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Conference Paper

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50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Baron, Mira G.; Kaplan, Sigal (2010) : The impact of 'studentification' on the rental housing market, 50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden, European Regional Science Association (ERSA), Louvain-la-Neuve

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THE IMPACT OF ‘STUDENTIFICATION’ ON THE RENTAL HOUSING MARKET

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ABSTRACT

The process of ‘studentification’ of neighbourhoods within metropolitan areas raises issues regarding the impact of student influx on contemporary urban development, since the impacts of the process itself on the urban environment are contradicting and their net effects are hardly assessed. The current study focuses on the influence of student influx on rent prices in the private rental sector in a core city of a medium-size metropolitan area. Specifically, the impact of ‘studentification’ on rent prices is evaluated by hedonic price analysis. Data were collected from on-line real-estate portals by recording rental apartment advertisements, and consist of apartments characterized by more than a dozen attributes including rent price, neighbourhood, structural features, and electrical appliances. In order to investigate the impact of ‘studentification’, the advertisements were extracted for two neighbourhoods that are similar in all their characteristics, apart from their level of ‘studentification’. The results indicate that the impact of a higher ‘studentification’ level on the rent price is negative and significant.

Keywords: rental housing market, private rental sector, ‘studentification’, hedonic price analysis. .

1. INTRODUCTION

Evidence from several countries (Rugg et al., 2002; Charbonneau et al., 2006) indicates that during the last two decades higher education students have gradually become a highly influential player in the private rental sector (PRS). This phenomenon results from the rapid growth in the number of higher education students and from the immigration of students at both the national and the international level. For example, while in 2004 there were more than 120,000 students in

the leading universities in Israel (CBS, 2005), only 10% of these students are accommodated in the dormitories. Furthermore, about 40-50% of the students in each university did not study in the same district of the university (CBS, 2004). While the proportion of students in the PRS nationwide may seem low, the proportion of students in the PRS in university cities is often very high. For example, during 2001 full-time students comprised 16% of all privately renting individuals in the United Kingdom, while in university cities the estimated proportion of students in the PRS reached above 50% (e.g., Rugg et al., 2002; Rugg and Rhodes, 2008). At the neighbourhood level, students are geographically concentrated in neighbourhoods near the campus and neighbourhoods that offer abundance of social activities (Rugg et al., 2002; Charbonneau et al., 2006; Smith and Holt, 2007; Hubbard, 2008).

The process of 'studentification' (Smith and Holt, 2007), namely the growing role of higher education students as a substantial consumer demand group in the PRS, raises issues regarding the impact of student influx on contemporary urban development. Among the impacts that have been discussed in the literature are the generation of demand groups for both public and private transport (Roggeveen and Thompson, 1968; Smith and Holt, 2007), the regeneration and the revitalization of deteriorating urban areas (Macintyre, 2003), the formation of a creative culture (Charbonneau et al., 2006), the formation of seasonal sub-communities that induce physical, economic and social concerns of local inhabitants (Kenyon, 1997; Smith and Holt, 2007; Hubbard, 2008), and last the support of local employment and local economy (Hubbard, 2008).

Even though higher education students grew as demand group in the PRS, their influence on the housing market has been scarcely discussed. McDowell (1978) concludes that students outbid low-income renters for furnished apartments in the PRS in Brighton (U.K.). Macintyre (2003) briefly mentions that in some communities the pressure of many students seeking accommodation may have the effect of sharply driving up property values beyond the reach of local inhabitants. Cortes (2004) investigates the impact associated with urban universities on local neighbourhood housing markets in the 1980's and discovers that, although the proximity to the university significantly influences rent prices, the direction of the impact may vary across cities depending on (i) the university's policy regarding building dormitories and (ii) the physical state of the dormitories with respect to the state of the buildings in the neighbourhood.

The present study adds to the literature on the impact of a high proportion of students on the housing market in medium-size metropolitan cities by investigating a case study from Israel and

discussing the issues and the challenges associated with using the traditional method of hedonic pricing in order to evaluate the impact of ‘studentification’ on the rental housing market. The importance of this issue derives from the need to understand the net effect of the contradicting impacts of ‘studentification’ on contemporary urban development for policy implications. While student influx is considered a promising force of urban regeneration and economic growth, concerns are raised regarding the detrimental effect of students’ temporary sub-communities on the rental housing market.

