of labor turnover among Silicon Valley firms, while Kiriakos discusses the importance of serendipitous discoveries in Silicon Valley.

5 Technological externalities occur when “innovations and improvements occurring in one firm increase the productivity of the other firms without full compensation” (Glaeser et al., 1992, p. 1127).

6 Kiriakos (2011) documents this for Finnish executives in Silicon Valley.

REFERENCES

- Agnes, P. (2000). The "end of geography" in financial services? Local embeddedness and territorialization in the interest rate swap industry. *Economic Geography*, 76(4), 347-366.
- Amel, D., Barnes, C., Panetta, F. and Salleo, C. (2004). Consolidation and efficiency in the financial sector: A review of the international evidence. *Journal of Banking and Finance*, 28(10), 2493-2519.
- Andersson, D. E. (2005). The spatial nature of entrepreneurship. *Quarterly Journal of Austrian Economics*, 8(2), 21-34.
- Andersson, Å. E. (1985). *Kreativitet—Storstadens framtid*. Stockholm: Prisma.
- Audretsch, D. B. (1998). Agglomeration and the location of innovative activity. *Oxford Review of Economic Policy*, 14(2), 18-29.
- Augier, M. and Thanning Vendelø, M. (1999). Networks, cognition and management of tacit knowledge. *Journal of Knowledge Management*, 3(4), 252-261.

- Beck, T. and Levine, R. (2002). Industry growth and capital allocation: Does having a market- or bank-based system matter? *Journal of Financial Economics*, 64, 147-180.
- Cook, G. A. S., Pandit, N. R., Beaverstock, J., Taylor, P., and Pain, K. (2007). The role of location in knowledge creation and diffusion: evidence of centripetal and centrifugal forces in the city of London financial services agglomeration. *Environment and Planning A*, 39, 1325-1345.
- Cooper, M. (2011). The great game clustering in wholesale financial services. *Financial Centre Futures*, 2-2011, London.
- Engelen, E. and Grote, M. H. (2009). Stock exchange virtualisation and the decline of second-tier financial centres—the cases of Amsterdam and Frankfurt. *Journal of Economic Geography*, 9(5), 679-696.
- Florida, R. (2002). *The Rise of the Creative Class*. New York, NY: Basic Books.
- Fujita, M. (1993). Monopolistic competition and urban system. *European Economic Review*, 37(2-3), 308-315.
- Fujita, M., Krugman, P. R. and Venables, A. J. (1999). *Spatial Economics: Cities, Regions and International Trade*. Cambridge, MA: MIT Press.
- Fujita, M. and Thisse, J. F. (2000). The formation of economic agglomerations. In: Huriot, J.-M. and Thisse, J. F. (eds.), *Economics of Cities*. Cambridge, UK: Cambridge University Press.
- Gehrig, T. (2000). Cities and the geography of financial centers. In: Huriot, J.-M. and Thisse, J.-F. (eds.), *Economics of Cities: Theoretical Perspectives*. Cambridge, UK: Cambridge University Press.
- Gertler, M. S. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography*, 3, 75-99.

- Glaeser, E. L., Kallal, H. D., Scheinkman, J. A. (1992). Growth in cities. *Journal of Political Economy*, 100(6), 1126-1152.
- Glaeser, E. L., Kolko, J., and Saiz, A. (2001). Consumer city. *Journal of Economic Geography*, 1(1), 27-50.
- Goldberg, M. A., Helsley, R. W., and Levi, M. (1988). On the development of international financial centers. *Annals of Regional Science*, 22, 81-94.
- Hayek, F. A. (1937). Economics and knowledge. *Economica*, 4(February), 33-54.
- Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review*, 35(4), 519-530.
- Hayek, F. A. (1948). The Meaning of Competition. In *Individualism and Economic Order*, Chicago: Univ. Chicago Press.
- Huriot, J. M. and Thisse, J. F. (2000). Introduction. In: Huriot, J.-M. and Thisse, J.-F. (eds.), *Economics of Cities*. Cambridge, UK: Cambridge University Press.
- Ikeda, S. (2004). Urban interventionism and local knowledge. *Review of Austrian Economics*, 17(2-3), 247-260.
- Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York, NY: Random House.
- Jacobs, J. (1969). *The Economy of Cities*. New York, NY: Random House.
- Jacobs, J. (1984). *Cities and the Wealth of Nations*, New York, NY: Random House.
- Kindleberger, C. P. (1974). The formation of financial centers: A study in comparative economic history. *Princeton Studies in International Finance*, Vol. 36.
- King, R. G. and Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108(3), 717-737.
- Kirzner, I. M. (1973). *Competition and Entrepreneurship*. Chicago, IL: University of Chicago Press.

