

THE MOTIVES UNDERLYING THE BEHAVIOUR OF THE AGENT IN DETERMINATION OF THE CITY FORM

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Abstract. Leapfrog growth pattern examined in Turkish cities results in many problems, especially environmental pollution (soil, water, air) and planning problems. This study will focus on the form and growth pattern of the cities. It can be explained by reference to the effects of the urban land market. This particular form and growth pattern have changed in time. Growth pattern includes two different periods. In the first period, leapfrog developments in the fringes of the cities create a decentralised city form for certain periods of time, whereas the subsequent infilling of the inner city vacant land re-creates the compact form. The motives underlying the behaviour of the agents effective in the determination of city form have been investigated in the research. Hence, the study shows how landowner behaviour gives way to leapfrog developments in the fringe, to the vacancy of the inner city land during a certain time period and its subsequent infilling.

Keywords: city form, motives, agents behaviour.

AIMS AND BACKGROUND

We may classify the motives underlying the behaviour of the agents effective in the determination of the city form into two categories.

1. The motive of maximising land rent;
2. The motive of maximising profit or utility from the activities carried out on land.

In the neo-classical models landowners behave in such a way as to maximise land rent. Hence, they rent their land out to the highest bidder in the market. In behaviour driven by the latter type of motive, land rent is included as a cost item, thus minimising land rent is the underlying motive. The consumers, on the other hand, maximise profit or utility by balancing their costs of various goods within the constraint of their income^{1,2}.

Studies on form and growth pattern of Turkish cities, however, introduces another way in which landowners maximise land rent³. Hence, landowners exploit other opportunities than just renting their land out to the highest bidder. Instead, they sell their land to the highest bidder in the market when the rent

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(and price) of their land reaches its highest level through improvements made on several features of the land over time. They hold the land in their ownership until this happens.

Hence, investors profit through the increase in the price of land between the dates of buying and selling the land. Their profit maximises when they buy the land when the previous landowners' expectations about the conversion of their land in the future is low, i.e. the price of land is the discounted form of the agricultural rent, and sell the land after urban conversion.

Agents are considered in four groups as "landowners", "developers", "owner-occupiers" and "renters". Then their targets will be defined in each group³. Among the agents which we will define in the following paragraphs, the "landowners" are motivated by maximising the increase in land price over time, whereas the "developers" and "owner-occupiers" are driven by maximising increase in land price over time as well as maximising profit or utility. The "renters", on the other hand, are motivated by the second motive only.

In this study, the concept which is the result of the examination on Turkish cities, had been determined as a city form that changing and growing pattern in a certain period of the time. Leapfrog developments in the fringes of cities create a decentralised city form for a certain period of time. And then, the subsequent in filling of the inner city, vacant land, re-creates the compact form.

Reference studies on Ankara, Istanbul and Izmir show that these cities can be determined as a sample of leapfrog development³.

It will be shown below that when these assumptions are modified appropriately, we can explain the rationale behind the agents' "leaping to the fringe", their "holding land around the edges of the city vacant", and their "spreading around the edges of the city on the vacant land in between the central city and the leapfrog settlements".

Moreover, it will be shown that behaviour motivated by the acquisition of an increase in land rent underlies each of such developments, whereas behaviour motivated by utility or profit maximisation only, gives way to no other type of development but to the spreading of developments around the edges of the central city. Thus, the behaviour of all agents, except the renters, namely the landowners, developers and owner-occupiers, enhances all types of developments, whereas the renters promote the compact growth of the city.

According to the acceptance in the models of Urban Land Market^{4,5}, development process contains three terms: (i) Leapfrog toward the fringes of the cities (T_0 - T_1); (ii) Conservation of the peripheries vacant (T_1 - T_2); (iii) Diffusion in the vacant lands which is location between the cities (city centre) and leapfrog development (T_2 - T_3).

T_0 is a term in which the land had been registered in the research area; in the T_1 term there is leapfrog development; T_2 - the beginning of the diffusion in

the vacant land; T_3 – the conclusion of the diffusion in the vacant land. Relation with the models of urban land marked, at a time to, T_1 , T_2 and T_3 the negatively declining rent structure is broken at several points by sudden breaches, due to the distinctive level of development of land in three parts of the city, namely, the central city, the periphery and the fringe of the city*.

The agents who face this price structure behave with an awareness to two periods. The first period lasts between T_1 and T_2 and the second period – between T_2 and T_3 .

At T_0 agricultural land remains in the ownership of landowners from the peripheral villages. At this stage, behaviour in the periphery and fringe of the city is rather different. In the periphery enclosure of the area within the settled area of the city in the future is expected. Thus two types of activities begin there. First, investors buy land in the area for the purpose of speculation, second part of the landowners developers their land by subdividing them into parcels for a few storey buildings and sell them. Thus, while one part of the landowners starts holding their land vacant for the purpose of speculation, another part of them opens up their land to development in the face of the existing demand. In the fringe no land development activities begin at this stage.