The remainder of the paper is organized as follows. Sections 2 and 3 focus on the applied methodology and the data collection. Section 4 presents the model estimation results. Last, section 5 presents a discussion of the issues and the challenges arising from the study, draws conclusions and recommends further research.

2. METHODOLOGY

The impact of ‘studentification’ on rent prices is evaluated by means of a hedonic price analysis of rental apartment prices. In particular, the impact of ‘studentification’ can be evaluated by regressing apartment prices on apartment attributes, location amenities and an indicator function identifying apartments that are located in ‘studentified’ neighbourhoods.

As the econometric issues arising from hedonic price analysis, such as the selection of an appropriate functional form, have been widely discussed and resolved in the literature (e.g., Halvorsen and Pollakowski, 1981; Cassel and Mendelsohn, 1985; Cropper et al., 1988), there are two main methodological challenges specific to this study. The first methodological issue concerns the identification of ‘studentified’ neighbourhoods. The proportion of students by neighbourhood is not easily observed and measured, since the rental sector is highly dynamic and it is often unregulated. In particular, rental transactions are conducted with high frequency and are not documented by any central municipal agency. The second methodological issue concerns the separation of the impact of ‘studentification’ from the impacts of other neighbourhood characteristics. Since the metropolitan area is essentially an ‘open’ system subject to a variety of influences that are not easily differentiable impacts of some traits might interfere with the impact of ‘studentification’ since they are not easily quantifiable and thus cannot be accounted for directly in the hedonic price function. Examples for such variables are

the socio-economic level of the population in the neighbourhood, the building style, the land use mixture, the availability of view and the amount of vegetation.

In order to solve the first methodological issue, the percentage of student population per neighbourhood can be estimated. Residential neighbourhoods with high proportion of students can be identified by conducting surveys among students, carrying out surveys among tenants, or looking at municipal tax discounts to students. In the current study, a survey collecting both stated and revealed preferences of students regarding their residential location choice is preferred. The survey among students provides an indication of the distribution of students around the metropolitan area without the need for a-priori assumptions about relevant neighbourhoods where they might live, unlike surveys among tenants that rely on such assumptions to collect information under budget constraints. The survey among students is also preferable to using local tax files, since even though students are eligible for municipal tax discounts as well as other population groups such as senior citizens, often the justification for tax discounts remains undocumented. Hence, using local tax files could lead to serious biases in the model estimation.

In order to solve the second methodological issue, the separation of “studentification” from other neighbourhood characteristics should be obtained. Data concerning real-estate transactions, whether for rent or for purchase, typically consist of detailed information regarding the dwelling characteristics that are easily observed and well documented. Such characteristics include the structural features of both building and dwelling, the building style, the property age and the availability of electrical appliances. In contrast, the acquisition of detailed information regarding neighbourhood amenities is costly and time-consuming because some location amenities remain latent and are not easily measurable. For example, if two neighbourhoods vary in their level of ‘studentification’ in addition to their air pollution level and accurate information regarding both phenomena is unavailable to the researcher, referring merely to a neighbourhood as a ‘studentified’ area would create bias that derives from the confounding mixed effect of ‘studentification’ and air pollution. The current study resolves this issue by collecting data about apartments located in two neighbourhoods that are similar in their characteristics apart from the level of ‘studentification’.

3. DATA

The data used for the analysis consist of apartments for rent in the core city of the medium-size metropolitan area of Haifa, located in the northern part of Israel. The apartments were extracted from advertisements published on popular on-line real-estate databases (i.e., www.madas.co.il, www.yad2.co.il) during the years 2007 and 2010. The on-line databases for rental apartment search are extremely popular among students in Israel since they allow both publishing and reading free advertisements without on-line registration. The extracted apartments were manually inserted and coded into a database while avoiding duplicate records that could be easily identified since landlords' name and phone numbers were included in the advertisements. Each advertisement included information related to the following apartment attributes: neighbourhood, price, size, number of rooms and balconies, renovation status, floor, the availability of a pleasant view, reserved parking space, bars, elevator, air conditioning system, solar water heater and washing machine.

