

Land Assembly Costs in Development Projects: Investment Assessment and Market Consequences

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Abstract The aim of the article is to discuss the main problems in land-development activity. Land assembly process is crucial for successful investment and the aggregated results of land assembly projects are fundamental for real estate market dynamics. In the article we describe possible explanations of significant differences between land market values and actual prices paid for single plots during assembly operations, as well as we discuss converging development yields.

In our study we focus on real estate market in Poland, and we examine land assembly operations in Krakow – one of most rapidly growing land markets in the region. The empirical part of the study is based on real estate transaction data, gathered by Cracow Real Estate Institute (KIN). The paper exploits the structure of transactions micro-data from Krakow to identify the potential large volatility of prices paid for adjacent plots, assembled during development projects.

Keywords - land assembly, development, costs, risk, investment value

The main objectives of the study, are listed below:

- exploration of land assembly projects,
- exploration of land acquisition cost, and their key determinants.

In order to research areas above, the research was both quantitative and qualitative. The core of our researched is based on land transaction data provided by Cracow Real Estate Institute (KIN), and based on Notary Acts (NAs). The data were drawn from large database covering nearly all land transaction made in Krakow since 1992 .

Complementary to being representative, the data used in our research were also highly detailed – available information covered several plot attributes (i.e. size, length, width, transaction price, address, GIS coordinates, distance from the city centre, possible usage, territory development) and additional transaction records (i.e. buyer, seller, time, valuation results where possible, current user where existing, supplementary agreements as stated in NA). All KIN data records are based on Notary Acts information and in-depth site scrutiny (of physical cadastre, and other real estate registers available, GIS survey, etc.).

Our sample from real estate market in Krakow (632 observations) covered transaction from 4/10/1992 to 31/12/2003. Sampling was based on land contiguity. Only adjacent plots sold by individual proprietors to institutional investors were included in the sample. Majority of these plots was available for multi-housing or commercial development, and most of them has been built over (scrutiny of whether site assembled was developed was another measure we used to ensure face validity of our data).

In order to realize other research goals additional qualitative research was performed. In that faze we conducted several in-depth unstructured interviews with developers, and real estate brokers operating in Krakow area. Main areas of our interest were:

- the faze of site search (techniques used, objectives, preliminary evaluation, etc.);
- the process of land-acquisition (problems, negotiations, strategy, legal pitfalls);
- assessment of an investment worth (methods applied, the role of risk, etc.).

Qualitative research results helped us to evaluate the impact of land acquisition costs on the investment outcome (in terms of risk and yield). It should be noted however, that results of that faze, are probably non-representative and incomplete. Alas, they can provide some interesting hypotheses to be tested in further quantitative research.

I. INTRODUCTION

House price appreciation in Europe has been very strong recently. With some exceptions residential prices increased in all European countries, but the growth effect was probably the most visible in emerging real estate markets of CE countries.

In the paper we focus on land acquisition problem, as we consider this phase of development project crucial for overall investment outcome, and to certain extent its aggregated results fundamental for real estate market dynamics. Firstly, even on emerging markets, the stock of greenfield suitable for development is systematically decreasing, as well as the number of large, superbly located plots. Therefore, every developer faces the land acquisition problem, which can be especially complicated when several small plots need to be assembled in order to start development. Secondly, as the building costs are hard to control, and demand is exogenous, land acquisition costs are the key variable when assessing investment yield.

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II. LAND ASSEMBLY PHASE OF A DEVELOPMENT PROJECT – AN EMPIRICAL ANALYSIS

History of land-development transaction shows that some parts of the city have witnessed very intense assembly operations during last 15 years. Three of them, seem to dominate the others in terms of transactions conducted: Bronowice, and Krowodrza Górka in north-west part of the city, and Ruczaj in south-west part of the city. As can be seen from the map attached, the east part of the city (namely Nowa Huta district) was not essentially interesting for potential developers.

