



**The Distribution of Rental Assistance  
Between Tenants and Landlords:  
The Case of Students in Central Jerusalem<sup>1</sup>**

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## **התחלקות הסיוע בשכר דירה בין שוכרים למשכירים: המקרה של סטודנטים במרכז ירושלים**

נעם זוסמן ודורון סייג

### **תקציר**

בשנים 2006-2011 הוענקו מלגות לסטודנטים שהתגוררו בשכירות במרכז ירושלים במטרה לעודד התחדשות עירונית, ואלו הביאו לגידול ניכר של מספר הסטודנטים באזור. המחקר בחן את התחלקות ההטבה בין השוכרים למשכירים. הוא הסתמך ברובו המכריע על מודעות להשכרה, לגביהן ידוע רק שכר הדירה המבוקש, וכן על תצפיות שעבורן נתון שכר הדירה בפועל, בשנים 2000-2012, ועל נתונים מינהליים של שכר הדירה ששילמו מקבלי המלגה. שיטת המחקר התבססה על אמידות הדוניות של שכר הדירה (כלומר בניכוי מאפייני הדירה) בשיטת הפרש-ההפרשים – השוואה של שכר הדירה במרכז העיר בתקופת הענקת המלגות לשכר הדירה לפני כן ואחרי כן לעומת הפרש זה בשכונות דומות (כולל סמוך למרכז העיר) באותן תקופות. המחקר מלמד – בהנחה שהשינוי בשכר הדירה בפועל היה זהה לשינוי בשכר הדירה המבוקש – שבתקופות סביב כניסת תוכנית המלגות לתוקף וסביב ביטולה שיעור גלגול המלגות לידי בעלי הבתים של המלגאים נע בין חמישית לשתי חמישיות; המלגות הביאו לעליית שכר הדירה במרכז העיר גם של אלו שאינם מלגאים, כך שהגידול בהכנסה משכר דירה של כל בעלי הבתים במרכז העיר (כולל המשכירים לדיירים שאינם מלגאים) היה שקול לכארבע חמישיות מסכום המלגות. שיעורים אלו הם בתוך הטווח הרחב של הממצאים מהעולם.

# **The Distribution of Rental Assistance Between Tenants and Landlords: The Case of Students in Central Jerusalem**

Doron Sayag and Noam Zussman

## **Abstract**

Students living in rental apartments in central Jerusalem were provided grants in 2006–11, in order to encourage urban renewal. This led to a marked increase in the number of students in the area. This study examined the distribution of the benefit between the tenants and the landlords. It relied predominantly on rental advertisements as well as actual rents from 2000–2012, and on administrative data of the rent paid by grant recipients. The research method was based on hedonic estimations of the rent using a difference-in-differences method—the rent in the center of the city during the grants period compared with the periods before and after, vis-à-vis that difference in similar neighborhoods (including adjacent to the city center) during those periods. The research indicates—subject to the assumption that actual rents and prices quoted in rental notices moved together—that in the periods around the start of the grant program and around its cancellation, the share of the grants reaching the recipients’ landlords ranged from one-fifth to two-fifths. The grants led to an increase in rents in the center of the city for nonrecipients as well, so that the overall additional rent is equivalent to four-fifths of the grant amounts. These rates are within the broad range of findings worldwide.

## A. Foreword

Affordable housing is a main objective of government social-economic policy (see, for example, Government of Israel, 2014). Its importance in Israel has grown with the increases in housing prices in the last few years. The government allocates many resources each year to housing assistance (for more details see: Agmon, 2013). In recent years, these resources amounted to more than NIS 3 billion a year—about 5 percent of direct social expenditure. The assistance is provided through different channels, including public housing, rental assistance in the open market (140,000 beneficiaries at an annual cost of NIS 1.4 billion<sup>1</sup> (Zeira, 2014), mortgage grants to those eligible, and instituting programs for pre-determined periods, such as soft loans and location grants for home purchasers and the subsidizing of contractors' development costs, most of which are in the periphery (for example "The Great Housing Opportunity Program" ["The Sharansky Plan", 2001], "The Atias Plan" of 2011–2012, and a grant for the purchase of a first apartment in Jerusalem in 2013). A government bill has also recently been debated to apply zero VAT to new first-time homebuyers in certain circumstances. In addition to these, large local authorities such as Jerusalem, Tel Aviv-Yafo and Be'er Sheva have instituted rental assistance programs in the open market for students who have chosen to live in certain neighborhoods, with the aim of encouraging urban renewal processes (for more details see Vurgan, 2012).

One of the topics on the agenda when operating a housing assistance program is the effect on home prices and rents of beneficiaries and others, and consequently also on the possibility of the target population and general public to find appropriate housing solutions. Among other things, there is room to examine whether and to what extent the assistance to beneficiaries finds its way into the hands of sellers/landlords.

Although government expenditure on housing assistance programs in Israel is, as previously stated, in excess of NIS 3 billion annually, the distribution of the assistance between the parties has not been examined until now.<sup>2</sup> A few studies have been carried out worldwide, examining to what extent rental assistance finds its way into the hands of

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<sup>1</sup> The average exchange rate was 3.5779 NIS/\$ in 2014.

<sup>2</sup> In the Bank of Israel Annual Report for 2002 (Bank of Israel, 2003) the results of a gross examination of the effect of "The Sharansky Plan" on home prices were presented. The conclusion is that they increased by a similar amount to the capitalized value of the assistance. Zussman et al. (2007) examined the rollover rate of changes in indirect taxation to consumer prices. They found that changes in the VAT rate had no effect on prices, at least in the short term, but an increase was found in the probability of price changes in the same direction as the change in VAT (see also Ribon and Sayag, 2013). Approximately two-thirds of the reduction in the purchase tax rate was rolled over into a reduction in consumer prices.

the beneficiaries' landlords. In France it was found that 78 percent of the expansion of the application of rental assistance in the country ended up in the hands of the landlords (Fack, 2006), and based on district variance in the level of housing assistance, Letremy and Trevien (2014) discovered that the vast majority comes into the hands of the landlords. In the British case, Gibbons and Manning (2005) showed that 60–66 percent of a national reduction in the subsidy to (new) tenants was rolled over to the landlords. According to studies from Finland (Kangasharju, 2010; Viren, 2013) 30–70 percent of the increase in the national rental assistance ceiling ended up in the landlords' hands. In the United States, Collinson and Ganong (2013) found that a national increase of one dollar in the rental assistance ceiling led to an increase of 13–20 cents in rents. Susin (2002) showed that an expansion of the national rental assistance voucher system in the United States led to an increase in rents for those with no entitlement to more than the value of the vouchers. The research literature shows therefore that the estimations of the distribution of rental assistance between the parties cover a wide range—apparently as a consequence of differences in the structure of the market and the elasticity of supply and demand.

The present study focuses on grants given to students who rented accommodation in the center of Jerusalem between the 2005/06 and 2010/11 academic years, and examines the distribution of the grant between tenants and landlords. The database for the study comprises information for the years 2000–2012, mainly from rental notices, as well as from the Central Bureau of Statistics Survey of Rents and from administrative data on the recipients of grants and the rents they paid. Hedonic estimations of rents (i.e. after adjusting for the characteristics of the dwelling) were made through a difference-in-differences method—a comparison of the difference between rents in the city center during the grants period and rents there in other periods, and this difference on the same periods in other Jewish neighborhoods in the capital or adjacent to the city center.

The main finding of the study is that in the periods around the introduction of the grant program and around its cancellation, the amount of the grants that found its way into the hands of the recipients' landlords varied from one-fifth to two-fifths. While the increase in rental income of all the landlords in the city center (including those renting to tenants who had no grants) was estimated at four-fifths of the amount of the grants. These rates are within the broad range of findings worldwide. It should be emphasized that the lack of information forced us to rely mainly on rental notices, although naturally

only actual rents should be relied on, but the correlation between them and the rents asked is extremely high.

The order of work is as follows: Part B describes the student grant program and the characteristics of recipients; Part C presents the database, a schematic theoretical framework, the method of estimation and the way the distribution of rental assistance between tenants and landlords was calculated; Part D presents stylized facts; Part E presents the results of the estimations; Part F discusses alternative explanations for the results, and Part G summarized.