- Kiriakos, C. M. (2011). Why being there matters: Finnish professionals in Silicon Valley. In: Andersson, D. E., Andersson, Å. E., and Mellander, C. (eds.), *Handbook of Creative Cities*. Cheltenham, UK: Edward Elgar.
- Krugman, P. R. (1991). Increasing returns and economic geography. *Journal of Political Economy*, 99(3), 7-17.
- Krugman, P. R. (1998a). What's new about the new economic geography? *Oxford Review of Economic Policy*, 14(2), 7-17.
- Krugman, P. R. (1998b). Space: The final frontier. *Journal of Economic Perspectives*, 12(2), 161-174.
- Lachmann, L. (1956/1978). *Capital and Its Structure*. San Francisco, CA: Institute of Humane Studies.
- Latter, T. (2001). *Just another financial center—or is Hong Kong special?* Address by Mr. Tony Latter, Deputy Chief of the Hong Kong Monetary Authority, at the Foreign Correspondents Club, Hong Kong, April 25, 2011.
- Lee, H. L. (2001). *Financial Centers today and tomorrow: A Singapore perspective*. Address by Mr. Lee Hsien Loong, Deputy Prime Minister of Singapore and Chairman of the Monetary Authority of Singapore, International Monetary Conference, Singapore, June 4, 2001.
- Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, 35(June), 688-726.
- Levine, R. (2004). The corporate governance of banks: A concise discussion of concepts and evidence. World Bank Working Paper No. 3404.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3-42.

- Malmberg, A. and Maskell, P. (2002). The elusive concept of localization economies: towards a knowledge-based theory of spatial clustering. *Environment and Planning A*, 34(3), 429-449.
- Marshall, A. (1920). *Principles of Economics*. London, UK: Macmillan.
- Mises, L. von (1922). *Socialism: An Economic and Sociological Critique*. Indianapolis, IN: Liberty Fund.
- Mishkin, F. S. (2007). Is financial globalization beneficial? *Journal of Money, Credit and Banking*, 39(2-3): 259-294.
- Porter, M. E. (1990). *The Competitive Advantage of Nations*. New York, NY: Free Press.
- Polanyi, M. (1966). *The Tacit Dimension*. London, UK: Routledge.
- Poon, J. P.-H. (2003). Hierarchical tendencies of capital markets among international financial centers. *Growth and Change*, 34(2), 135-156.
- Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(October), 1002-1037.
- Reed, H. (1981). *The International Finance System and Economic Development*. New York, NY: Praeger Publishers.
- Saxenian, A. (1990). The origins and dynamics of production networks in Silicon Valley. *California Management Review*. 33(1), 89-112.
- Sautet, F. (2000). *An Entrepreneurial Theory of the Firm*. London, UK: Routledge.
- Schumpeter, J. A. (1911/1934). *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.
- Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy*. New York: Harper and Row.
- Storper, M. and Venables, A. J. (2004). Buzz: face-to-face contact and the urban economy. *Journal of Economic Geography*, 4(4), 351-370.

Venables, A. (1996). Equilibrium locations of vertically linked industries. *International Economic Review*, 37(2), 341-359.

Yeandle, M. (2011). *The Global Financial Centres Index 9*. Financial Centre Futures Z.Y. Group, London, UK: Long Finance.