“Real Estate Capital Flows and Transitional Economies”

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Abstract

Foreign real estate capital was a major source of financing domestic property market office construction in Central Europe after the fall of the Berlin Wall in 1989. During the 1990s, over 800 office buildings were either newly constructed or refurbished in Budapest, Prague and Warsaw. The primary focus of this analysis is explaining the spatial construction and redevelopment patterns of the post-1989 office buildings in these cities. Secondarily, we analyze the correlation of foreign direct investment flows to annual construction of office buildings. We seek to explain the location of new or refurbished office buildings in the central business district (CBD) or in non-CBD locations in terms of the effect of time, size of property and other variables, and test whether there is a positive correlation relationship of foreign direct investment flows and new office construction or refurbishment. Integrating relevant foreign direct investment (FDI), economic geography and property theories in the research, the authors attempt to bridge existing gaps in the literature.

Introduction

The existing economic and property research literature overlooks the impact and role of foreign property demand and foreign property capital flows in domestic property markets. The application of selected multinational enterprise ("MNE") and foreign direct investment ("FDI") theories and research, integrated with selected property theories, can create a blended, systematic model that sheds new light on the behaviour of domestic property markets including supply and demand economics, market maturity and changes in property values while, at the same time, increasing understanding of MNEs and FDI in relation to location theories, spatial agglomeration and economic geography.

The distinction between domestic and foreign property demand and property capital flows provides an ideal framework for theoretical development and analysis similar to existing foreign direct investment ("FDI") theories. One such foreign direct investment theory is John Dunning's Investment Development Path ("IDP") theory that explains the net foreign direct investment position of a country relative to its economic growth stage(Kumar and McLeod, 1981). Narula (1996) succinctly summarizes the major foundations of the Investment Development Path:

> *"First, national economies undergo structural change as they grow. Second, the structure and level of development of the economy of a country are related in a systematic way to the extent and nature of the FDI activity undertaken by its domestic firms (outward FDI), as well as by those of other nationalities with its national boundaries (inward FDI). Third, the relationship between the FDI activities (both inward and outward) associated with a given country and its economic structure is a dynamic and interactive one, i.e. FDI activity is influenced by the structure of the economy, as well as vice-versa."*

Applying Dunning's IDP to commercial property markets entails an application of macroeconomic principals to urban economics. For example, if urban economies undergo structural changes and various levels of development similar to the macroeconomic structural changes proposed in the Dunning model, then we can identify questions abut the application of the IDP to real estate. Is the pattern of foreign *property* direct investments related to the urban economic structure? Is the relationship between foreign property direct investments and the urban economic structure dynamic and interactive as claimed in the IDP?

A priori, foreign property direct investments are a reaction to actual or expected increases in foreign property demand. There is ample evidence of the impact of foreign property investment related to the service sector on real estate markets in developed economies. For example, foreign-based advanced producer service firms, e.g., advertising, banking, accountancy, and legal firms (Sassen, 2000) occupy significant office space in New York, London, and Tokyo. Foreigners are major sources of capital flows for acquisitions and ownership of properties in cities as New York, Washington D.C. and London(Laposa, 2004, Lizieri *et al.*, 2000). Service sector FDI inflows into the European Union (EU) 1996-2000 accounted for 65.5% of total FDI inflows from extra-EU countries, with real estate and business services accounting for 25.7% of service FDI flows (European Commission, 2002). The focus here, however, is on FDI in transitional economies. The empirical evidence of an influx post-1989 of service-oriented multinationals (firms that use commercial property types as office buildings), into transitional countries provides a unique circumstance to apply the IDP theory to commercial property markets.

The World Bank and other international financial institutions classify numerous countries in Asia, Central Europe and Latin America as transitional[1]. Analysis is, thus, timely. The United Nations monitors progress of the transitional process(United Nations Secretary-General, 2002), periodically reporting to general sessions at the UN on the integration of transitional economies into the world economy. A separate study for the United Nations (Adlington et al., 2000) recognizes the importance of developing real estate markets in transition economies. According to Adlington *et al*., the European Commission in 2001 "*…concluded that eight of the countries of Central and Eastern Europe (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia) were functioning market economies which could, in the short term, withstand the pressure of competition and market forces with the European Union*". The domestic property markets in each of the referenced countries are critical components of the ability to withstand competitive market forces.

[1] The United Nations includes 14 countries in the Central and Eastern European States and 12 countries in the Commonwealth of Independent States. See Table 1, United Nations, 9 August 2002, "Integration of the economies in transition into the world economy," report of the Secretary-General; reference A/57/288. Kolodko (2002), for the IMF, identifies 25 countries as transitional.

Domestic property markets supply necessary property types as offices, warehouses and hotels to serve increased foreign demand. The European Union formally admitted the Czech Republic, Hungary and Poland in 2004. As new members of the European Union, the increased foreign participation in domestic property markets makes understanding the behaviour of Central European domestic property markets more critical.

Recent trends in global capital flows support increased research on property capital flows in transitional economies. According to the United Nations (1999), service sector foreign direct investment inflows have increased as a share of total world FDI inflows from 38.9% in 1988 to 47.7% in 1997[2]. Service sectors include construction, trade, finance, business services, hotels, and real estate. Behrman's (1974) claim that MNE service firms are '*location-oriented*' and Boddewyn et al's (1986) classification of MNE services into location-bound services[3] point to significant foreign property demand, specifically in the office sector of a domestic property market. As FDI flows increase in these industry sectors, demand for office, hotel, and warehouse properties increase in domestic property markets. Where the current stock of office, hotel, and warehouse does not meet international standards, then demand for new stock (and real estate services) increases. As demand for new property stock increases, demand for property capital investments from foreign and/or domestic sources increases. If domestic capital markets and sources are immature, restricted or otherwise nonexistent, then foreign property capital sources, including foreign construction firms, developers, opportunistic funds and multinational investment banks are obvious alternatives. Thus, the presence of foreign companies and foreign investment within the geographic boundaries of the urban area is the first hint of, and partially explains, a structural shift in a transitional economy's property market.