## **B. The grant program for students renting accommodation in the center of Jerusalem**

The center of Jerusalem has long suffered from functional decline and physical deterioration (Tibi-Maimon and Efron, 2004; Ramon et al., 2011). Since 2001, the Jerusalem Development Authority, through its subsidiary Eden—The Center of Jerusalem Development Company, has been implementing a comprehensive plan for urban regeneration in the city center. The plan included laying track for the light railway along with changes in the traffic system, including closing streets to private vehicular traffic, approving extensive building plans, and providing building grants to developers, for the rehabilitation of public spaces, cleaning the facades of buildings, assistance with the production of cultural events and so forth (for more details see Ramon et al. 2011; Naim 2012).

Under the urban renewal plan, during the 2005/06 to 2010/11 academic years, the Jerusalem Development Authority gave an annual grant to students living in rented accommodation in the city center (Figure 1), with the aim of encouraging a quality and vigorous population to take up residence there. Those who qualified for grants were undergraduate students (90.6 percent), graduate students (6.6 percent), and a few doctoral students, at institutes of higher education funded by the Council for Higher Education and in a multi-year program in post-secondary art schools sponsored by the Ministry of Culture and Sport (Table 1). Those eligible for the grant included Israeli citizens living in rented accommodation (not belonging to a first-degree relative) in the city center for at least half a year, and at least 70 percent engaged in studies. The period of eligibility for the grant was restricted to three years and was not conditional on any

income test. In the case of an apartment with a number of students living in it (Table 2), each of them was eligible for a grant.

The grant declined over the years (Table 3). About 85 percent of recipients were given a full grant and the remainder received a partial grant because the rental period was shorter than a year (Table 4). In the 2009/10 academic year the grants averaged 23 percent of the annual rent paid by recipients. The distribution of the grants as a percentage of the rents (Figure 2) was broad, due to differences in the level of the rents and the grants. However, for 80 percent of those who obtained grants, the grant covered 10–30 percent of the annual rent.

In the first year of the plan's implementation (2005/06), the number of grants was small, apparently because the plan only took effect towards the end of the year: While Government Decision 3696 to strengthen Jerusalem—including revitalizing the city center and encouraging students to live there—was passed on June 6, 2005, it took several months to make arrangements, and the academic year began on October 30, 2005.

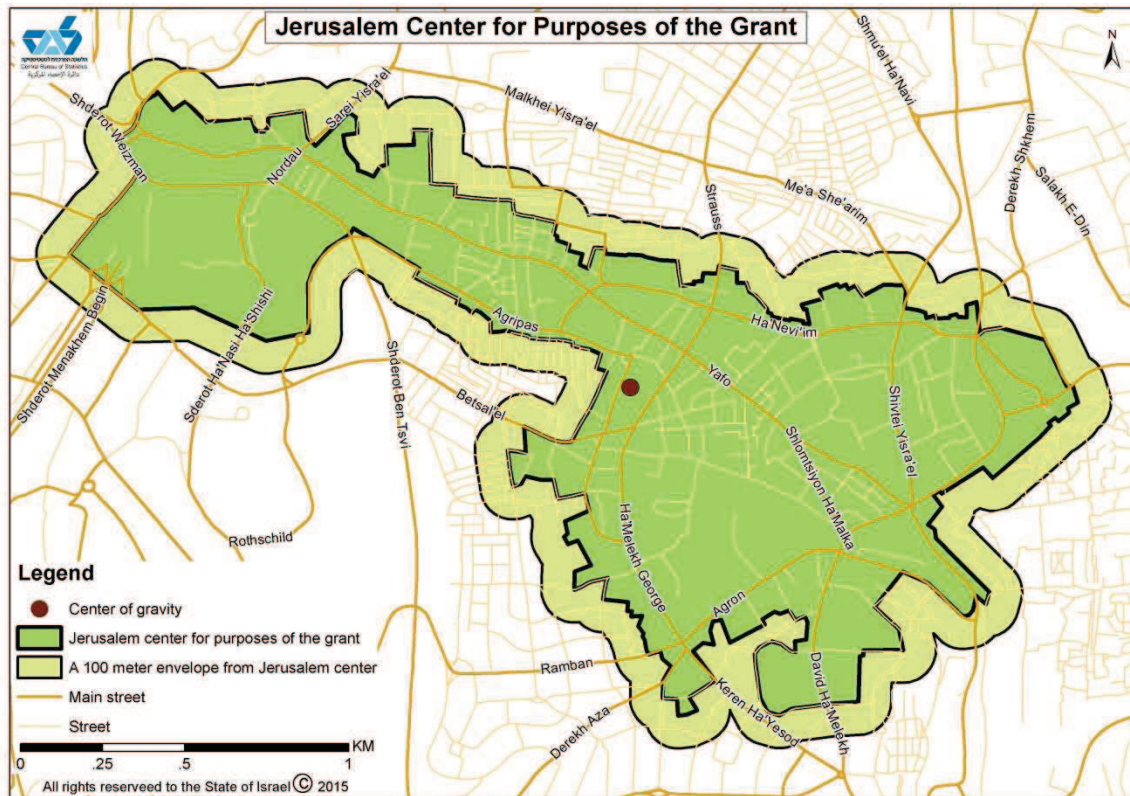
There is no doubt that the grants program led to a considerable increase in the number of students renting apartments in the center of Jerusalem, and consequently to the achievement of the aims of the Jerusalem Development Authority. On the assumption that the overwhelming majority of students who lived in the city center received a grant, the number of students in the city center increased by close to 900 between the 2005/06 and 2010/11 academic years (the number of grants increased in the same period from about 650 to about 1,510—see Table 3 below).

Calculations based on the 2008 population census show that the number of students who rented an apartment on the open market (not in dormitories) in Jewish neighborhoods in Jerusalem was 17,500 (of whom 2,100 were in the city center)<sup>3</sup>, and as such the percentage of students who moved to the city center was more than 5 percent. In the peak years of the program, students with grants occupied three-fifths of the apartments rented in the city center. It may be that the increase in rents in the center of Jerusalem following the introduction of the grants program—as will be shown later—encouraged home owners in the area to make them available for rent, leading to an even greater increase in the flow of students there and helping to achieve the aims of the Jerusalem Development Authority.

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<sup>3</sup>A total of 13,600 households—a third of the households renting in Jewish neighborhoods in Jerusalem.

**Figure 1: The center of Jerusalem for grant purposes (in dark green)**



1) The area in light green indicates the area outside the city center with entitlement to a grant, up to a distance of 100 meters from the center (the city center "envelope").

**Source:** The Jerusalem Development Authority and the Central Bureau of Statistics.

**Table 1: Grants according to institutions of higher education, 2009/10 academic year**

| Educational institute                           | Number of recipients | Distribution (percent) |
|---|----------------------|------------------------|
| The Hebrew University                           | 700                  | 45.2                   |
| Bezalel – Academy of Art and Design             | 397                  | 25.6                   |
| Hadassah Academic College, Jerusalem            | 247                  | 16.0                   |
| Azrieli – College of Engineering                | 63                   | 4.1                    |
| The Academy of Music and Dance                  | 43                   | 2.8                    |
| Religious educational institutions <sup>1</sup> | 35                   | 2.3                    |
| The Open University                             | 9                    | 0.6                    |
| Other <sup>2</sup>                              | 54                   | 3.5                    |
| Total   | 1,548                | 100                    |

1) The Haredi College, the Lev Academic Center, Emuna College, Lifshitz College.

2) The Musrara School of Art, the School of Visual Theater, the Sam Spiegel Film and Television School, the David Yellin Academic College of Education, the Center for Classical Oriental Music and Dance, the Lander Institute, Nissan Nativ Acting Studio, the Vertigo Dance School.

**Source:** The Jerusalem Development Authority and the authors' calculations.



**Table 2: Distribution of grant recipients' apartments according to the number of recipients and the size of apartment, 2009/10 academic year**

| Number of rooms in the apartment | Number of recipients sharing |            |            |           |            |
|----------------------------------|------------------------------|------------|------------|-----------|------------|
|                                  | 1                            | 2          | 3          | 4+        | Total      |
| 1-1.5                            | 132                          | 37         | 2          | -         | 171        |
| 2-2.5                            | 148                          | 132        | 6          | -         | 286        |
| 3-3.5                            | 106                          | 121        | 67         | 5         | 299        |
| 4-4.5                            | 20                           | 31         | 46         | 3         | 100        |
| 5+                               | 3                            | 7          | 8          | 3         | 21         |
| Not known                        | 24                           | 10         | 3          | -         | 37         |
| <b>Total</b>                     | <b>433</b>                   | <b>338</b> | <b>132</b> | <b>11</b> | <b>914</b> |

Source: The Jerusalem Development Authority and the authors' calculations.