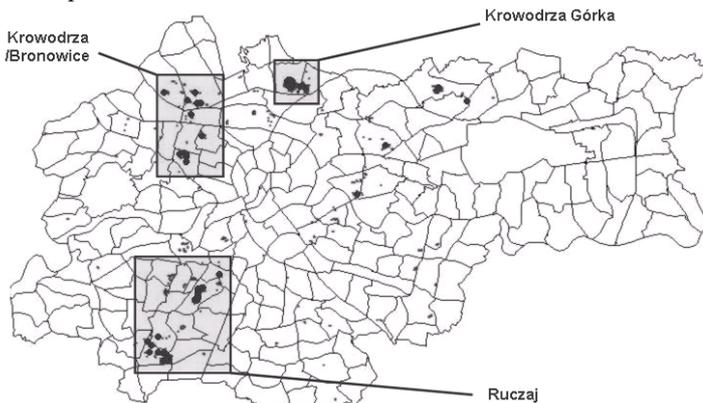


Fig. 1. Selected land assembly operations in Krakow from 1993-2004

Source: author's own

The statistics for housing development follow the same pattern, so the concentration of land-assembly practices is supposedly not caused by specific land patterns in west part of Krakow (small plots forcing developers to perform complicated assembly operations), but the potential investment benefits (housing attractiveness of west part of Krakow, contrasted with post-socialist Nowa Huta).

During examined period of time, 116 land assembly operations were undertaken. This number does not include transaction conducted by municipality of Krakow and the Treasury of Poland, with the aid of compulsory purchase. The operation were not homogenous in terms of time span needed to complete the entire operation, number of transactions involved, and operation total worth.

First conclusion drawn from our analysis is that assembly operations in Krakow, were rather small sized (74% of transaction involved less than 5 operation). The biggest operation involved 40 transactions. The majority of assembly projects were completed in one year time span (one in four operation took only several days). Only 20% of all operation took longer than 20 months. The last evidence of different scale of land assembly in Krakow is based on information of operation worth – it ranges from less than 10 thousand zł to as much as 41 mln zł.

As for the plots involved in each operation, suffice it to say that they varied considerably. Empirical evidence shows that typical plot in Krakow is long rather than wide (although there are exceptions). Minimum front width of plot from our sample was 1 meter only, and the maximum 615 meters.

More careful analysis shows also that a modal plot was small, and often of irregular shape. As can be seen from figure 2, when the simple shape ratio is used (front width to length of a plot) it occurs that most of land pieces assembled by developers were long rectangle shaped. This result is not surprising – as a matter of fact it is consistent with outcomes of previous research conducted by Bitner-Fialkowska in selected European cities (2002).

When dealing with land transactions, a few words must be spoken about legal issues of assembly process. Significant number of plots had major legal disadvantages – hindered access to public road, easement appurtenants, and personal servitudes. Many plots were co-owned. All these defects made the future development a costly, and problematic endeavor.

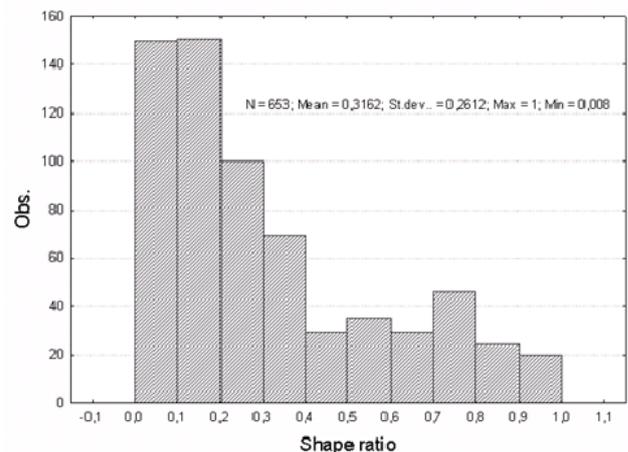


Fig. 2. Transaction based evidence of typical shape ratio of land suitable for development in Krakow

Source: author's own based on KIN database

More illustrative evidence of the statistics above is provided by figure 3.