The existing physical stock of commercial properties in Budapest, Prague and Warsaw in 1989 was not adequate, in terms of physical quality and quantity, to meet the increase in MNE-driven demand for commercial properties during the early transitional phase. MNEs, accustomed to state-of-the-art buildings in developed countries, were presented with limited options in terms of location of available spaces, telecommunications, facility equipment and maintenance, and physical layouts. In addition to space constraints, the practical mechanics of leasing property and the approval process to construct new facilities were just some property-related issues surrounding MNE entrance into Central Europe. The development of domestic property rights in Central European countries, whether non-existent, evolving, or quasi-established, either restricted or encouraged foreign property investment and development firms' participation in Central European domestic property markets. Furthermore, the security of domestic property rights influences local firm behaviour and resource allocations with impacts for economic growth (Claessens and Laeven, 2003).

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[2] *World Investment Report* 1999, Annex Table A.1.16 and A.1.17.

[3] Location-bound service is one of three classifications per Boddewyn, Halbrich and Perry. The other two are foreign-tradeable and combination services.

Research Questions

A priori, the increase in foreign property demand from service sector firms for commercial office space in Central Europe from 1989 to 2002 partially explains the increase in office supply fuelled by foreign capital sources in Budapest, Warsaw and Prague. Foreign property demand was evident to foreign and domestic property companies in the 1990s due to:

(1) the increase of foreign direct investment in Central European countries;
(2) the swell of foreign registrations with government ministries;
(3) the rise of foreign business travel; and
(4) commencement of foreign operations in domestic property markets by MNEs.

In Budapest, Prague and Warsaw, a growing number of foreign property service providers as brokerage firms (DTZ, Knight Frank, CB Richard Ellis), property investment advisors (Jones Lang LaSalle, Heitman, ING Real Estate), and other professional service firms as property managers, lawyers and insurance firms fuelled office demand.

As the growth of foreign demand in domestic property markets continued to increase in the early transitional years, new supply attempted to meet existing or short-term expected demand. Initially, the entrance of foreign firms reduced available space (decreasing office vacancy rates); eventually construction of new supply commenced. Changes in office demand caused a structural shift in the domestic business cycle. The sustained entrance of foreign firms required continued adjustments of new supply in order to maintain market equilibrium. Lags naturally exist between early increases in demand and the delivery of new supply. However, highly speculative new supply financed by foreign or domestic sources, that irrationally anticipates demand may result in higher vacancy rates, declining rental rates and decreasing property values. Construction booms that include a large proportion of speculative office buildings have consistently caused abnormal high vacancy rates, lower rents and declines in values in developed economies (Hendershott and Kane, 1992, Wheaton and Torto, 1988, Wheaton, 1987).

The first research question centres on the relationship between foreign direct investment and new office supply. Although foreign direct investment data includes geographic areas outside Budapest, Prague and Warsaw and traditional FDI models focus on primary extraction, manufacturing and distribution, there is the presumption of an effect in the central cities in each country and on the office sector of the real estate market. Thus the first research question is:

- *Is there a correlation between foreign direct investments in the Czech Republic, Hungary and Poland and office construction in Prague, Budapest and Warsaw from 1989 to 2002?*

Commercial properties constructed in Budapest, Prague and Warsaw during the 1990s shape the urban landscape of those cities. Foreign capital invested in new office construction in Central European cities effectively creates a physical, three-dimensional asset with descriptive factors as size, location and year of construction. The location of new office buildings was significantly influenced by government approvals and restrictions such as building permits in historical cultural districts, property rights relating to specific land parcels and availability of land. Office buildings constructed after 1989 either encouraged continued spatial agglomeration in existing business locations or created new concentrated areas of business activities.

Did foreign firms spatially agglomerate during the transition period regardless of whether they leased or owned space, constructed a new office building for their use, or acquired existing properties in Prague, Budapest or Warsaw? Is the location decision of foreign firms a function of *time*, e.g., are there time-dependent changes in the spatial location of foreign firms as the market evolves or as more MNEs enter a market? Are location decisions a function of *space*, e.g., are there initial preference for CBD properties and later for locations in the periphery or non-CBD suburban submarkets[4]? Are location decisions a function of *economics*, e.g., is there space available within a domestic property market? Unlike many emerging economies, the three cities examined here already had an established built form with pre-existing office buildings. However, this did not conform to conventional Western urban economic models and there was no conventional pre-existing downtown CBD. Thus the second research question is:

- *Is there an explanation for the location, in or outside the CBD, of post-1989 new and/or refurbished office buildings in Budapest, Prague and Warsaw?*

Literature

There are numerous theories on the impact of MNEs and FDI flows. Rugman (1999) provides a succinct overview of the history of multinational enterprise theories that begin with Dunning (1958), Vernon (1966) and Hymer (1976). Jones (1996) details a historical perspective on the evolution of international business. Although transitional economies are not considered, less developed countries, several issues and questions concerning transitional economies and multinational enterprises have common characteristics. During the initial stage of transition, countries moving from centrally planned to market democracy and capitalism are potential subject to what Penrose (1971) describes as "*…the ambivalent attitude toward foreign enterprise and the widely-expressed fear of foreign exploitation*". Well-capitalized multinational enterprises, seeking to enter the Central European market had management, marketing, product development and financial advantages over domestic firms and local governments. The drastic overhaul of national, regional and local governments, coupled with immature financial and legal systems during the initial phase of transition, created an opportune environment for exploitation in transitional economies, as in less developed countries (Mauro, 1995).

[4] For example, German developer Bayerische Hausbau's MOM Park, a 30,000 m^2 office development in Budapest's Central Buda submarket[4] is a significant addition to the pre-1989 Budapest office stock.

Buckley and Casson (1985) argue that "*it is fair to suggest that location theory elements in the modern theory of the MNE have been neglected*." Location factors combined with MNE product cycles may influence MNE locations (Vernon, 1974). Vernon's product cycle theory may explain the trend towards information technology outsourcing to such countries as India. Property is not listed as a location-specific endowment of consequence to MNEs[5] although offshore production facilities are mentioned.