The price structure at T_0 have been determined by distance and development level of the land. On the other hand, price structure has been determined by the expectation of the landowner.

LEAPFROG DEVELOPMENT IN THE FRINGE INVESTOR BEHAVIOUR (LANDOWNER, DEVELOPER, OWNER-OCCUPIER)

In leaping to the fringe the land-owning agents are driven by the motive of maximising increase in land rent acquired in a certain period. Landowners, developers and owner-occupiers invest in land in the fringe by this motive. Below rationale underlying leapfrog development in the fringe will be outlined³.

INVESTOR BEHAVIOUR (LANDOWNER, DEVELOPER, OWNER-OCCUPIER) IN THE LIGHT OF LAND AT DIFFERENT LEVELS OF DEVELOPMENT

Investors are motivated by acquiring the increase in land rent during a certain time. Thus, they invest in parts of the city in which this increase would be maxi-

* The city space is divided into three compartments comprising of the central city, periphery and the fringe. The particular definitions attributed to these terms in this study are as follows: central city is that part of the city which is planned and developed, it has a compact form; the periphery is that part of the city where urban development is anticipated and for this reason is under use transition; agricultural land in the periphery is split with scattered urban developments and agricultural production is in a ripening stage; the fringe is the agricultural area surrounding the periphery of the city.

mum. In fact, the proportion of the increase in price of a unit of land bought at T_1 and sold at T_3 to its price in T_1 varies in different parts of the city due to the different rates of increase in rents in these areas. These differences are due to the distinct levels of development of land in different parts of the city and the breaches between the rents of land at different levels of development.

The proportion of increase in rent between T_1 and T_3 to the initial rent (i.e. the profit of an investor) is the lowest on urban land within the central city, higher on the transitional land in the periphery and the highest on the agricultural land in the fringe.

Within the high rents in the central city, differential rent and most part of the development rent are embedded. These rents are capitalised into the selling price of land by the previous landowner.

The only opportunity for an investor who buys the land at a high price to acquire land rent increases on this land stems from an increase in differential rent.

In the periphery, the relatively high rents involve the differential rent and a part of the development rent created by the subdivision of agricultural land. These rents are capitalised into the selling price of land by the previous landowner. An investor who buys land at this relatively high price faces the prospect of an increase in land rent due to the growth of the city (differential rent)* and urban conversion (development rent).

In the fringe, the low rents involve the agricultural rent of land. No land development activities have taken place on land yet. So, the previous landowners acquire almost no part of the total increase in rent of urban land. An investor who buys the land at this low price faces the prospect of receiving an increase in differential rent and all of the development rent which will be created on the land.

Thus, the landowners who own the least developed land (in the fringe) receive the highest proportion of increase in land price. In each part of the city the land rent increases acquired by investors are the highest at the boundaries. This is because of the higher rate of decrease of urban land relative to the rent of transitional land in the periphery and to the constant agricultural land in the fringe.

The effects of increases in differential rent and development rent between T_1 and T_3 on the level of profits of investors in different parts of the city are the same. Both of them increase at larger proportions at larger distances from the city center rendering profits of investors higher in the fringes of the city. However, it should be noted that while an increase in differential rent increases prof-

* Differential rent usually figures out in two forms: first, location rent, which is relation with the distance of the centre of the city; the second type of differential rent is relation with the local natural productivity.

its of investors with distance continuously, an increase in development rent increases them with sudden breaches at certain distances from the city center, i.e. at the boundary of the urban land within the city, of transitional land in the periphery and agricultural land in the fringe.

Hence, it is the development rent which divides the city into three compartments from the point of view of land investors.

In this condition, investment in the fringe and periphery, respectively, is more profitable than investment within the city.

This, in turn, explains the leapfrog developments in the fringe of the city which take place at T_1 . However, the figure as well demonstrates that the leapfrog development does not locate at the boundary of the agricultural land in the fringe where land investment is most profitable. It skips part of the agricultural land in the fringe and locates at a farther distance. This can not be explained with reference to the different rates of increase in rent of land in different parties of the city. This is rather because of the price structure at T_1 shaped by landowner expectations.

INVESTOR BEHAVIOUR IN THE LIGHT OF THE PRICE STRUCTURE SHAPED BY LANDOWNER EXPECTATIONS

As was mentioned before developments in the fringe have been attributed to the high proportion of land rent increases in this part of the city within a certain time period due to the small proportion of the total land rent increases capitalised into the prices paid to the previous landowner. The price structure facing an investor, however, changes when landowner behaviour shaped by their expectations of higher rents in the future is considered.

Hence, landowners throughout the city discount the expected future rents into their present reservation prices. Landowner expectations, on the other hand, are the highest in the periphery. This is because of the high probability of conversion of land in the periphery into urban land while land within the city has already been converted and the probability of conversion in the fringe is low.