A total of 290 rental apartment advertisements were extracted for two neighbourhoods, namely Ahuza and Neve-Shaanan, which are similar in their characteristics apart from the level of 'studentification' and hence allow isolating its impact from other neighbourhood characteristics. The data was collected from September to December in 2007 and in May and June of 2010. The residential density, the structural features of the buildings and the average property age are similar in the two neighbourhoods. The residential density in Ahuza area ranges between 6,000-10,000 inhabitants per square kilometer, while the residential density in Neve-Shaanan partly ranges between 6,000-10,000 inhabitants per square kilometre and partly ranges between 11,000-15,000 inhabitants per square kilometres. The dominant building type in both neighbourhoods comprises of multi-storey buildings of up to 3-4 storeys, comprising of 10-16 apartments. As shown in Figure 1, the similarity in the structural characteristics of the buildings in the two neighbourhoods is evident. Although the first houses in both neighbourhoods were built during the 1920's and 1930's, most of the buildings in both neighbourhoods were constructed in the 1950's.



Figure 1 - Similar dominant housing type and style in Ahuza (left) and Neve-Shaanan (right)

In terms of socio-economic level, the CBS socio-economic index rating of the two neighbourhoods is similar: 7 in Neve-Shaanan and 8 in Ahuza on a 10-points national scale (CBS, 1995). In terms of shopping and leisure opportunities, although the Ahuza neighbourhood offers more shopping opportunities along its main street, both neighbourhoods are located within very short driving distance from nearby large and relatively new shopping malls, hosting a variety of shops, restaurants and coffee shops, cinemas and gyms. In terms of location and view, both neighbourhoods are located on the top of the Carmel Mountain and both neighbourhoods include properties without a view as well as properties looking at either the green Carmel mountain slopes or the Mediterranean sea of Haifa bay. The two neighbourhoods are also similar in terms of vegetation as demonstrated in Figure 2.



Figure 2 - Similar vegetation in Ahuza (left) and Neve-Shaanan (right)

Regarding environmental amenities, Table 1 presents the level of pollutant concentration in two monitoring stations, which are located in the two neighbourhoods (Ministry of Environmental Protection, 2006; Ministry of Environmental Protection, 2007). The level of air pollution in the two neighbourhoods is of the same order and magnitude, and is disregarded in the analysis.

Table 1 - Concentration of pollutants in 2006 and 2007 for the two neighbourhoods

Pollutant	2006		2007		Recommended level (Israeli standard)
	Ahuza	Neve Shaanan	Ahuza	Neve Shaanan	
PM2.5 Yearly average ($\mu\text{g}/\text{m}^3$)	21	23	18	20	15
SO2 yearly average (ppb)	2	2	2	2	--
NOX yearly average (ppb)	18	12	14	12	--
NO2 yearly average (ppb)	11	11	12	11	21
CO (ppm)	1	2	< 1	< 1	--

The main difference between the two neighbourhoods is their distance from campus and their resulting attractiveness to students. The neighbourhood of Neve-Shaanan is adjacent to campus and located within walking distance, while the neighbourhood of Ahuza is located only within driving distance from campus. The location of the two neighbourhoods with respect to the campus is illustrated in Figure 3. Notably, the Technion and Haifa University are the two main public higher education institutes in Haifa with 12,740 students and 16,176 students respectively (CBS, 2005). Both institutes are located in close proximity to each other and hence they are similar in terms of their distance from the two neighbourhoods.