Buckley hints at the role of property when he points out that MNEs are concentrated in the "…*location of economic activity they control*" (Buckley and Brooke, 1992). If MNEs in particular sectors agglomerate, and non-residential property types generally support specific economic activities for respective industries, then the properties occupied by MNEs must be spatially concentrated as well. Thus, it is reasonable to assume a clustering of service-oriented MNEs in within cities such as London or New York. Similarly, it is also rational to predict that MNEs in comparable industries will concentrate in cities as Prague, Budapest or Warsaw.

MNE research has only recently focused on the service sector. Jones (1996)points out three determinants of the growth of multinationals in service sectors: (1) trade-supporting services, (2) location-bound services, and (3) foreign-tradable services. Buckley and Brooke (1992) identify the significance of services, e.g., advertising, marketing, engineering and management, coupled with service-related activities as trademarks and patents, with international trade, claiming that "…*such trade plays an important part in the process of economic growth*." Location-bound services, which seek profitable opportunities in host countries, partially explain the rapid expansion of retailers and financial service firms in transitional economies. Due to the nature of a location-bound investment and marketing strategy, such multinationals require space to produce the goods and services offered in the host county. Jones (1996) also discusses the history of multinational banking, showing how various factors influenced the evolution of international expansion: host country regulations, technology improvements, and the development of an international capital market system.

Spatial economics provides another strand to the model. The debate between the importance of location and its affect on competitive advantage addresses location factors as infrastructure, labour, communications and market size (Porter, 1996). Urban economics and urban growth theories implicitly affect a theory of property capital flows. The organization of firms and the spatial distribution of economic activities within an urban environment assume a built environment. The spatial composition of the built environment – offices, retail, warehouse or manufacturing – supports the level and type of economic activity and acts as a catalyst for economic activities and spatial agglomeration. For example, manufacturers require industrial properties to produce goods and warehouses to store raw, intermediate and finished goods. Capital is required initially to develop and construct the industrial facilities and warehouses for the manufacturer.

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[5] Buckley and Brooke (1992) list "…*(1) raw materials, leading to vertical foreign direct investment (2) cheap labor, leading to offshore-production facilities; and (3) protected or fragmented markets, leading to foreign direct investment as the preferred means of marketing servicing*".

As other manufacturers desire to locate future facilities in the same area, agents in the property market construct and operate additional industrial properties. Van der Krabben and Boekema (1994) identify the process of the built environment as a 'missing link' between urban economic growth theories and real estate development. The authors argue against a simplistic view that changes in the urban spatial structure are simply a by-product of changing location preferences by firms and households.

Urban economists have debated the relationship of metropolitan specialization versus diversity and the resulting impact on productivity. Glaeser *et al.* (1992) support the theory that diversity is related to long term urban population and economic growth more than specialization. A metropolitan area concentrated in one or more specialization will require particular property types to support such economic diversity. Economic diversity presumes a more diverse property type distribution within the city to support the variety of production. Drennan *et al.* (2002) extend the diversity versus specialization debate by including the service sector alongside the goods producing sector. Since the focus of research on city diversity or specialization is wages, income per capita or economic growth, the relationship to the property market is not addressed. Lambooy's (2002) comparative study of knowledge development and urban economic growth is based on an evolutionary economic framework with knowledge development and the selection of new ideas and products as the catalyst of urban economic growth. Lambooy refers to "*…corporate headquarters, research and development centres, technical and training centres, universities, and related professional, technical, and commercial service firms*" as knowledge infrastructure components. There is obvious, but silent, interdependency between knowledge development and knowledge infrastructure - the property market of offices, R&D buildings, and flex properties that house knowledge workers.

(Fujita *et al*., 1999) conclude *The Spatial Economy* by arguing that

> "*…the justification for studying the geography of economies is that it is so visible and important a part of the world. It is hard to see any reason – other than tradition, based on analytical intractability – why interregional and urban economics should receive any less attention that international trade, why the location of production should not be as central a concern of mainstream economics as capital theory or the distribution of income*." (p.349).

Property is what is visible - as property is fixed and immobile. Property is also a long life asset spanning multiple decades to centuries. Properties developed and constructed during a specific time period do not necessarily fulfil the demand of economic production in another. McCann (1995) argues that location theory is silent in explaining spatial clustering of firms when firms "*…have few or no trading links with other firms or households either in the same urban area or even in the same geographical region…*" If firms restructure, thus demanding more or less space, there will be an impact on the built environment.

Methods and Data

The first question is determining if the classic methods associated with Dunning's Investment Development Path models are appropriate for the Property Investment Development Path (PIDP) model. Dunning's IDP model seeks to explain the net foreign direct investment position of a country relative to the country's economic stage. The net foreign direct investment position of a country is a simple calculation of foreign direct investment outflows (OW) less foreign direct investment inflows (IW). The determination of a country's economic stage is a country's gross domestic product (GDP) divided by total population resulting in GDP per capita (GDPK) . Dunning specifies normalizing outward and inward foreign direct investment flows by dividing OW and IW flows by total population(Dunning, 1986). The result is a ratio of OWK (outward foreign investment flows per capita) less IWK (inward foreign investment flows per capita), divided by GDPK as illustrated by the following equation:

$$\left(OWK - IWK\right)/GDPK \qquad \textbf{Equation 1}$$

Typically, statistical analysis of the IDP uses cross-sectional data for a single year and includes a number of countries generally producing a J-shape quadratic curve for Dunning's four economic stages: (1) IW is greater than OW in stage 1 and 2 creating a downward sloping curve, and (2) as OW increases, it closes the gap with IW in stage 3 and eventually is greater than IW in stage 4; thus creating an upward curve.