**Table 3: Amount of the full grant and the number of recipients**

| Academic year | Amount of the full grant (Current NIS) | Number of recipients (approximately) |
|---------------|--|--------------------------------------|
| 2005/06       | 6,600                                  | 650                                  |
| 2006/07       | 5,400                                  | 1,027                                |
| 2007/08       | 5,004                                  | 1,278                                |
| 2008/09       | 4,200                                  | 1,345                                |
| 2009/10       | 3,800                                  | 1,550                                |
| 2010/11       | 3,400                                  | 1,510                                |

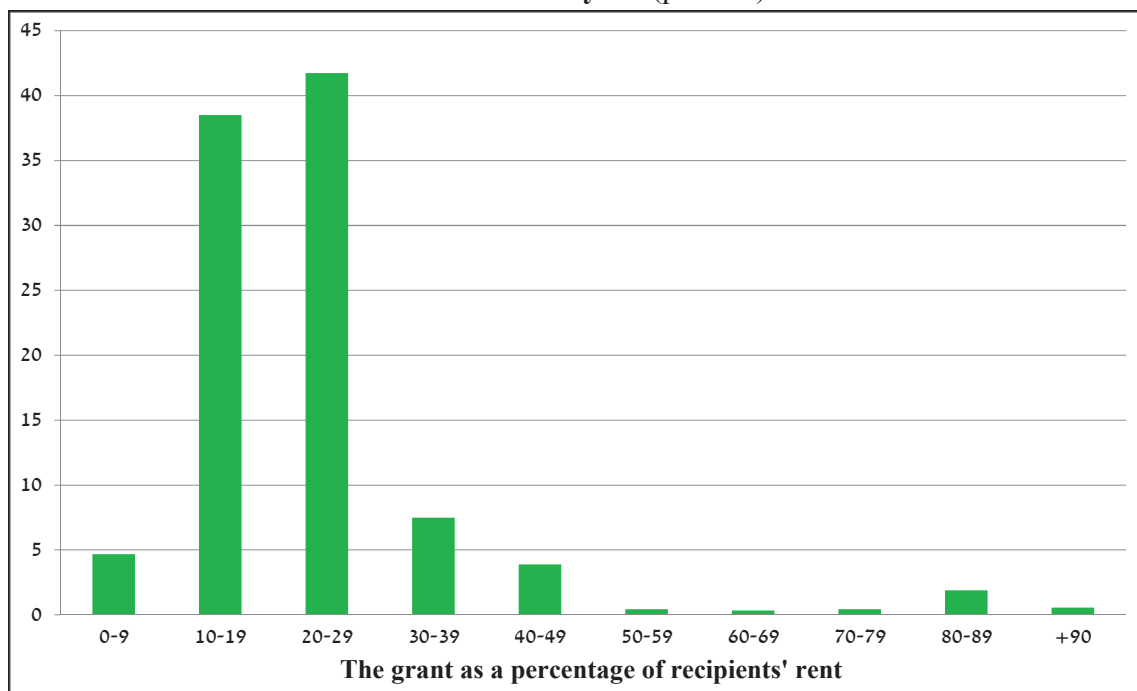
Source: The Jerusalem Development Authority.

**Table 4: Distribution of partial grants, 2009/10 academic year**

| Percentage of grant | Range of the grants (Current NIS) | Average grant (Current NIS) | Number of recipients (approximately) | Distribution (percentage) |
|---------------------|-----------------------------------|-----------------------------|--------------------------------------|---------------------------|
| Full                | 3,800                             | 3,800                       | 1,288                                | 83.0                      |
| Partial (76–96%)    | 3,008–3,662                       | 3,450                       | 197                                  | 12.5                      |
| Partial (51–75%)    | 2,058–2,850                       | 2,500                       | 42                                   | 3.0                       |
| Partial (50%)       | 1,900                             | 1,900                       | 25                                   | 1.5                       |

Source: The Jerusalem Development Authority and the authors' calculations.

**Figure 2: Distribution of the grant as a percentage of the rent paid by recipients,<sup>1</sup> 2009/10 academic year (percent)**



1) The total grants given to those living in an apartment divided by the annual rent paid by the recipients in the apartment. Percentages greater than 70 relate to those renting rooms in one of the monasteries in Jerusalem.

**Source:** The Jerusalem Development Authority and the authors' calculations.

## **C. The database, the theoretical framework and the method of estimation**

### **The database**

The database for the study comprises three information sources:

- a) *Rental notices* – These were collected by a private company from newspapers, Internet sites, information banks and so forth. The date of publication of each notice, the address of the apartment, the number of rooms and the rent being asked on the date of publication are known.
- b) *Central Bureau of Statistics Survey of Rents* – sample of a panel of rented apartments in urban areas. (For more details see Burck, 1999). For every apartment, the contract start date, the address of the apartment, the number of rooms and the actual rent are known.

c) *A file of students renting in the center of Jerusalem who received a grant in the 2009/10 academic year*<sup>4</sup> – The file was obtained from the Jerusalem Development Authority and contains the contract start date, the contract termination date, the address of the property, the number of rooms in the apartment, the number sharing the apartment, the size of the grant, the monthly rent, and general information on the students, including degree, the year of studies, the educational institution and the faculty.

The data files were supplemented with geographical information in order to obtain the precise location of each apartment (hereinafter anchoring), the statistical area (according to the 2008 population census), the socioeconomic rating of the area according to the census, the distance to the center of gravity of the city center (near the Ben Yehuda pedestrian mall—the brown dot in Figure 1), an outline of the boundary line of the city center, and the distance to it. In the years 2000–2012, a total of 73,400 apartments were anchored from rental notices (94.2 percent) and 4,420 apartments from the Survey of Rents (91.5 percent), of which 2,690 and 95 apartments, respectively, were in the city center. Due to the limited number of apartments in the center of Jerusalem that were included in the Survey of Rents, the study is based almost solely on rental notices. There were 1,549 grant recipients in the city center in the 2009/10 academic year, living in 914 apartments.<sup>5</sup>

A large proportion of the non-anchored apartments are in Arab neighborhoods in Jerusalem. Since the apartments in those neighborhoods are not actually an alternative for students in the Jewish neighborhoods, they were omitted from the study (about 10 percent of the notices that were anchored). In the end, the study population included approximately 78,000 apartments in Jewish neighborhoods in Jerusalem in the years 2000–2012, predominantly apartments offered for rent as well as rented apartments. To these were added apartments in which grant recipients were living in the city center in the 2009/10 academic year.

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<sup>4</sup> We did not have similar data on grant recipients in the previous academic years.

<sup>5</sup> By way of comparison, at the time of the 2008 population census, 2,053 students (in 1,381 households) were living in the city center and 1,550 students had grants. The number of households living in rented accommodation in the city center at that time was 2,254.

### A schematic theoretical framework

The following is a brief and schematic description of the equilibrium in the rental market in the center of Jerusalem (Figure 3A) and in the other neighborhoods (Figure 3B)—prior to the award of the grant (Period 0) and during it (Period 1)—assuming that similar apartments in the city center and in the other neighborhoods are not perfect substitutes. As for the rental market in the center of Jerusalem, prior to the award of the grants, at the intersection of the demand curve for apartments  $D_o$  and the supply curve for apartments  $S$ , the number of rented apartments was  $Q_o$  ( $q_o^s$  students and  $q_o^{ns}$  others) and the rent was  $P_o$ . Following the award of the grants, demand from students for rental apartments in the city center increased (demand curve  $D_1$ ), and a new equilibrium was created at a higher rent  $P_1$ , both for students (whose net rent is less than the amount of the grant) and for others, assuming that the landlords do not engage in price discrimination. (The alternative case is described later.) The number of apartments rented by students increased to  $q_1^s$  and the others declined to  $q_1^{ns}$ . With higher grants, more flexible demand, more rigid supply, and greater students' share in total demand for apartments in the city center, the increase in rents there following the award of grants is expected to be steeper.<sup>6</sup>

An analysis of the rental market in the other neighborhoods provides the following insights<sup>7</sup>: Following the award of the grants, student demand for rental apartments outside of the city center fell, and demand there among nonstudents increased (since rents in the city center rose and the rental apartments in the city center and in other neighborhoods are not perfect substitutes). It is unclear what happened in the short term to aggregate demand but it apparently increased, and a new equilibrium was created at a higher rent  $P_1$ .<sup>8</sup> Those who were not students were pushed out of the city center into the other neighborhoods, and the number of apartments they rented increased to  $q_1^{ns}$ .