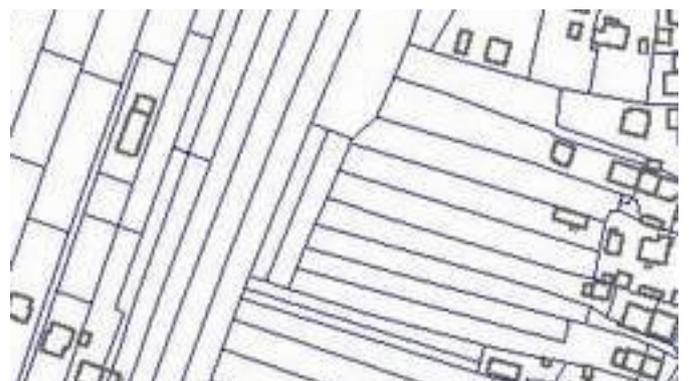


Fig. 3. Typical land pattern of sprawling city - the evidence from Krakow

Source: physical cadastre map of Pasternik in Krakow, http://www.bip.krakow.pl/?dok_id=13033&sub_dok_id=1303

The long, narrow rectangular plots are good for agriculture, but seriously disadvantageous when development projects are concerned. The land pattern displayed in figure 3 forces

developers to assemble several plots from different owners in order to conclude large development projects.

III. LAND ASSEMBLY COSTS AND RISK

From all land assembly operations in our sample, considerable number of 34 was accomplished within few days period (most of this number in one day). These were drawn out of the sample and examined separately.

To examine acquisition costs we performed scrutiny of each land assembly operation. In order to find more generalized pattern of price movement we studied relation between prices of land pieces gathered in each project (we set the price of first transaction accomplished during the whole process to 100) and the time from the start of the entire operation (in months). The results illustrated by scatterplot can be seen on figure 6.

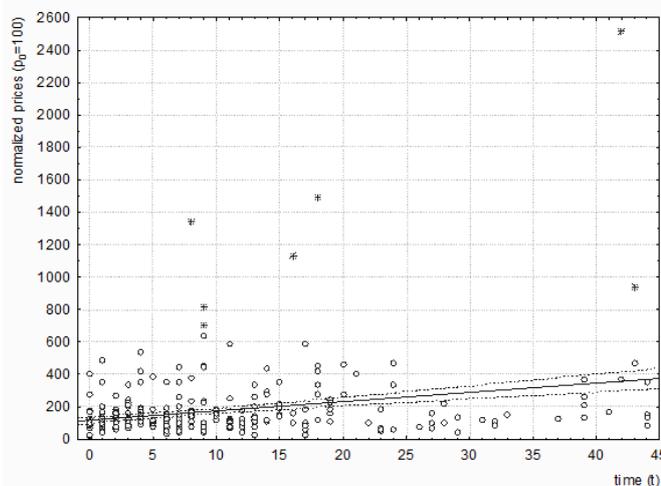


Fig. 4. Land prices in land assembly project in Krakow
Source: author's own based on KIN database

As can be seen from illustration above, there is no apparent abnormal appreciation process when transaction prices are concerned.

As we do not aspire to build the competing model of a land assembly process, there were several interesting effects observed. Although the research was exploratory we believe that the results obtained have substantial descriptive value. Several facts we have detected are listed and discussed below:

- In many operations investor faced the legal situation where there were several co-proprietors of a single plot. Empirical evidence shows, that in most of assembly operations in Krakow shares were sold simultaneously. It seems that a kind of the “either all or none strategy” was applied. Of course there were also (as always) interesting exceptions. When several shares and/or plots were sold simultaneously, the prices per sq meter were similar – and often exactly the same. Descriptive statistics show that prices are concentrated around the mean - the standard deviation to mean ratio of 34 simultaneous acquisition projects from our sample was only 0,24, with kurtosis of 18.
- In some projects the “step by step strategy” of land assembly was observed. It was typical for several big

assembly projects, that usually were conducted in distinct fazes - when certain number of plots were acquired, there were built over, and investor began negotiations with owners of adjacent plots. If the result was positive, the area of development was enlarged at comparatively lower cost (all necessary infrastructure existing, benefits of operation scale, etc.);