The high reservation prices of landowners in the periphery lead the investors to leap to the fringe. In this way, they skip part of the agricultural land in the periphery where land investments are most profitable given the differences between development level of land in different parts of the city.

The land price level at T_1 shaped by landowner expectations and the level of profits from land investment in different parts of the city in the face of this price level is shown in Fig. 1.

As a result of the differences in the development levels of land in different parts of the city and landowner expectations of urban conversion in the future up to a certain distance from the city center buying land in the fringe and stimulating development there is a profit maximising behaviour for investors in

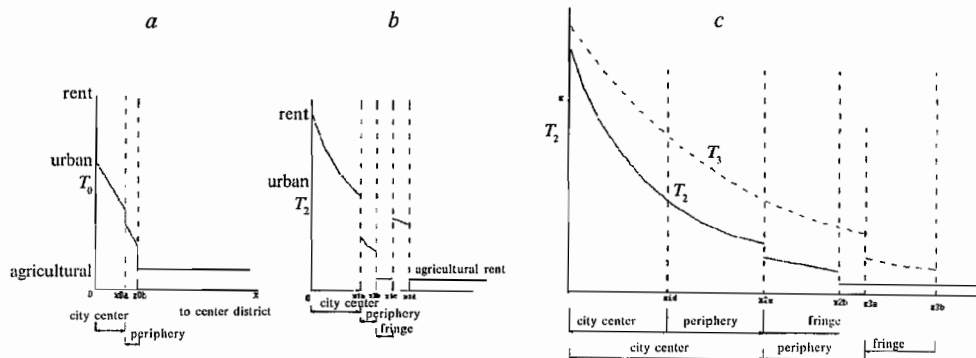


Fig. 1. The land rent structure determined by the effects of distance to the city centre and development level of the land (T_0 , T_1 , T_2 , and T_3).

the long run. As the city grows by land development activities at diverse stages and more land is enclosed in the city, the land investors continuously leap onto an outer part where agricultural land which has not been developed yet and on which expectations have not arisen provides them with the prospects of high profits.

Before the leapfrog development. In Fig. 1 the land rent structure which determined by the effects of distance to the city centre and development level of land at T_0 , T_1 , T_2 and T_3 is presented. As was above mentioned price is determined by distance and development level of land. On the other hand, price structure is determined by the expectation of the land owner (Fig. 1a).

- Vacant land in the periphery between T_1 and T_2 . At T_1 , before the leapfrog development, land in the periphery of the city presents a specific situation. Although it has not been converted into urban land yet, the (reservation) prices have reached the level of capitalised urban rent as a result of the landowner expectations of conversion in the future. Thus, the developers who search for an appropriate location in and around the city space skip the peripheral land characterised by high prices and leap to the fringe.

The demand of developers for land in the periphery give way to a further increase in the reservation prices in the area even before the leapfrog development takes place.

After the leapfrog development. The leapfrog development almost attributes certainty to the expectations of urban conversion of land between itself and the central city. Thus, after the leapfrog development, the (reservation) prices of land in the periphery increase by considerable rates. In this way, the landowners hold their land out of the market until a second period in which the rent of their land increases to the level of their expectations. They sell the land when the bid-prices reach their reservation prices in the second period. The rent of land increase in

the second period through an increase in differential rent by the growth of the city and an increase in development rent by the urban conversion.

As Fig. 1 demonstrates the (reservation) prices of land in parts of the periphery farther from the central city exceed those in the parts nearer to it in the first period. The first period after leapfrog development, prices of land in parts of the periphery farther from the central city are higher than in near part (Fig. 1b).

This is because of the large land ownership pattern in the far periphery which enables land speculation on large land parcels as well as having the potential of attracting demand of developers who need large scale land parcels (industrialist, big housing cooperatives operating at large scale).

Land nearer to the central city, on the other hand, suffers the small land ownership pattern and the existing settlement in the area which impedes land speculation and the operation of large scale developers in the area. However, this fact is reversed after the development differentials of land disappear at T_3 when all land is converted into urban land. Then, rent differentials are reduced to the effect of distance only (Fig. 1c).

• Development of the inner city vacant land between T_2 and T_3 . Owners of the vacant land in the periphery open up their land to development when the rent of land increases to the level of their expectations. This happens at T_2 after the differential rent on land increases by the growth of the city between T_1 and T_2 . Following this increase the land is converted into urban land through urban planning. This, on the other hand, increases the development rent on land. When the inner city vacant land is converted into urban land, the development differentials within the city disappear.

As a result, the entire city space including the inner city vacant land forms a market with homogeneous land supply. After this, the rent of land is shaped by the bidding process determined by the effect of distance only. The vacant inner city land is developed in the T_2 - T_3 period (Fig. 1c).

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