An alternative model to that of the competitive market is based on the differential bargaining power in negotiations on the level of the rent (for more details see Gibbons

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<sup>6</sup> It may also be supposed that the students with grants would improve the conditions of their apartments, so that their consumption of housing services would increase whereas the others would decrease it (see Fack, 2006).

<sup>7</sup> For reasons of simplicity, we used the same symbols as in the analysis of the rental market in the center of Jerusalem. This does not mean that the values ( $Q$ ,  $q$  and  $P$ ) are identical to the ones above.

<sup>8</sup> Even if the accumulated demand outside the city center increased, the resultant increase in prices should be contained since the percentage of nonstudents pushed out of the city center (net of the students who came into it) is smaller than the total tenants outside the city center.

and Manning, 2005): The student grant is a benefit that can be divided between the students and the landlords, and consequently the rent paid by students in the city center may possibly be higher than that paid by others for the same apartment. It is generally assumed that the rents are uniform (law of one price); otherwise the competition between those not eligible for grants over apartments in the city center would lead to an increase in the rents they pay until they reach equality with the rents paid by the recipients. Viren (2013) found this to be the case.

The above analysis is a schematic presentation of the rental market prior to the introduction of the grant program and immediately thereafter, and is therefore static. We shall now consider in general terms the dynamic over time.<sup>9</sup> As part of the grant program, the level of the grant was gradually reduced; the number of grants came close to peaking in 2008, long before the end of the program (Table 3 above), and was far from exhausting the full potential for renting in the city center. Consequently, the difference between rents in the city center and rents in neighborhoods outside the center should have narrowed during the period of the grants. For this reason it is advisable to concentrate the study on the time periods around the inception of the grant program and around its cancellation.

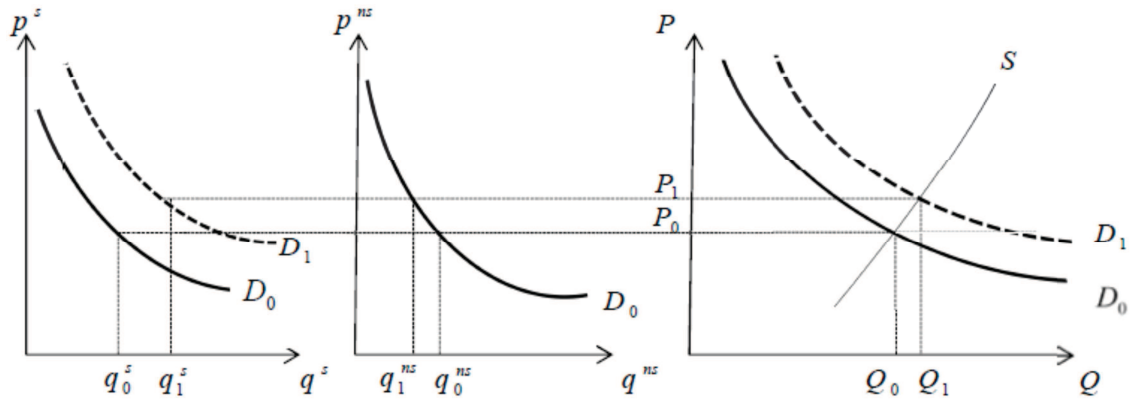
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<sup>9</sup> We will ignore changes over time in the number of potential tenants and in the supply of rental apartments (see Part F).

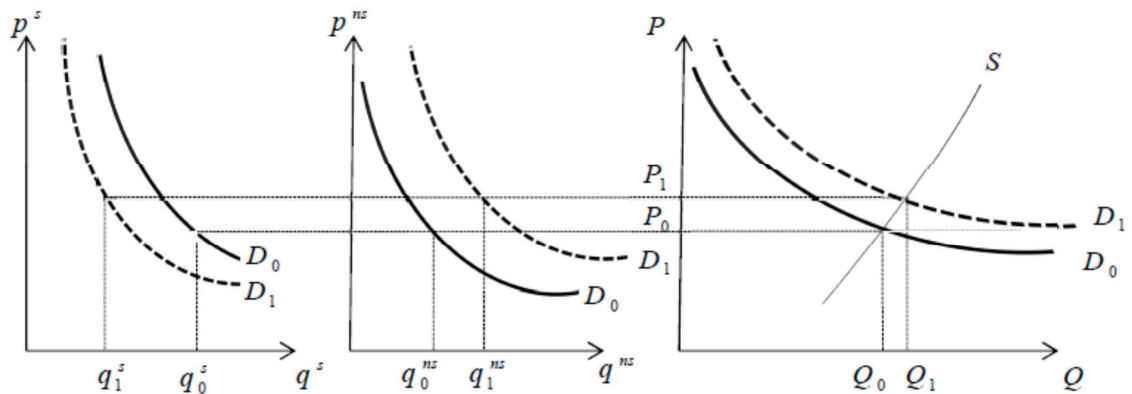
**Figure 3: Demand for rented apartments in Jerusalem prior to the award of the grants and thereafter**

Students                      Non students                      Total

**A. Jerusalem center**



**B. Other neighborhoods**



**The method of estimation and the way the percentage of rent that found its way into the hands of the landlords was calculated**

The method of estimation

The awarding of grants to students living in rented accommodation in the center of Jerusalem (the treatment group) in the 2005/06 to 2009/10 academic years (the treatment period) was a kind of quasi natural experiment, allowing use of the difference-in-differences (Diff-in-Diff) method, as had been done in other studies on the topic. A comparison of the difference between rents in the treatment group during the treatment period and rents before and after with this difference in other neighborhoods in Jerusalem (the control group) in the same period.

The estimation does not differentiate between rental apartments in the city center in which grant recipients lived (whether they comprise all the tenants or some of them) and other apartments in the city center, and consequently we assume that there is no price discrimination, that is to say the rents in the city center are uniform—for the recipients and the others. This argument is even more applicable in the case of rental notices.

Hedonic equations were calculated with the following general structure, similar to the structure of calculations reviewed in Part A and to the variables included in them, and subject to the availability of the data:

$$(1) \quad \log(P_{ilt}) = \beta_0 + \beta_1 X_i + \beta_2 ADS_i + \beta_3 TP + \sum_{l=1}^L \delta_l N_l + \beta_4 TP \cdot N_c + \sum_{t=1}^T \lambda_t T_t + \varepsilon_{ilt}$$

Where:

- $P_{ilt}$  – Monthly rent asking price (in shekels)/ actual rent for apartment  $i$  in neighborhood  $l$  on the date of publication of the notice / contract start date  $t$ ;
- $X_i$  – Vector of features of apartment  $i$ : the number of rooms and the socioeconomic rating of the statistical area in which the apartment is located (during the 2008 population census). The ranking is from 1 to 20 (where 20 is the highest rating);
- $ADS_i$  – A dummy variable for apartment  $i$  offered for rent (compared with a rented apartment);
- $TP$  – The treatment period (details to follow);
- $N_l$  – A dummy variable for neighborhood  $l$  (not including Arab neighborhoods), where  $N_c$  ( $N_c \in N_l$ ) is the city center area in which the grant was given (the treatment group);
- $T_t$  – A dummy variable for period  $t$  (the year/quarter – details to follow);
- $\varepsilon_{ilt}$  – Random error.

The estimator  $\beta_4$  expresses the change (as a percentage) in the average rent in the city center relative to rent in the other neighborhoods as a result of awarding the grants. It should be emphasized that the method of estimation does not allow possible changes attributable to the grants program to be identified in the rents in neighborhoods outside the city center.

### The way the percentage of rent that found its way into the hands of the landlords was calculated

The percentage of rent that found its way into the hands of the landlords renting to recipients was calculated in the following way (for more details see Fack [2006]), assuming that in the city center there is no price discrimination between recipients and other tenants:

- a) The absolute change (in shekels) in the average monthly rent ( $\Delta P$ ) is a multiple of  $\beta_4$  and the average monthly rent in the city center.
- b) The proportion of recipients in the total of those renting apartments in which recipients are living is  $\alpha$ .
- c) The level of the student grant is  $S$  shekels per month. Assuming that the average number of recipients per apartment is  $n$ , the average level of the grant for a benefiting apartment is  $nS$  shekels per month.
- d) The percentage of the grant that finds its way into the hands of those renting to recipients is:  $(\alpha\Delta P)/(nS)$ .