Theoretically, it is possible to transform the IDP method to the PIDP. A strict interpretation of the IDP method transforms OW to outward property investment and IW to inward property investment, respectively POWK and PIWK (K denoting normalization by population). No changes are required for GDPK.

$$\left(POWK - PIWK\right)/GDPK \qquad \textbf{Equation 2}$$

Where:

POWK	=	Property outward flows per capita
PIWK	=	Property inward flows per capita
GDPK	=	Gross domestic product per capita

There are several issues with equation 2. *First*, the PIDP model focuses on regions or urban areas and not country level analysis. Thus the use of GDPK may be inappropriate. In countries where a single property market or city generates the majority of gross domestic product such as Singapore, Hungary or less developed countries with a primate city, then the use of GDPK may be suitable. However, in developed countries with multiple cities and diverse economic areas producing goods and services, then equation 2 does not accurately reflect the interaction of outward and inward property flows and economics for individual and local property markets. Furthermore, different cities in the same country are not necessarily at the same urban economic stage if using benchmarks as per capita income or average household income to identify similar stages as in the IDP. Just as OW and IW in the IDP model are geographically constrained to a country, so too POW and PIW data need to be constrained to a specific urban geography.

On a mathematical substitution basis, if estimates of gross metropolitan product (GMP) are available and reliable, then Dunning's IDP model is adaptable to the PIDP subject to sufficient data on property outward flows and property inward flows at the metropolitan level. Normalizing each variable by population produces POWK, PIWK and GMPK as shown in the following equation:

$$(POWK - PIWK)/GMPK \qquad \textbf{Equation 3}$$

The *second* issue of strictly applying the IDP to the PIDP centres on differences between non-property inward and outward flow data compared to property inward and outward flow data. Registration of outward and inward property capital flows in domestic property markets or host countries are poorly documented by comparison to non-property inward and outward flow data. Significant efforts in the property industry by respected private organizations as property advisors, commercial brokers and industry associations have improved regional and cross border property flow data and knowledge. Nonetheless, the quantity and quality of property flow data is suspect in less developed countries. There are differences between government registrations of foreign companies purchasing domestic companies that generally require documentation with local or national authorities, to foreign property investors purchasing domestic properties that do not require as extensive documentation with government agencies. Even if a property sales transaction is recorded with a local government authority, neither full disclosure of the sales price nor the nationality of the buyer are necessarily recorded.

The *third* issue in converting the IDP to the PIDP is that foreign direct investments by definition are equity investments whereas foreign property capital flows include both equity and debt investments such as commercial mortgages. A London-based investment bank or a Norwegian pension fund can invest in a hotel in Madrid through a multiple of financial structures (open or closed end funds, joint venture, participating mortgages, direct investments, etc.). Thus, due to geographic constraints, data quality and financial structure options, the property-adapted IDP equations (Equation 2), do not fit the PIDP model.

Although Dunning's IDP basic equation does not completely apply to the PIDP model, there are IDP concepts that are relevant to the PIDP model such as the time-variant distribution of inward and outward flows. Is the relationship and ratio of foreign property outward flows to foreign property inward flows a function of the domestic property market economic stage, and if so, is GMPK a suitable benchmark to identify different property market or urban economic stages? How do domestic property firms in Hungary, Poland and the Czech Republic evolve, raise capital and create the necessary human capital expertise to invest and develop in foreign countries (POW)?

There are limitations when considering model methodologies for transitional economies. One, there is a limited time series, from 1989, precluding the use of standard time series models. Although transitional economies are limited in the number of years, sufficient data for statistical analysis is available via other means. For example, numerous researchers have used panel data models in transitional economies analysis and studies.

Égert (2002) uses time series and panel cointegration models with quarterly economic data from 1991 to 2001 for several Central European countries to test for a Balassa-Samuelson effect. Bevan and Estrin (2000) used panel data on FDI flows from market to transition economies for the period 1994 through 1998 for 11 countries in Central Europe and the Baltics with flows from 18 countries. Fries and Taci (2001) also use panel data modelling on 515 banks in 16 transitional countries for the years 1994 to 1999.

To answer the first research question, we begin by constructing a time series of foreign inflows and foreign stock in the Czech Republic, Hungary and Poland, and total office construction in Budapest, Prague and Warsaw. The period is limited to 1989 to 2002 inclusive. Calculations of first differences for total foreign stock are necessary to create a stationary time series and computation of cumulative new construction and/or refurbished office stock in square meters for Budapest, Prague and Warsaw are useful for comparisons with growth in total foreign stock. Although the time series is limited, cross correlation analyses between first differences of total foreign stock to annual office construction for a period of 2 years (lead and lag).

The second research question focuses on whether an office building is located in the CBD or not depending on a set of independent variables. Here, we propose using a multinomial logit model. Prior work using such a framework includes Lee (1982), who examines the location behaviour of manufacturing firms in Bogotá, Columbia and Kittiprapas and McCann (1999) who apply logit and multinomial models to explain the regional behaviour of the electronics industry in Thailand.

Data

The first research question requires data on FDI flows and FDI stock levels for the Czech Republic, Hungary and Poland. The source of the FDI data, the United Nations Conference on Trade and Development (UNCTAD), follows similar research on the IDP(Dunning, 1997), and annual office construction in Budapest, Prague and Warsaw is from DTZ. FDI data covers inflows and outflows in millions of US dollars, and inward and outward stock levels in US dollars.

The second dataset is a compilation of 857 office buildings constructed or redeveloped post-1989 in Budapest, Prague and Warsaw. For buildings, information is available on city, location information (property name, address and district and sub-market code), the size in meters, the type of building, date constructed and an indication of whether the property was new or refurbished[6]. There are, inevitably, missing variable problems. Additional variables created or transformed from the original variables include a (1,0) Central Business District dummy variable, time from transition, size in thousands of meters, and property size groups. The assignment to the property size group interval variable is 1=less than 2,400 square meters, 2=2,400 to 5,570 square meters and 3=5,750 square meters or greater. The property size cutoff points are based on three equally distributed ranges.

[6] New or refurbished variable only available for Prague office buildings.

Empirical Results

***FDI versus Office Construction* -** Exhibit 1 shows that, as expected, there is a strong correlation between FDI and office construction in the Warsaw and Budapest markets. However, the time series data is non-stationary and thus the high correlations are misleading. In order to correct, first differences of the FDI stock levels are compared to annual new office building construction stock. The Czech Republic is not included due to limited time series data.