- In many operations prices per sq meter related to prices of first piece of land sold. This particular effect can be attributed to imperfect market data and strong asymmetry of information (especially on supply side). We called these effects „regression to mean” and “chaining” pricing strategy, as sellers relied heavily on information about average price paid for plots in neighborhood (without taking into account different site attributes), and tend to account for time when setting the asking price, which were on a slightly higher level than plots sold before (their reservation prices usually equaled the price of those previously sold). Surprising enough – when compared to theoretical expectations - appreciation in most of cases was mediocre (and generally followed market trends in Krakow).
- As can be seen from figure 4 land assembly cost were volatile (increasing investment risk). Several observations deviated considerably from others. The result is rather intuitive, and discussed in previous studies . These so-called “costly outliers” were usually plots, that were indispensable for entire development project to continue. The highest prices per sq meter were paid for tiny pieces of land stretching out in the middle of assembly area (of course when seller discovered the operation soon enough, and applied a successful negotiation technique), and for part of plot that supplied the whole investment area with access to public road (the same applied to easement appurtenants establishment).
- In case of large assembly operations, speculative behavior was observed. A number of important parcels were sold twice within short time span. This “speculative buyout” resulted in enormous land appreciation – usually more than by 100% a year (in some cases even more spectacular). The result suggest that repeated-sales indices of price movement in Krakow can be seriously biased .
- According to result of qualitative research some developers tend to choose plots not covered by precise master plans. Even though the risk is much higher (as use planning is an effect of bureaucratic procedure), they benefit from inefficient market with strong asymmetry of information, and count for extraordinary profits (the importance of secret/protected information connected to possible site development options – usually not available for individual sellers). In recent years, many developers amassed huge quantities of land suitable for development (land banks) with option to invest (and they wait for housing prices to go up even higher).

The last issue to be discussed here, is a consequences of new developments to urban landscape quality. As mentioned before only about 10% of Krakow's area is covered by master plans. The effects are obvious, and can only be described as chaotic development. The developers invest where it is

possible, and they exceed potential gains by increasing the built-up area to maximum. Some of the most valuable plots in city centre are built-up by substandard - in terms of architectural design - investments.

As development in Krakow is hampered by bureaucratic procedures, we can observe an increasing urban sprawl over surrounding villages. The case of Krakow resembles the situation observed in other rapidly growing cities in emerging real estate markets - Warsaw, Moscow, Bratislava. Many problems are caused by an inefficient road infrastructure - the embarrassing result of lack of strategic urban planning and foresight.

IV. CONCLUSION

As indicated before, the paper is intended to fill the gap on the subject of the land supply from the perspective of development projects. Although discussion on land supply is present in real estate literature, it focuses merely on mature western markets. Little is known about land-development problems in emerging markets in CEE countries.

In our study we focused on real estate market in Poland, and we examined land assembly operations in Krakow - one of the most rapidly growing land markets in the region.

The empirical results are to some extent similar to previously conducted research in western Europe and US. Surprisingly enough we discovered that land acquisition cost appreciation during most of land assembly operations was not as high as we expected on the basis of theoretical models available in the literature. The prices of succeeding land assembly transactions seemed to be rather chained to the first transaction price in the neighborhood (rather than fundamental market value of sites). On the other hand in many operations at least one deviant (in terms of enormous price paid) observation was noticed. We observed several speculative transactions that influenced the final outcome of land assembly operation. The other problems of land-assembly operations were connected to: legal issues, small sizes of separate plots, co-ownership of one piece of land, communication and access to public road burdens.

Typical land assembly operation was rather small sized (few transactions involved), and quick (a modal of 0-6 months). According to qualitative research results, when investment value and market efficiency is concerned the emphasis must be put on land planning and information issues. The role of negotiations was also pointed out - several endeavors were accomplished in just one day, at cooperatively low cost (after negotiating with all land proprietors involved in one time).

Our research has a preliminary character, and is explorative in nature. It is still carried on. Many problems discovered are far from being resolved - most of which due to scarce, and non representative investment information from developers. Important fields of future research include the following:

- measurement of sensitivity of investment value on land assembly costs (via Monte Carlo simulations);
- evaluation of the different strategies of land assembly on land acquisition process outcomes (in paradigm of game approach theory).

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