The awarding of the grants led to an increase in rents in the city center during the period when the grants were awarded, both for recipients and for other tenants (assuming, as previously stated, that there is no price discrimination), whether they were living in shared accommodation with recipients or in rented accommodation in apartments with no recipients. The ratio between the increase in income from rent and the amount of the grants can be calculated in the following manner<sup>10</sup>:  $\Delta P$  times (the number of households renting in the city center) divided by (the total payments of monthly grants).

### **D. Stylized facts**

The development of rents in Jerusalem is shown in Figure 4A. In general, it is similar to the development of rents throughout Israel, which are mainly affected by macroeconomic factors. (For more information see Nagar and Segal, 2011).

Despite the Palestinian uprising (Second Intifada), rents in the capital increased considerably during 2002 (details in Part F), due to a sharp devaluation of the shekel

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<sup>10</sup> It would appear that the grants also led to an increase in rents in neighborhoods outside the city center. In the absence of a reliable comparison group for those neighborhoods (for example neighborhoods outside Jerusalem) it was impossible to measure the extent of the increase in rents there.



against the dollar, since most of the rental contracts were drawn up in dollars. From 2003–2007 rents fell in line with the appreciation of the shekel and a marked increase in the supply of apartments in the first half of the decade. In 2008 there was a sharp increase in rents following an accelerated depreciation of the shekel. During that year a steep drop was recorded in the percentage of rental contracts drawn up in dollars, and since then the link between the exchange rate and rents has been extremely weak.<sup>11</sup> From 2009 on, rents have risen (in real terms).

The development of the asking price for monthly rents (on the date of publication of the notice) in the city center in comparison with that in the other non-ultra-Orthodox Jewish neighborhoods in Jerusalem is shown in Figure 4B. The figure is based on two calculations. One (the dotted lines in the figure) is a weighted average of the rents stated in the notices, according to a distribution of notices by number of rooms in the center of Jerusalem in 2004, and in the case of notices in other neighborhoods (Jewish, non-ultra-Orthodox)—also according to a distribution of the number of notices by neighborhood in 2004. The other calculation (the solid lines in the figure) is based on estimators of the dummy variables for the years in estimations of the log of rent asking prices (separately for the city center and the other neighborhoods) as dependent on the number of rooms, the socio-economic rating of the statistical area in which the apartment is located, with dummy variables for the neighborhood and dummy variables for the years.

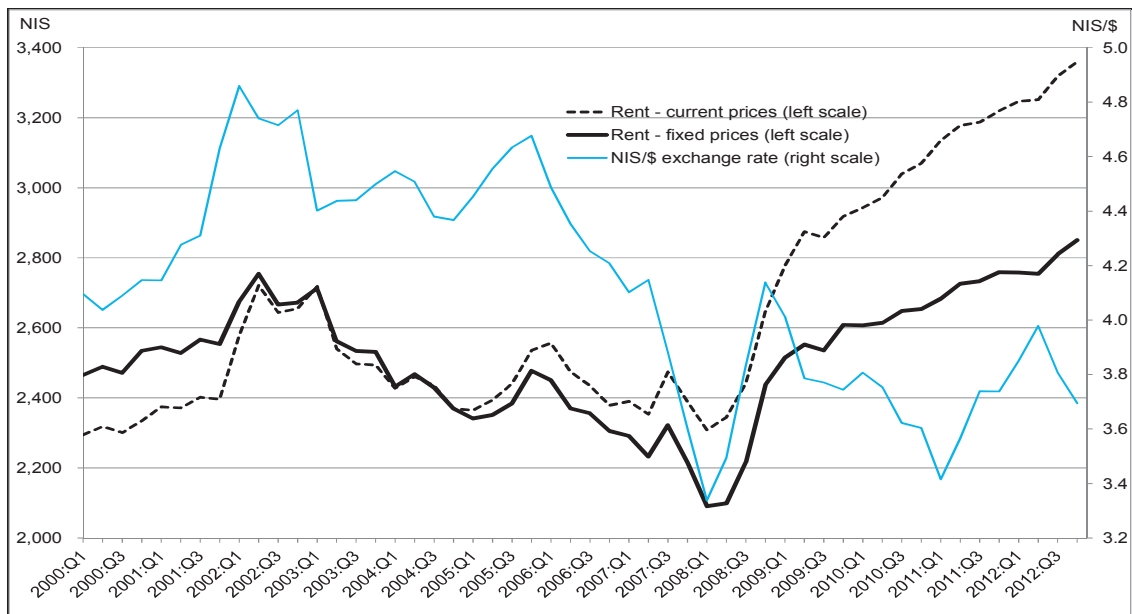
The figure shows that in the period preceding the award of the grants, the development of rent asking prices in the city center was similar to the development in the other neighborhoods. From 2006–2008, the first complete years of the grants (which reduced with the years), rent asking prices in the city center rose more rapidly than in the other neighborhoods, and from 2009–2010 the rates of increase were similar. In the transition from 2010 to 2011, during which the grants were cancelled, rent asking prices in the city center fell, whereas in the other neighborhoods they rose slightly. Overall, from 2004–2012—in other words from the period before the grants were awarded until the period after they were awarded—the aggregate change in the level of rents in the Jerusalem city center (about 40 percent according to the results of the estimations) was similar to this change in the other Jewish non-ultra-Orthodox neighborhoods in the city.

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<sup>11</sup> The percentage of rental contracts and rent notices in which the rents are stated in dollars in the center of Jerusalem was very similar to the percentages in the other Jewish neighborhoods in each of the years 2000–2012. On the transition from rent prices in dollars to those in shekels, see Goldberg and Katz, 2014.

The index of average rent for the Jerusalem neighborhoods is shown in Figure 5. The rent asking price in the city center is on the border of the highest tertile (Figure 5A). The correlation between the actual rents and the rent asking prices, at the neighborhood level, is approximately 0.9 (Figure 5B), and the correlation between the annual change in actual rent and the change in the rent asking price (after adjusting for the apartment and neighborhood features) is also around 0.9. Thus the development of actual rent was very similar to that of the rent asking price. However, due to the dearth of observations of actual rents in the center of Jerusalem, it is not possible to conclude from the high correlations that the relation between the rent asking price in the city center and the actual rent is similar to that in other neighborhoods in the capital.

**Figure 4A: The development of monthly rent in Jerusalem, 2000-2012<sup>1</sup>**

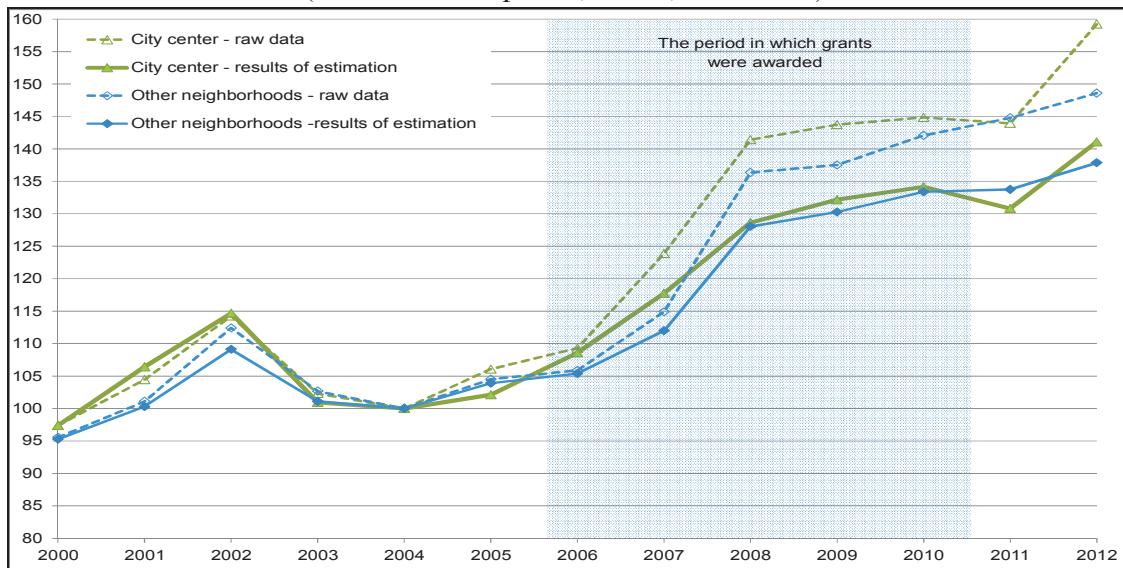


1) The rent for 2.5–3 room apartments. Fixed prices—adjusted to the Consumer Price Index excluding housing (in 2004:Q4 prices).

