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How Transport Links Help Market Integration: the Case of Moscow Office Rental Market

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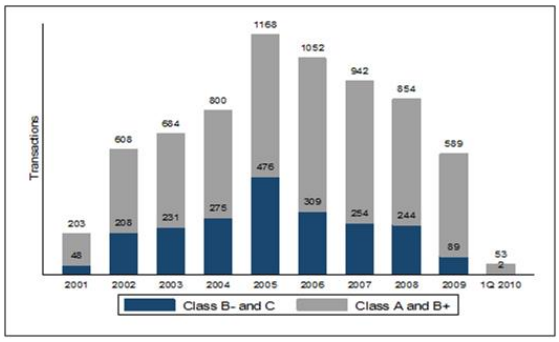
This brief is based on a research project on Moscow office real estate (Ignatenko & Mikhailova, 2014). We study the market for office space rentals in Moscow. Our main interest regards spatial competition: when an object is rented, does the rental rate respond to the behavior of competing objects in a geographical vicinity? What is the geographical extent of the market, and how do urban transportation links help integrate local markets and extend the geographical scope of competition? We find that urban transportation "shortens" the effective distances and intensifies competition between geographically differentiated objects. The effects are modest, but statistically significant.

We analyze a unique dataset on office space rental deals in Moscow in 2001-2010. The dataset was collected by an analyst team at *Cushman & Wakefield Russia* and includes all the deals on office spaces that were publicly advertised, with detailed and verified information on the object characteristics, rental prices, and the contract dates. We also have information on the object's location – precise geographical coordinates – and thus we are able to study this market at a very detailed level of geographical aggregation.

Moscow Office Rental Market in 2001-2010, an Overview

The market for office space in Moscow went through a stage of rapid growth through 1990s and 2000s. Economic development drove the demand for all types of offices at all price ranges. The demand was met by a conversion of residential and industrial spaces into offices, as well as by new construction. In our sample, the top year in terms of the number of transactions was 2005, with a slight decline in the years after, and a somewhat sharper drop in 2009 after the global financial crisis. The composition of different types of offices and their characteristics have changed toward slightly higher quality through that decade: the share of transactions with class A and B+ offices was steadily rising (see Figure 1).

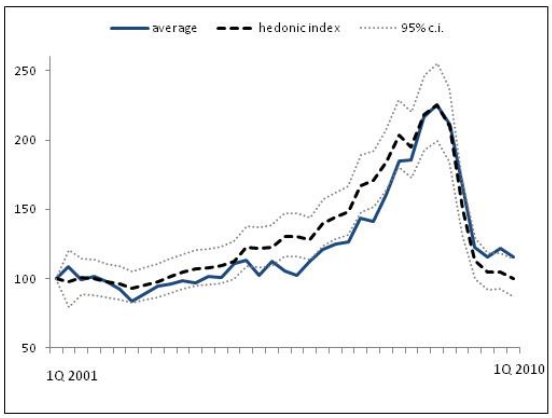
Figure 1. Number of Office Rental Transactions by Year and Class of Office



Source: Authors' own calculations.

Up until the third quarter of 2008, the rental rates were constantly increasing. Average office rental prices in Moscow grew more than two-fold during 2001-2008, but fell almost to the initial level after the global financial crisis and the subsequent crush of the market. Figure 2 illustrates the quarterly index of simple average office rental rates and the corresponding hedonic price index. A hedonic index is constructed using a regression of the objects' prices onto the observed characteristics of the objects and a set of time period indicators. Thus, the regression decomposes the overall price into the contributions of object quality and time period. The estimated time effects give the hedonic index, cleaning the time series of prices from all of the effects of changes in quality. Interestingly enough, the value of the hedonic index at the beginning of 2010 was exactly at the same level as in 2001. Thus, although the average price level was higher in 2010, all the price gains can be attributed to an increase of the average object's quality.

Figure 2. Average Price and Hedonic Price Index of Moscow Office Rentals, 2001-2010



Source: Authors' own calculations.

In Moscow we observe a typical behavior of the real estate market during booms and busts. While prices rise, tenants switch to lower quality objects to fit the budget, and the hedonic index rises faster than the average price. When prices fall, tenants support the higher end of market, looking for high-quality bargains, and the hedonic index falls faster than the average price. Overall, Moscow real estate market fits the basic stylized facts.