Exhibit 1 – Correlation Office Construction Stock to FDI Stock

		Poland FDI Stock (current USD)	Hungary FDI Stock (current USD)
Warsaw Office Stock (sq meters)	Pearson Correlation	.990(**)	.925(**)
	Sig. (2-tailed)	.000	.000
	N	13	13
Budapest Office Stock (sq meters)	Pearson Correlation	.995(**)	.941(**)
	Sig. (2-tailed)	.000	.000
	N	13	13

** Correlation is significant at the 0.01 level (2-tailed).

Exhibit 2 illustrates the correlations of first differences in FDI stock levels with annual office building stock. Once again, data limitations for annual office construction in Prague negate its inclusion in the correlation matrix (1st differences of FDI stock level for the Czech Republic are included). The correlation for Warsaw office construction and Poland FDI is 0.808, significant at the 1% level, whereas it is -0.170 between Hungary FDI to Budapest office. Based on the data in Exhibit 2, the null hypothesis is accepted for Poland and Warsaw but not Hungary and Budapest. It appears that new office stock was delivered to Warsaw's commercial property market just as FDI stock levels were increasing. It is unclear if the delivery of new office stock encouraged further FDI investment in Poland or if there are other explanations.

In order to test for leads and lags, a cross correlation at ± 2 years is presented in Exhibit 3. Although the correlation between Hungary FDI stock to Budapest is low, as illustrated in Exhibit 2, the cross correlation shows a significant relationship at +2 lag (0.700). The significant correlation at +2 years supports the contention that office construction reacted to increases in foreign direct investment rather than potentially anticipating increases in foreign demand. Other reasons for the lagging effect can include delays in public approvals, land availability and restrictions on foreign developers.

Exhibit 2 – Correlation of 1st Differences FDI Stock vs. Office Building

		1st Difference Poland FDI Stock	1st Difference Hungary FDI Stock	1st Difference Czech Republic FDI Stock
1st Difference Warsaw Office Stock	Pearson Correlation	.808(**)	-.014	.529
	Sig. (2-tailed)	.001	.966	.077
	N	12	12	12
1st Difference Budapest Office Stock	Pearson Correlation	.690(*)	-.170	.494
	Sig. (2-tailed)	.013	.597	.102
	N	12	12	12
1st Difference Poland FDI Stock	Pearson Correlation	1	.195	.714(**)
	Sig. (2-tailed)		.544	.009
	N	12	12	12
1st Difference Hungary FDI Stock	Pearson Correlation	.195	1	.626(*)
	Sig. (2-tailed)	.544		.030
	N	12	12	12
1st Difference Czech Republic FDI Stock	Pearson Correlation	.714(**)	.626(*)	1
	Sig. (2-tailed)	.009	.030	
	N	12	12	12

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Exhibit 3 – Cross Correlations 1st Differences Office Stock to FDI Stock

	Budapest Office to Hungary FDI		Warsaw Office to Poland FDI	
Lag	Cross Correlation	Std.Error	Cross Correlation	Std.Error
-2	.067	.316	.430	.316
-1	-.289	.302	.501	.302
0	-.170	.289	**.808**	.289
1	.123	.302	.526	.302
2	**.700**	.316	.558	.316

Thus, the null hypothesis of a significant contemporaneous relationship between FDI stock level changes to office construction is accepted for Poland and Warsaw, but rejected for Hungary and Budapest. Yet the null hypothesis is accepted for Hungary and Budapest if office construction is lagged two time periods.

Location of New Office Buildings Logit models are used to test for the spatial distribution of new office buildings in Budapest, Prague and Warsaw using the Office Building data. Descriptive statistics of the relevant variables are provided in the Appendix. Analysis does not include office properties with missing data for year of construction and property size. The logit model uses variables TIME and SIZE to explain the distribution of the LOCATION variable. The LOCATION variable is discrete with 1= CBD location and 0 = Non-CBD location. Based on spatial agglomeration theories of office-using producer service industries and the unique role of central business districts, this hypothesis tests for a time-decaying and size factor against the null that there are no differences in the spatial distribution of office properties in Budapest, Prague and Warsaw. Prior to presenting logit model results, a simple ANOVA test compares property size (SIZE) and time from transition (TIME) for CBD and non-CBD office buildings in Budapest, Prague and Warsaw (see Exhibit 4).

Exhibit 4 – ANOVA Results, SIZE and TIME by Market by LOCATION

City				Sum of Squares	df	Mean Square	F	Sig.
Budapest	Size (000s sq meters) * CBD Dummy	Between Groups	(Combined)	22.163	1	22.163	.605	.437
		Within Groups		9,819.93	268	36.642		
		Total		9,842.09	269			
	Time from Transition * CBD Dummy	Between Groups	(Combined)	60.65	1	60.654	6.037	.015
		Within Groups		2,692.40	268	10.046		
		Total		2,753.05	269			
Prague	Size (000s sq meters) * CBD Dummy	Between Groups	(Combined)	61.69	1	61.694	3.055	.082
		Within Groups		5,573.14	276	20.193		
		Total		5,634.83	277			
	Time from Transition * CBD Dummy	Between Groups	(Combined)	41.98	1	41.980	7.986	.005
		Within Groups		1,450.93	276	5.257		
		Total		1,492.91	277			
Warsaw	Size (000s sq meters) * CBD Dummy	Between Groups	(Combined)	1,467.65	1	1,467.65	23.879	.000
		Within Groups		13,398.53	218	61.461		
		Total		14,866.18	219			
	Time from Transition * CBD Dummy	Between Groups	(Combined)	47.68	1	47.676	7.038	.009
		Within Groups		1,476.71	218	6.774		
		Total		1,524.38	219			

The ANOVA results show significant differences between CBD and non-CBD office buildings for SIZE and TIME for all markets with the exception of property size in Budapest. The sample size of CBD office buildings in Budapest is small relative to the Prague and Warsaw. The number of office buildings in CBD Budapest (37) account for just 13.7% of total office buildings (270), significantly less than Prague's 89 office buildings (32.0% of total office buildings) and Warsaw's 72 office buildings (32.7% of total office buildings).