**Source:** The Central Bureau of Statistics, the Bank of Israel and the authors' calculations.

**Figure 4B: The development of monthly rent asking prices in Jerusalem:  
The city center compared with other neighborhoods,<sup>1</sup> 2000-2012**

(NIS at current prices; Index, 2004=100)

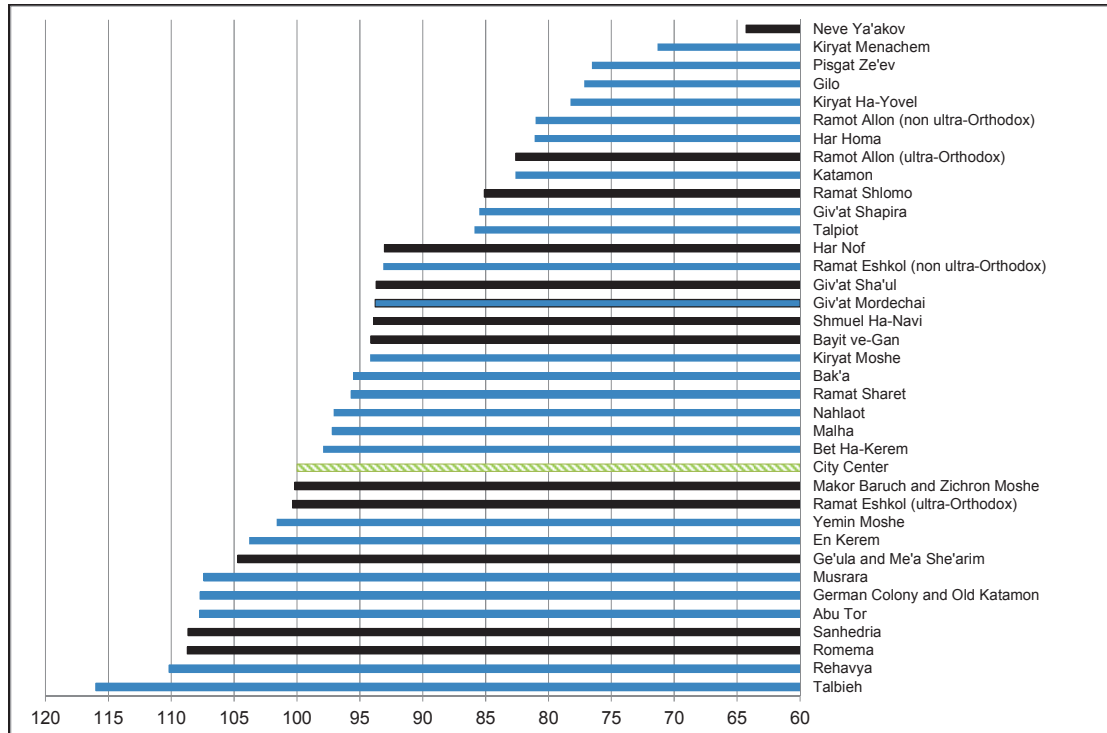


1) The hatched lines of the raw data are a weighted average of the prices on the notices, according to a distribution by group size in the center of Jerusalem in 2000, and in the case of notices in other neighborhoods (non-ultra-Orthodox Jewish) – also according to a distribution of the number of notices by neighborhood in 2004. The solid lines are based on estimations, once for the city center and once for the other non-ultra-Orthodox Jewish neighborhoods combined, of log the rent asking price (when the notice was posted) as dependent on the number of rooms, in a socio-economic ranking of the statistical area, with a dummies for the neighborhoods and a dummies for the years. The estimations were made in respect of notices for apartments of up to 4 rooms. The estimators for the years are shown in the figure.

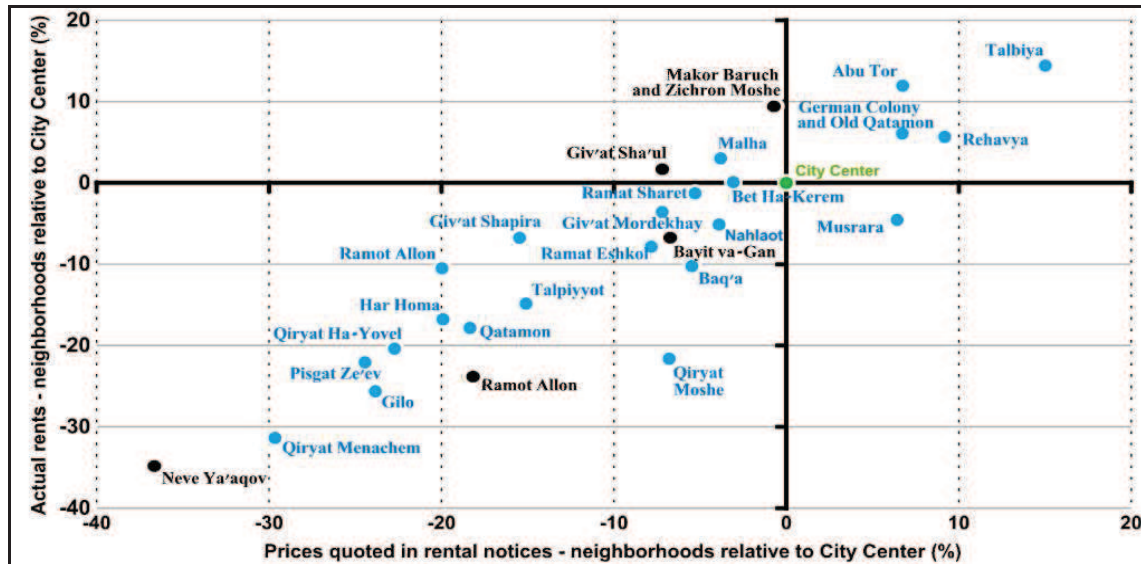
**Source:** The Central Bureau of Statistics and the authors' calculations.

Figure 5: Monthly rent in Jerusalem by neighborhood, 2000-2012<sup>1</sup>

A. Index of rent asking prices<sup>2</sup>  
(Jerusalem center<sup>3</sup>=100)



B. The difference between the rent asking price and the actual rent<sup>4</sup> in the city center and that in the other neighborhoods (percentages)



The figures are based on the estimators for the neighborhoods' dummy variables in estimation for the years 2000-2012 of log rent (separately for the rent asking price and the actual rent) as dependent on the number of rooms and dummies for the year and the neighborhood.

Part of the differences observed in the rent between the neighborhoods may be attributable to the age of the apartments and their other physical features, about which we have no information.

- 1) Black columns (points) indicate ultra-Orthodox neighborhoods.
- 2) Opening rent asking prices in rental notices.
- 3) The central Jerusalem area qualifying for the award of a grant.
- 4) In some of the neighborhoods no information was collected in a rent survey.

Source: The Central Bureau of Statistics and the authors' calculations.

## **E. Results of the estimations**

The results of the hedonic estimations of the development of rents in the center of Jerusalem during the period of the grants compared with other periods, in comparison with the parallel development of rent in other Jewish neighborhoods in the capital—using the difference-in-differences method (equation 1)—are shown in Tables 5–9. The estimations for the most part include apartments offered for rent, about which only the rent asking price is known, and apartments rented for which the actual rent is known, in the years 2000–2012, unless otherwise stated.<sup>12</sup> The results of the estimations will allow the percentage of the grants that ended up in the hands of the landlords to be calculated, assuming that the change in the actual rent was identical to the change in the rent asking price in the rental notices. The following is the order of presentation of the estimations' results:

- 1) The development of rents in all the apartments in the center of Jerusalem in the period of the grants compared with all the other periods combined, in comparison with the rent in all the apartments in all the other Jewish neighborhoods in the capital during the same period (Table 5);
- 2) As in paragraph (1), focusing on up to 4-room apartments—in which almost all the students live—and restricting the comparison group to Jewish non-ultra-Orthodox neighborhoods, since these provide alternative student accommodation in the city center (Table 6);
- 3) Estimations such as those in paragraph (2) but in a timeframe around the introduction of the grants program, and separately in a timeframe around its cancellation (Table 7);
- 4) Estimations as in paragraph (2) when the comparison group is apartments near the town center (Table 8);
- 5) Estimations in the timeframes (such as in paragraph (3)) when the comparison group is apartments near the town center (as in paragraph (4))—Table 9.

In estimations that include the years 2000–2012 (estimations 1, 2 and 4) the unit of time is a year, and in estimations 3 and 5 a quarter.