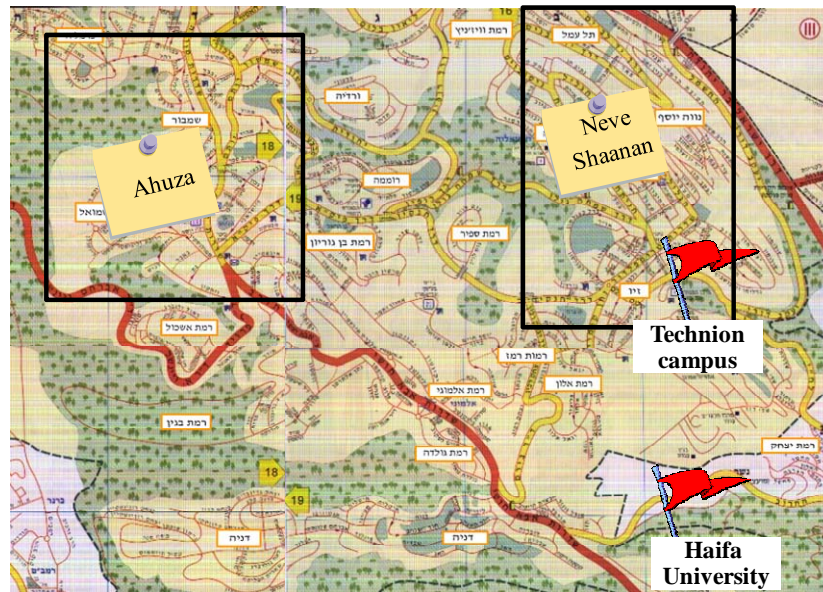


Figure 3 – The location of the two neighbourhoods with respect to the campuses

A survey that was recently conducted among 1,049 students at the Technion campus (Kaplan, 2010) provided indication for the difference in the level of ‘studentification’ in the two neighbourhoods. The survey collected information about the car travel time from the two neighbourhoods to the Technion campus, the neighbourhood attractiveness to students with respect to neighbourhood characteristics, and most importantly the revealed and stated preferences of students to reside in the two neighbourhoods. The car travel time from the two neighbourhoods to campus as perceived by respondents and the rating of the two neighbourhoods by the students on a 7-point Likert-scale ranging from 1 (poor) to 7 (excellent) are presented in Table 2. Notably, the only significant differences between the neighbourhoods are with respect to the perceived car travel time to the campus and the perceived accessibility to campus by public transport.

Table 2 – Rating of neighbourhood characteristics as perceived by students

Variable	Ahuza	Neve-Shaanan
Car travel time (minutes)	19.87 (6.70)	10.82 (2.78)
Accessibility to student job opportunities (score)	4.93 (1.61)	4.78 (1.55)
Accessibility to leisure activities (score)	6.26 (1.38)	4.55 (1.35)
Availability of public open spaces (score)	4.25 (1.63)	4.35 (1.40)
Accessibility to campus by public transport (score)	3.88 (1.48)	6.21 (1.43)

Standard deviation in parenthesis ()

According to the revealed preference data, 50.5% of the survey respondents resided in the two neighbourhoods. 66.4% of the interviewed lived in Neve-Shaanan. Moreover, 56.3% of the respondents reported their stated preference to reside in Neve-Shaanan, while only 13.8% of the respondents preferred Ahuza neighbourhood. Hence, according to the survey, the two neighbourhoods differ in their level of ‘studentification’, and while Neve-Shaanan can be regarded as a highly ‘studentified’ area, this is not the case with the Ahuza neighbourhood.

4. HEDONIC MODEL ESTIMATION RESULTS

The cumulative price distribution in the ‘studentified’ neighbourhood of Neve-Shaanan versus the ‘non-studentified’ neighbourhood of Ahuza is shown in Figure 4. According to the curves presented in Figure 4, the neighbourhood of Neve-Shaanan is characterized by a larger proportion of cheap apartments relatively to the neighbourhood of Ahuza. The mean monthly rent price per room in Ahuza is 1020 Israeli New Shekel (NIS) while it is 820 NIS in Neve-Shaanan.