Dichotomous Logit Model Results

The logit model uses the Office Building dataset and includes office properties with time from transition (TIME) > 0 and property size (SIZE) > 0. Property size (SIZE) is converted into an interval variable whereby individual office properties are grouped into three to four size ranges (SIZERANGE). There are 768 office properties from Budapest, Prague and Warsaw that meet those two decision rules. Logit models are generated for the combined property markets and then for each individual market with TIME, SIZE and SIZERANGE as independent variables. The dependent variable in all logit models is location. Location is a nominal variable, with construction or redevelopment in the central business district (CBD) equal to 1, and locations outside the CBD equal to 0. Exhibits 5 and 6 illustrate the logits and corresponding probabilities for CBD location for the combined markets and for each property market. The results clearly show a declining probability by year from transition for CBD location. Warsaw has the highest initial probability of a CBD location; Budapest and Prague have similar declining curves as seen in Exhibit 7. Size of building is significant for Warsaw in both the Anova and Logit formats, although its impact on location seems small; in the Anova, Prague shows a weak (10% level) significant relationship between location and size. Size does not seem to matter – much.

Exhibit 5: Logit Output Tables – TIME

All Markets

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-1.057	.082	164.298	1	.000	.347

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	858.529[a]	.023	.034

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Exhibit 5: Logit Output Tables – TIME

Classification Table[a]

	Observed		Predicted: CBD Dummy: Non CBD	Predicted: CBD Dummy: CBD	Predicted: Percentage Correct
Step 1	CBD Dummy	Non CBD	570	0	100.0
		CBD	198	0	.0
	Overall Percentage				74.2

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time_from_Transition	-.093	.022	17.716	1	.000	.911
	Constant	-.400	.171	5.474	1	.019	.670

a. Variable(s) entered on step 1: Time_from_Transition.

Individual Markets

Variables in the Equation

City			B	S.E.	Wald	df	Sig.	Exp(B)
Budapest	Step 0[a]	Constant	-1.840	.177	108.115	1	.000	.159
Prague	Step 0[a]	Constant	-.753	.129	34.318	1	.000	.471
Warsaw	Step 0[a]	Constant	-.721	.144	25.148	1	.000	.486

a. Variable(s) entered on step 1: Time_from_Transition.

Exhibit 5: Logit Output Tables – TIME

Model Summary

City	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Budapest	1	210.023[a]	.021	.038
Prague	1	340.558[b]	.029	.040
Warsaw	1	271.395[c]	.030	.042

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001 for split file City = Budapest .

b. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001 for split file City = Prague .

c. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001 for split file City = Warsaw .

Classification Table[a]

				Predicted		
				CBD Dummy		
City		Observed		Non CBD	CBD	Percentage Correct
Budapest	Step 1	CBD Dummy	Non CBD	233	0	100.0
			CBD	37	0	.0
		Overall Percentage				86.3
Prague	Step 1	CBD Dummy	Non CBD	189	0	100.0
			CBD	89	0	.0
		Overall Percentage				68.0
Warsaw	Step 1	CBD Dummy	Non CBD	144	4	97.3
			CBD	64	8	11.1
		Overall Percentage				69.1

a. The cut value is .500

Exhibit 5: Logit Output Tables – TIME

Variables in the Equation

City			B	S.E.	Wald	df	Sig.	Exp(B)
Budapest	Step 1[a]	Time_from_Transition	-.129	.054	5.759	1	.016	.879
		Constant	-.801	.445	3.246	1	.072	.449
Prague	Step 1[a]	Time_from_Transition	-.163	.059	7.634	1	.006	.850
		Constant	-.131	.252	.270	1	.603	.877
Warsaw	Step 1[a]	Time_from_Transition	-.142	.055	6.624	1	.010	.868
		Constant	.704	.566	1.548	1	.213	2.022

a. Variable(s) entered on step 1: Time_from_Transition.

Exhibit 6 shows the calculations of individual logits by time from transition and the corresponding probabilities of CBD location for All Markets, Budapest, Prague and Warsaw.

Exhibit 6 – Logit Model Results with TIME

	All Markets		**Budapest**		**Prague**		**Warsaw**	
Time	Logits	Probabilities	Logits	Probabilities	Logits	Probabilities	Logits	Probabilities
Constant	-0.400		-0.801		-0.131		0.704	
Coefficient	-0.093		-0.129		-0.163		-0.142	
2	-0.279	43.1%	-1.059	25.8%	-0.457	38.8%	0.420	60.3%
3	-0.279	43.1%	-1.188	23.4%	-0.620	35.0%	0.278	56.9%
4	-0.372	40.8%	-1.317	21.1%	-0.783	31.4%	0.136	53.4%
5	-0.465	38.6%	-1.446	19.1%	-0.946	28.0%	-0.006	49.9%
6	-0.558	36.4%	-1.575	17.2%	-1.109	24.8%	-0.148	46.3%
7	-0.651	34.3%	-1.704	15.4%	-1.272	21.9%	-0.290	42.8%
8	-0.744	32.2%	-1.833	13.8%	-1.435	19.2%	-0.432	39.4%
9	-0.837	30.2%	-1.962	12.3%	-1.598	16.8%	-0.574	36.0%
10	-0.930	28.3%	-2.091	11.0%	-1.761	14.7%	-0.716	32.8%
11	-1.023	26.4%	-2.220	9.8%	-1.924	12.7%	-0.858	29.8%
12	-1.116	24.7%	-2.349	8.7%	-2.087	11.0%	-1.000	26.9%
13	-1.209	23.0%	-2.478	7.7%	-2.250	9.5%	-1.142	24.2%
14	-1.302	21.4%	-2.607	6.9%	-2.413	8.2%	-1.284	21.7%

Exhibit 7

Variables in the Equation

City			B	S.E.	Wald	df	Sig.	Exp(B)
Budapest	Step 1(a)	**Size**	.000	.000	.955	1	.328	1.000
		Time from Transition	**-.148**	**.053**	**7.851**	**1**	**.005**	**.862**
		Constant	-.776	.442	3.089	1	.079	.460
Prague	Step 1(a)	**Size**	.000	.000	1.542	1	.214	1.000
		Time from Transition	**-.136**	**.049**	**7.772**	**1**	**.005**	**.872**
		Constant	-.089	.187	.227	1	.634	.915
Warsaw	Step 1(a)	**Size**	.000	.000	18.102	1	.000	1.000
		Time from Transition	**-.166**	**.057**	**8.309**	**1**	**.004**	**.847**
		Constant	.134	.599	.050	1	.823	1.143

a Variable(s) entered on step 1: Size, Time from Transition.