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<sup>12</sup> Estimations from which the observations of actual rent (from the CBS Survey of Rents) were deleted produced results very similar to those obtained in the estimations presented below, since the great majority of the observations in the database came from rental notices. It is not possible to make estimations based only on the actual rent data due to the paucity of observations.

### **1) All the apartments in the center of Jerusalem compared with all the apartments in the other Jewish neighborhoods**

The results of the estimations of rent in the city center from 2000–2012 compared with the rent in other Jewish neighborhoods in the capital are shown in Table 5. We begin with a description of the contribution of the control variables to rents in Jerusalem. Table 5 (Model 1) shows that every additional room increases the rent by 24 percent. An increase of one unit in the socioeconomic rating of the statistical area (on a scale of 20 units) adds about 1.5 percent to the rents.<sup>13,14</sup> By way of comparison, the parallel value relating to apartment prices in Jerusalem in the years 1999–2009 is 1.9 percent (Sayag, 2012, Table 19). Every kilometer further from the city center reduces the rent by 6 percent. Rents are about 8 percent higher in the ultra-Orthodox neighborhoods<sup>15</sup> than in the non-ultra-Orthodox neighborhoods, all else equal, including the socioeconomic rating of the neighborhood.<sup>16</sup> The rent asking price in notices is about 12 percent higher than the actual rent.<sup>17</sup> When a fixed effect for the neighborhood (Model 2)<sup>18</sup> is added to the hedonic estimation, the estimations remain almost unchanged, apart from an intensification of the effect of the socioeconomic rating, and the explained variance is 0.68.

The development of rents in the city center in the years before the grants were awarded was similar to its development in the other neighborhoods (Table 5, Model 3).<sup>19</sup> The dynamic over time of the effect of awarding the grant on the level of rents in the city center was affected by two factors—increased awareness of the program and with it an increase in the number of grants, and a marked decline in the size of the grant—so that

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<sup>13</sup> The lowest socioeconomic level (on a scale of 1–20) is in the ultra-Orthodox neighborhoods. For example, Ge'ula and Me'a She'arim have the lowest level—less than 3. The Bet Ha-Kerem neighborhood, the German Colony and Old Katamon have the highest level—around 15.

<sup>14</sup> The replacement of the socioeconomic rating explanatory variable in the median annual income from salary and self employment per capita in the statistical area leaves the other estimators almost unchanged.

<sup>15</sup> Identification of an ultra-Orthodox neighborhood by the Central Bureau of Statistics, as of 2009, is based on the voting patterns in Knesset election (Gurovitz and Cohen-Kastro, 2004).

<sup>16</sup> In an estimation that does not include the socioeconomic rating, rent in the ultra-Orthodox neighborhoods is similar to rent in other Jewish neighborhoods.

<sup>17</sup> Some of the difference can be explained by the fact that the Survey of Rents focuses on contract renewals and in many cases the changes in the rent at the time of renewal are smaller in absolute terms than those of new tenants because of the tenants' and landlords' concern about transaction costs. In contrast, among those renewing contracts there was a phenomenon of fixed rent (or rent linked to the Consumer Price Index) for a long period, and they were revised once every few years depending on the situation of the rental market.

<sup>18</sup> It should be remembered that the socioeconomic rating is on a statistical area level and for the most part a neighborhood combines several statistical areas.

<sup>19</sup> In 2001, rents rose in the center of Jerusalem relative to the rents in other neighborhoods. No satisfactory explanations for this were found.

ultimately the total payments of grants reached a peak in 2007/08 and subsequently declined. In 2005, no clear effect of the grants on rents in the city center was identified—an expected result, since distribution of the grants began only at the end of the year. In the first two full years of the grant relative rents rose by 4–6 percent. The grant as a percentage of rent was much higher, and so the students rents net of the grant declined relative to the rents in the other neighborhoods. In the following years, rents in the city center increased at a slower rate than in the other neighborhoods. Although the number of grants reached a peak in that period, the grant was very much reduced, and the total of grants paid declined. When the grant was cancelled in 2011, rents in the city center fell by 7 percent relative to the other neighborhoods. It should be remembered that few students began to rent apartments during the first half of the year and it was expected that the cancellation of the grant in the middle of the year would lead to a reduction in relative rents in the city center in the second half of the year. Consequently, the relative reduction in rents in the city center can be explained by the weakening of the landlords' bargaining power with the cancellation of the grant and the concern that there would be a mass exodus of students who accounted for more than half of the tenants in the city center.

An additional estimation (not shown) was made for the years in which the grant program was in operation, in order to check the effect of the changes in the level of the grant on rents in the city center in comparison with rents in the other neighborhoods. The estimation was similar to that shown in Model 3, but instead of the interaction variables of the year multiplied by a dummy for the city center, an explanatory variable of the level of the full grant in each year was included. The value of the variable is the level of the full grant for rented apartments in the city center in each year and 0 for apartments rented in other neighborhoods. It turns out that every thousand shekels of grant—above the level of the average grant in the city center during the grants program—increases the rents there by 1.6 percent relative to the rents in the other neighborhoods. (The estimator is significant at 1 percent.)<sup>20</sup>

In total, during the period when grants were awarded, rents in the city center were an average of 2.3 percent higher than in the other parts of the city, compared with the difference in another period (Table 5, Model 4).

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<sup>20</sup> Similar estimations were made relying on those in Model 1 in Table 6, and the parallel values obtained there are 1.2–1.3 percent. (The estimators have a significance of 1 percent.) In Model 1 in Table 8 (the right-hand part) a non-significant value of 1.5 percent was obtained (p=18%).

The vast majority of observations used for the estimations were taken from rental notices and not from the Survey of Rents, but we are first and foremost interested in the effect of the grants program on actual rents. To counter a possible claim that in the difference between the rent asking price and the actual rent there may be a difference between the city center and the other neighborhoods, in particular during the grants program, Model 4 was estimated with the addition of the interaction variables notice X center, notice X period of the grant program, and notice X period of the grant program X city center; the estimator of the three-way interaction variable shows whether during the period of the grant program the difference between the rent asking price and the actual rent in the city center was different from that in the comparison neighborhoods. It transpired that the value has no significance (not shown).<sup>21</sup> The result should be treated with caution due to the small number of observations of actual rent in the city center.

## **2) Apartments of up to 4 rooms in the center of Jerusalem compared with similar apartments in Jewish non-ultra-Orthodox neighborhoods**

Since more than 90 percent of the students receiving grants lived in rented apartments of up to 4 rooms, from this point on we will limit the estimations to these apartments. The results of these estimations are shown in Table 6 (the right side), and they are similar to the results above. The estimation based on all the Jewish neighborhoods (Model 1) provides the following picture: From 2006 to 2007 relative rents in the city center increased by 5 percent, from 2008 to 2010 the grant was not identified as having any significant effect on rents in the city center, and in 2011 rents in the city center fell by 7 percent in comparison with the rents in the other neighborhoods.

We calculate the average percentage of the grant that found its way into the hands of their landlord during the period of the grant, as shown in the previous section, assuming that the change in the actual rent was identical to the change in the rent asking price in the rental notices. The estimation of the percentage change in average rents in the city center during the period of the grants is 2.1 percent (Model 2)<sup>22</sup>, and the average monthly rent for an apartment there during that period was NIS 3,226. Rents thus rose by NIS 65 a month or NIS 800 a year. The average number of recipients per apartment was 1.7 out of 2.2 living in recipients' apartments, so the increase in the recipients' annual

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<sup>21</sup> Similar results were obtained in Table 6, Model 2 and Table 8, Model 2.

<sup>22</sup> When the estimations in Table 6 (Model 2) are restricted to observations from the Rent Survey based on the actual rents, the values are not significant, a predictable result considering the small number of observations in the city center.



rents was NIS 625. The average level of the grant was NIS 4,170 per year and the annual grant for a benefiting apartment was NIS 7,050. Thus the average share of the grant that found its way into their landlord was approximately 9 percent.

We calculate the ratio between the increase in rental income of all the landlords in the city center and the amount of the grant. Calculations based on the 2008 census show that there were 2,254 households renting there (and we assume that this is also the number during the entire period of the grants). Therefore, the average annual increase in total rents in the city center during the period of the grant was NIS 1.83 million. A total of NIS 5.12 million in grants were paid each year. Therefore, the increase in rental income was 36 percent of the grant payments, with most of it from tenants who did not get a grant and were asked to pay a higher rent.