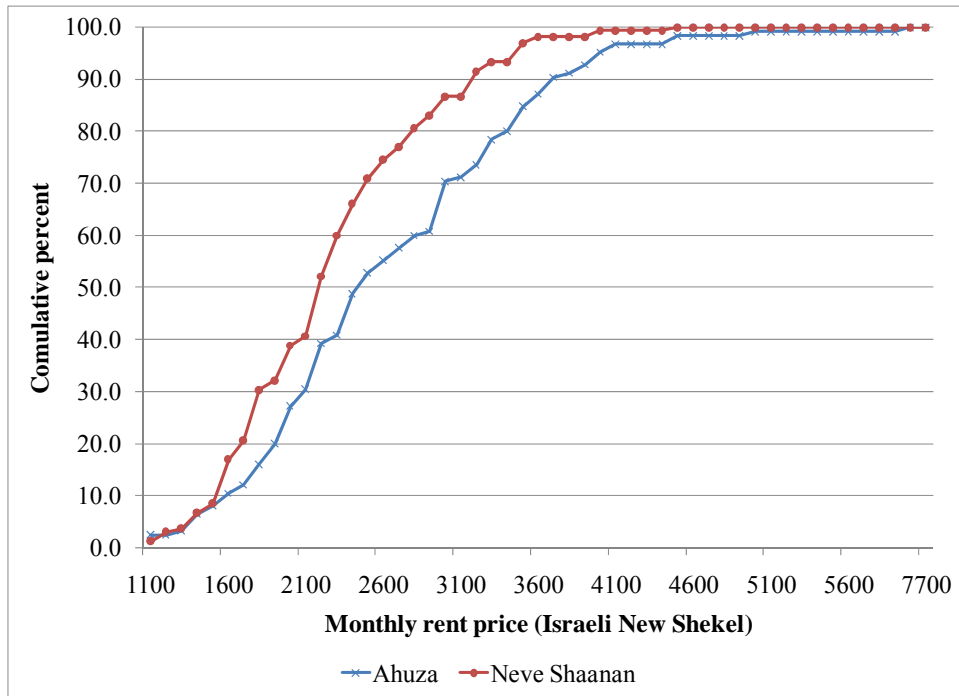


Figure 4 – The price distribution in the two neighbourhoods

This estimated hedonic model is a fixed-effect semi-log model described in the following equation. The semi-log model is preferable over the linear model since it assumes constant percentage partial effects and in this study it shows better goodness of fit. The semi-log model is also preferable over the log-linear model since it has the advantage of dealing with situations where some of the attributes have zero values (e.g., dummy variables).

$$\ln(\text{price}) = \beta_0 + \beta_1 \text{studentified} + \beta_2 \text{rooms} + \beta_3 \text{balcony} + \beta_4 \text{renovated} + \beta_5 \text{aircond} + \beta_6 \text{floor} + \beta_7 \text{parking} + \beta_8 \text{bars} + \beta_9 \text{view} + \beta_{10} \text{solar} + \beta_{11} \text{washmach} + \beta_{12} \text{year2010}$$

The variable *studentified* is a dummy variable that is equal to one in case the neighbourhood has a high ‘studentification’ level and zero otherwise. The variables *floor*, *rooms* and *balcony* account for the floor number, the number of rooms and the number of balconies of the apartment, respectively. The variables for number of rooms and balconies serve as proxy variables to apartment size since only 55% of the observations contained information about the size (square meters) of the apartment. The variables *renovated*, *aircond*, *parking*, *bars*, *view*, *elevator*, *solar* and *washmach* are dummy variables that account for renovated apartment and for the availability of an air conditioning system, a reserved parking space, security bars, a pleasant view, an elevator, a solar water heater and a washing machine, respectively. The variable for the amount

of municipal taxes is not utilized in the current study as only 60% of the observations contained information about municipal tax values. The dummy variable *year2010* controls for any significant change in the rental housing market between the years 2007 and 2010, since in the current empirical work aggregating the data from different time periods is necessary to account for enough observations. The constant β_0 accounts for effects which are otherwise unaccounted for in the model. The model estimation results are presented in Table 3. All the variables are significant at the 0.05 significance level, as variables with a lesser degree of significance are omitted from the model.