Classification Table[a]

				Predicted		
				CBD Dummy		Percentage Correct
City		Observed		.00	1.00	
Budapest	Step 1	CBD Dummy	.00	233	0	100.0
			1.00	38	0	.0
		Overall Percentage				86.0
Prague	Step 1	CBD Dummy	.00	221	1	99.5
			1.00	112	4	3.4
		Overall Percentage				66.6
Warsaw	Step 1	CBD Dummy	.00	140	8	94.6
			1.00	50	23	31.5
		Overall Percentage				73.8

a. The cut value is .500

Variables in the Equation

City			B	S.E.	Wald	df	Sig.	Exp(B)
Budapest	Step 0(a)	Constant	-1.813	.175	107.444	1	.000	.163
Prague	Step 0(a)	Constant	-.649	.115	32.100	1	.000	.523
Warsaw	Step 0(a)	Constant	-.707	.143	24.419	1	.000	.493

a Variable(s) entered on step 1: Size, Time_from_Transition.

Omnibus Tests of Model Coefficients

City			Chi-square	df	Sig.
Budapest	Step 1	Step	8.296	2	.016
		Block	8.296	2	.016
		Model	8.296	2	.016
Prague	Step 1	Step	14.157	2	.001
		Block	14.157	2	.001
		Model	14.157	2	.001
Warsaw	Step 1	Step	30.903	2	.000
		Block	30.903	2	.000
		Model	30.903	2	.000

Conclusions

This paper has examined foreign capital flows into the real estate markets of Budapest, Prague and Warsaw following the 1989 economic and political liberalization. By combining together theoretical perspectives from the Foreign Direct Investment literature, research on multi-national enterprises and from urban economic models, it is possible to generate a number of hypotheses about the nature of those capital flows. First, we test for the relationship between changes in the level of FDI in each of the three countries and changes in office construction in their capital cities. FDI drives demand for new space – but increasingly this is demand for service-oriented buildings, not the manufacturing, production facilities that are the main focus of much of the FDI literature. Second, we test the spatial distribution of new building and refurbishment in the three cities. We hypothesize that it is likely that the initial location of construction will be highly clustered, focused on the CBD in each city, with a dispersion occurring as firms become more familiar with, and confident about, the market.

Evidence from the Warsaw market indicates a strong contemporaneous correlation between changes in FDI and office construction (which is not simply a function of increasing investment). This implies some anticipation of demand for space in the market. By contrast, change in office construction in Budapest lags changes in FDI. The different policy responses to the process of economic liberalization, early moves to deregulate in Poland and the planning constraints imposed by the preservation of the historic core may explain these different responses.

With respect to location, there seems strong evidence from all three cities that, initially, firms clustered strongly in downtown CBD locations but that there has been a rapid dispersion. This early clustering did not reflect the initial distribution of office space (which was dispersed). Size of building is weakly significant as an explanation of decentralization in some of the models, but its impact is much less significant than the time variable. Anecdotal suggestions point to a desire to locate near other non-domestic firms: for security, or as a confidence factor. In developed economies, suburbanization of office space has followed residential decentralization. Given the short timescale, this is unlikely to be an explanation for the observed changes in distribution in Budapest, Prague and Warsaw.

Empirical work in transitional and emerging markets is often hampered by short time series and difficulties in obtaining and cleaning data. That is the case in this study. Nonetheless, the results point both to the important link between incoming FDI and office construction in domestic city centres (a relationship that is under-researched in the FDI and MNE literature) and to an evolving spatial process that points to an initial clustering followed by a rapid dispersion from the central CBD's of the three markets.

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APPENDIX: OFFICE CONSTRUCTION: SIZE, TIMING AND LOCATION

Exhibit A1 – CBD vs. Non-CBD Office Building Descriptives

City	Location	Variable	N	Minimum	Maximum	Mean	Std. Deviation
Budapest	Non CBD	Size in meters	244	821	60,000	5,356.95	6,055.85
		Year of Construction	233	1990	2003	1997.73	3.17
		Valid N (listwise)	233				
	CBD	Size in meters	44	1,438	30,943	5,937.78	5,539.49
		Year of Construction	39	1985	2001	1995.87	3.72
		Valid N (listwise)	39				
Prague	Non CBD	Size in meters	222	280	33,800	4,101.91	4,700.91
		Year of Construction	222	1993	2003	1997.59	2.68
		Valid N (listwise)	222				
	CBD	Size in meters	116	105	20,000	2,941.27	3,500.74
		Year of Construction	116	1993	2003	1996.53	2.47
		Valid N (listwise)	116				
Warsaw	Non CBD	Size in meters	148	300	27,000	6,927.94	5,193.14
		Year of Construction	148	1992	2003	1999.53	2.41
		Valid N (listwise)	148				
	CBD	Size in meters	73	1,000	49,782	12,495.11	11,459.28
		Year of Construction	73	1989	2003	1998.41	3.14
		Valid N (listwise)	73				

Source: JLL, author (Note: N indicates sample size)