A hedonic analysis reveals the value of the object's characteristics in the eyes of the consumer. The presence of transport infrastructure creates direct benefits. Consumers value an accessible transport infrastructure: offices lose 9% of rental price for each 10 minutes of walking distance to the nearest subway station. It is easy to calculate the surplus from a new subway line: it would increase the value of the land and real estate objects in the area of service. Because land and real estate are supplied inelastically, the bulk of this benefit goes to the owner. Consumers (in our case, tenants) receive the benefit of shorter commuting time, but in exchange for higher rental prices.

In addition to these direct benefits, transport links also tend to promote market integration by making objects that are near and objects that are far away, more substitutable in the eyes of the consumer. Transport links lower the degree of product differentiation in the geographical dimension. And, as with any kind of product differentiation, this should limit seller's market power and reduce prices. The benefits of increased competition (if any) go directly to consumers. We analyze competition between the offices for rent in the context of geographical distance to determine whether transport links indeed make competition stronger.

Spatial Competition and Transport Infrastructure

We use the dataset to study price competition between real estate objects. Real estate objects are best thought of as differentiated goods. Each object possesses a set of characteristics and a fixed location, i.e. objects are differentiated by consumer characteristics and by geography.

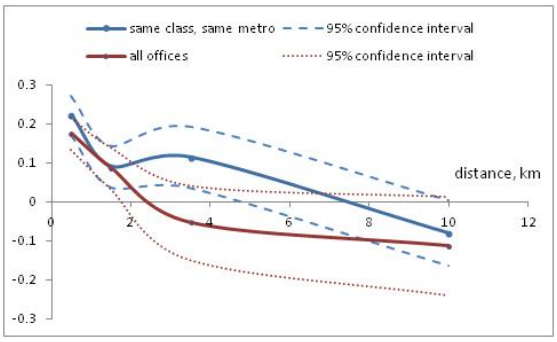
Each object is essentially unique, but the owners' market power is limited by competition. Competition between objects is stronger if objects are closer in consumer characteristics and in location, so that potential tenants view them as closer substitutes. An owner of an object reacts to the behavior of their competitors, i.e. sets the price reacting to the prices set by similar objects in the neighborhood. We study how the strength of price reaction depends on geographical distance between objects by estimating the slope of the reaction function of the owners in a price competition game.

Our estimates show that price reactions of competition from the neighboring objects are very modest. Hypothetically, if two offices of similar size in the same location are for rent, and one of them cuts a price by 10%, the other responds on average by cutting price by only 1.7%. Even at a zero geographical distance between competing objects, there is substantial market power, presumably because of strong differentiation in the other product characteristics. The response is weaker if competing objects are located further away from each other, and at 1.8 kilometers is statistically indistinguishable from zero, i.e. such objects practically do not compete.

When we consider competition inside a more narrowly defined class of offices (grouping A and B+ offices vs B- and C offices), the results change slightly. We find that offices compete mainly within their own class. The reaction to the prices of another class is not different from zero, even in the immediate geographical vicinity. For the offices within the same class the geographical range of competition extends from 1.8 km to 2.1 km, and the reaction to neighbor's prices is slightly stronger, with an elasticity of 0.2.

As a next step, we include transport links into our measure of distance. Consider offices that are located on the same subway line, i.e. where a passenger can travel between locations without changing the line. Price response to such competing objects is not much stronger: about 22% of the shock, but it stays above zero at longer distances. Price responses become indistinguishable from zero only at a distance of about 4.7 km. Figure 3 compares the two estimated price response functions: for all offices and for offices of the same class and on the same subway line.

Figure 3. Price Response as a Function of Geographical Distance when Objects are Connected by a Direct Subway Line



Source: Authors' own calculations.

To summarize, our findings confirm the old stylized fact: the real estate market is very "local". It is local not only in a geographical sense, but also in a product space sense: objects compete only with similar objects and mainly in the immediate geographical neighborhood. Direct transportation links (subway) promote market integration: it "shortens" the effective distance and makes the geographical boundaries of a market much wider. In the case of office real estate, the effect on the price level is very modest. The price reaction is weak even in the immediate vicinity, and it decays quickly with the distance. Yet our research underscores that the effects of transportation links on market integration and competition are real and measureable, and should be considered in cost-benefit analysis of transportation projects.

References

Ignatenko, Anna and Tatiana Mikhailova "*Spatial Competition and Transport Infrastructure: The Case of Moscow Office Rental Market*", mimeo, 2014

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