Table 3 – Hedonic model estimation results

Variable	Estimated coefficient	t statistic	Probability
Studentified	-0.141	-7.14	0.000
Rooms	0.174	17.3	0.000
Balconies	0.043	3.40	0.000
Renovated	0.049	2.31	0.022
Aircond	0.095	4.57	0.002
Elevator	0.071	2.39	0.018
Year2010	0.355	16.96	0.000
Constant	6.951	180.83	0.000
Number of observations			290
Adjusted R-squared			0.753

As expected, the monthly rent price is positively associated with the apartment structural features, namely number of rooms, number of balconies and renovation status. The monthly rent price is also associated with the availability of air conditioning system, a necessity in the Mediterranean climate. The availability of an elevator in the building adds to the value of the monthly rent price. The year fixed effect is significant and positive, indicating a considerable increase in the PRS in Haifa between 2007 and 2010. The impact of higher level of ‘studentification’ is negative and significant at the 0.05 significance level. According to the model, the monthly rent price of an apartment located in the “studentified” neighbourhood that is adjacent to campus is 14% lower than a similar apartment that is located in the ‘non-studentified’ neighbourhood.

5. CONCLUSIONS AND FURTHER RESEARCH

The current study focuses on the influence of student influx on rent prices in the PRS of a core city of a medium-size metropolitan area. The importance of this issue derives from the need to

understand the effect of ‘studentification’ on contemporary urban development for policy implications. While student influx is considered a promising force of urban regeneration and economic growth, concerns are raised regarding the negative effect of students’ temporary sub-communities on the rental housing market.

While the econometric issues arising from hedonic price analysis, such as the selection of an appropriate functional form, have been widely discussed and resolved in the literature, two important methodological issues are discussed and resolved in the current study. The first issue is the identification of ‘studentified’ neighbourhoods, which is not easily observed and measured due to the dynamic nature of an unregulated PRS. In the current study, ‘studentified’ neighbourhoods are identified through a survey collecting both stated and revealed preferences of students in the leading universities within the research geographical scope. This student survey provides an indication of the distribution of students around the metropolitan area without the need for a-priori assumptions about the relevant neighbourhoods where they reside, in contrast to surveys among tenants that rely on such assumptions to collect information under budget constraints. The second issue concerns the differentiation of the impact of ‘studentification’ of a neighbourhood from other impacts in an ‘open’ urban system subject to a variety of influences that are not easily quantifiable. This issue is resolved in the current study by collecting data from two neighbourhoods that highly resemble one another in their characteristics apart from the level of ‘studentification’, subject to the information resources available for the current research.

The results of the hedonic price model show that in the case of the study, where two neighbourhoods located in the core of a medium-size metropolitan area differ in their ‘studentification’ level and the ‘studentified’ neighbourhood is adjacent to a public university campus, the impact of higher level of ‘studentification’ is negative and significant. This finding agrees with the previous conclusions of Cortes (2004) that neighbourhood adjacency to public universities is statistically associated with lower rents compared to city averages.

Four possible directions exist for further research. First, further research is necessary on the influence of students on housing values from purchase transactions, as the current case study focuses exclusively on monthly rent prices. Second, in the current case study, two similar neighbourhoods were compared in order to understand the impact of the university campus on rent prices. A limitation of this methodology is that, even in the case of similar neighbourhoods,

the influence of 'studentification' can be mixed with other neighbourhood impacts that are not easily quantifiable. An interesting research direction is to investigate case studies in which either a university is newly built in an existing old neighbourhood or removed from an existing neighbourhood due to a relocation of the campus. Under such conditions, the impact of the university campus on the monthly rent prices could be investigated for the same neighbourhood over time. Third, a high proportion of students in a neighbourhood may radically influence the structural features of apartments, apart from its influence on monthly rent prices. For example, there is certain evidence from the media in Israel that high proportions of students induce the legal and illegal partitioning of apartments into very small dwelling units. This phenomenon should be investigated along with the impact of 'studentification' on monthly rent prices since it likely influences the rental housing market. Moreover, while the hedonic price analysis accounts for the apartment structural features, it assumes that the basic apartment type does not change as a result of 'studentification'. The aforementioned partitioning of apartments induces discontinuity in the housing market and hence should be accounted for in the hedonic model in order to avoid possible biases. Last, it would be interesting to explore the impact of high proportions of students, which are large temporal sub-communities, on the level of maintenance of both buildings and neighbourhood, in addition to their influence on housing prices. The issue of maintenance is important since it directly influences the quality of living and safety of the population in neighbourhood.

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