Exhibit A2 – Boxplots CBD vs. Non-CBD Office Buildings, All Markets

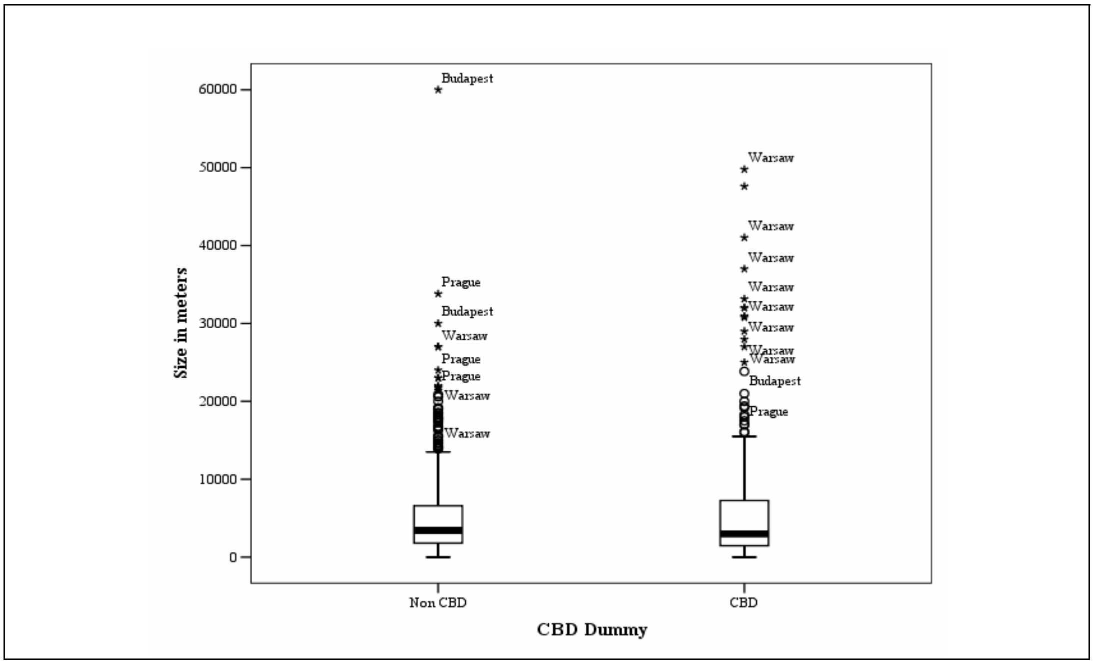

Exhibit A3 – Non CBD vs. CBD Properties, All Markets (Office Building)

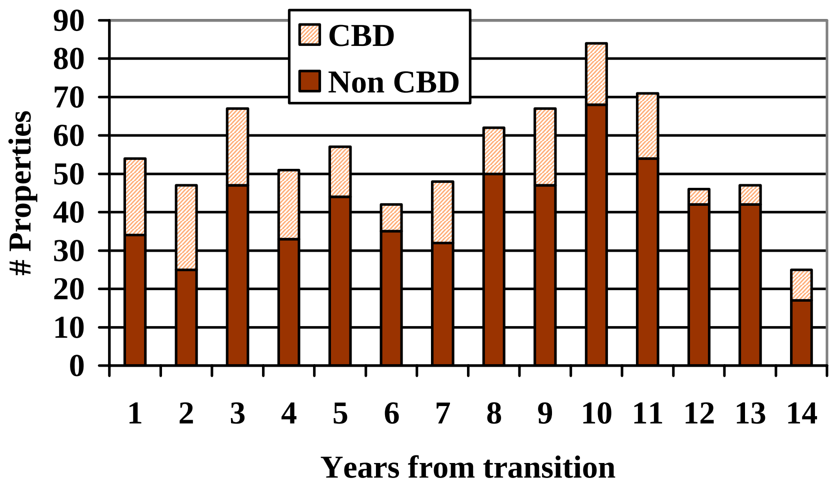

Exhibit A4 – Budapest Distribution by Submarket by Size

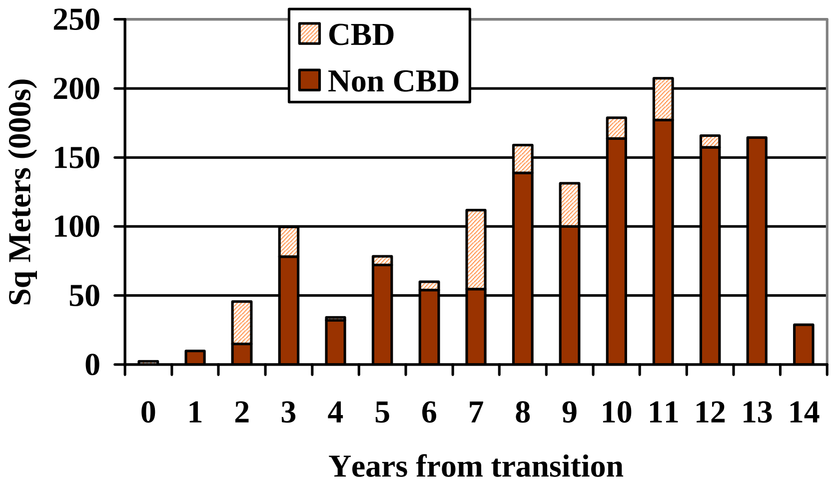

Exhibit A5 – Prague by Submarket by Size

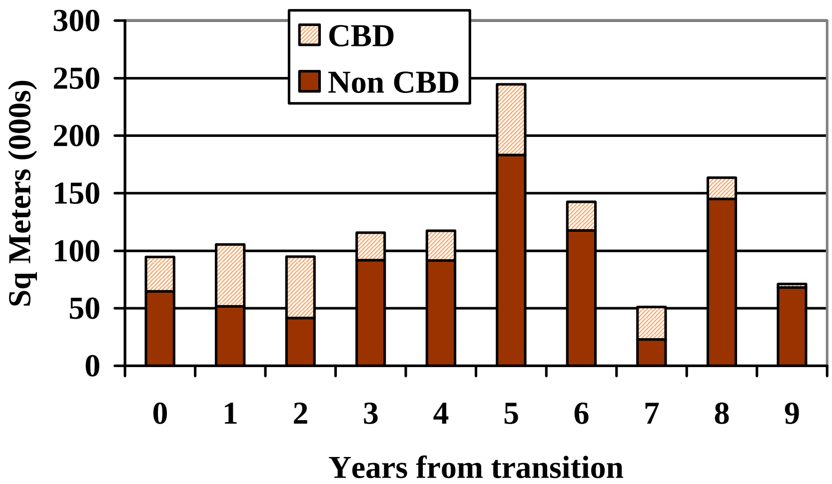

Exhibit A6 – Warsaw Office by Submarket by Size