On the left side of Table 6, the estimations exclude ultra-Orthodox neighborhoods, since they were only a partial alternative for student accommodation, the great majority of the students not being religiously observant. As evidence of this, calculations based on the 2008 census show that the percentage of students living in free rentals (not in dormitories) in the ultra-Orthodox neighborhoods of Jerusalem was 13 percent of the total number of students living in free rentals in the city. They were 17 percent of the total number of households renting in those ultra-Orthodox neighborhoods, compared with double the percentage in the non-ultra-Orthodox neighborhoods. Moreover, only an insignificant percentage of the students receiving the grant were studying at religious/ultra-Orthodox institutions (Table 1 above).

The estimations that do not include the ultra-Orthodox neighborhoods in the comparison group produce very similar results to those in which all the Jewish neighborhoods were included, both from the point of view of the dynamics of the rents in the center of Jerusalem over time compared with those in the other neighborhoods, and from the point of view of the percentage of grant that found its way to the landlords.

#### Heterogeneity by apartment size

It may be supposed that as a result of the grant, the rent difference between large and small apartments in the city center would increase in comparison with this difference in other neighborhoods, because in larger apartments the average rent for each lodger is less than in small apartments and it was found that the proportion of grant recipients among the lodgers was relatively high; thus the percentage of the grant in the rent for each lodger is higher and the landlord can demand a higher rent. The results of the

hedonic calculations (not shown)—like those in the left column of Table 6—made separately for each group of number of rooms, support the supposition. Whereas for apartments of 1–1.5 or 2–2.5 rooms, the value of the period of the grant X city center interaction variable is positive and small but not significant, for apartments of 3–3.5 rooms it is 4.1 percent, and for 4–4.5 room apartments—14.5 percent, and the significance in both these cases is on the level of one percent.

### **3) Time windows around the introduction/cancellation of the grants—apartments of up to 4 rooms in the center of Jerusalem compared with similar apartments in Jewish non-ultra-Orthodox neighborhoods**

The difference-in-differences estimations made until now have examined rents in the city center *throughout the entire* period of the grants compared with the rents prior to and following them *together*, in comparison with the rents in Jewish neighborhoods (non-ultra-Orthodox) during the same period. We will now focus on the time window around the introduction of the grants program, and separately in a time window around the cancellation of the program. The time window around the introduction of the grants program is defined as the 2004/05 academic year, the year preceding the initiation of the program, together with the 2006/07 academic year, the first full year of its implementation. The time window around the cancellation of the grants program is defined as the first year after its cancellation.<sup>23</sup> It can be seen from Table 7 that rents in the city center increased by 6.4 percent in the first year of full implementation of the grants program relative to rents in the other, non-ultra-Orthodox neighborhoods.<sup>24</sup> When the program was cancelled, relative rents fell by 3.9 percent. The percentage of the grant that found its way into the hands of the recipient landlords was 18 percent during the period the program was running, and 22 percent on the eve of its cancellation. The increase in income from rent for each of the property owners in the city center (renting to recipients and others) was 85 percent of the amount of the grants during the first period when the program was running, and 71 percent on the eve of its cancellation.

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<sup>23</sup> The cancellation of the grant program was announced in June 2011.

<sup>24</sup> A similar estimation was made around a different time window of the introduction of the grant program, including the academic year 2004/05 (as in the original estimation), and the academic year 2005/06 (instead of 2006/07) as the first year of the program, during which there were relatively few grants. As expected, the estimation did not show any significant positive effect of the program on rents in the city center.

#### **4) Apartments of up to 4 rooms in the center of Jerusalem compared with similar apartments in non-ultra-Orthodox Jewish neighborhoods around the city center**

The comparison group for rents in the center of Jerusalem has until now been the Jewish (non-non-ultra-Orthodox) neighborhoods in the capital. However, it may be that the development of rents in the city center was different from the other neighborhoods unrelated to the grants that were given to students in the city center (see Part F), despite the fact that, as we showed above, during the years preceding the award of the grants, the rents in both areas developed in a similar fashion. Estimations were therefore made on the difference-in-differences method of the rent asking price in the center of Jerusalem in comparison with the rent asking price in the non-ultra-Orthodox Jewish neighborhoods outside the area of the city center qualifying for a grant and at a distance up to 100 meters from it (hereinafter "the envelope")—Figure 1 above. The envelope includes, Morasha (Musrara), Nahlaot, parts of Talbiye and Rehavya.

Table 8 (the right side) shows that in general the results obtained are very similar to the results for the comparison group, which included all the non-ultra-Orthodox Jewish neighborhoods in Jerusalem (Table 6 above, the left side). In the period preceding the award of the grants, the development of the rent asking price in the city center was very similar to that in the envelope (Table 8, Model 1). From 2006–2007 the rent asking price in the city center rose relative to the increase in the envelope by 6–9 percent—almost double the percentage increase relative to the rent asking price in all the neighborhoods. In 2011, when the grants were cancelled, the rent asking price fell by 6 percent relative to apartments in the envelope, similar to the result above. Overall, the rent asking price in the city center rose during the period of the award of the grants by 2.7 percent relative to the rent asking price in the envelope (compared with 2.1 percent in comparison with all the neighborhoods).<sup>25,26</sup> The percentage of the grant making its way to the recipient landlords was 12 percent and the percentage of the grant that came into the hands of all the landlords in the city center was 46 percent.

The calculation of the effect of the grants program on the increase in rents in the city center through an examination of the development of rents there in comparison with rents in the envelope may be biased downward if the property owners in the envelope

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<sup>25</sup> When the estimations in Table 8 (Model 2) are restricted to observations from the Survey of Rents based on the actual rents, the values are not significant, a predictable result considering the small number of observations in the city center.

<sup>26</sup> When the ultra-Orthodox neighborhoods are also included, relative rents in the city center increased by 3.0 percent.

increased the rent asking price on seeing that their peers adjacent to them in the city center did so in the period of the grants. Accordingly, the left part of Table 8 shows the results of estimations of the difference-in-differences equations between the rent asking price in the envelope and that in the other non-ultra-Orthodox Jewish neighborhoods in the capital (apart from the town center). We can see from the table that there were no real differences between the two areas in the development of the rent asking price, and thus the calculation above is not biased.

#### **5) Time windows around the introduction/cancellation of the grants—apartments of up to 4 rooms in the center of Jerusalem compared with similar apartments around the city center**

The results of the estimations of the difference-in-differences equations for the time windows around the introduction of the grants program and around the date of its cancellation, in which the comparison group was the envelope of the city center, are shown in Table 9. In the time window of the introduction, rents in the city center rose by 7.1 percent relative to rents in the envelope, and in the cancellation window it declined by 4.7 percent. The percentage of the grant that found its way into the hands of the grant recipient landlords was 20 percent on the date the grants program was instituted and 27 percent on the eve of its cancellation. The increase in income from rents to all landlords in the city center (renting to recipients and others) was 94 percent of the amount of the grants at the time the grants program was initiated and 86 percent on the eve of its cancellation. These values are similar to those obtained in the case of estimations in which the comparison group was all the non-ultra-Orthodox Jewish neighborhoods in the capital (paragraph 3 above), although only a small number of observations were included in the current estimations.

#### Summary of the results of the estimations

The difference-in-differences estimations can be categorized into several groups according to the definition of the treatment period and the comparison group. In some of them, the treatment period included the entire period of the grants program and in others only the time windows around the introduction of the program or its cancellation. The comparison group included all the non-ultra-Orthodox Jewish neighborhoods in the capital or only those around the city center.

Table 10 is a summary of the results of the estimations and a calculation of the increase in income from rents of all the property owners in the city center (renting to recipients and others) relative to the amount of the grants, all assuming that the change in the actual rent was identical to the change in the rent asking price in the rental notices. The following conclusions can be drawn from an examination of the Table: In estimations in which the treatment group was the entire period of the grants program, the increase of rents in the city center relative to the comparison group was considerably less than in the time windows. This result should not be surprising since, as explained in Part C, the grant was reduced over time and the number of recipients did not come any closer to the total of possible tenants in the city center. It was therefore possible to predict that the difference between rents in the city center and rents outside it, which had widened with the entry of the grants program into effect, would gradually be reduced (Figure 4B). The result is therefore that the estimations around the time windows, and especially those around the introduction of the grants program (when the grant was relatively high), are more appropriate for the purposes of calculating the application of the grants. It bears mentioning that the results of the estimations and calculations concerning the time window of the introduction are similar to those of the cancellation. The Table also shows that there are no significant differences between the estimations in which the comparison group included all the non-ultra-Orthodox Jewish neighborhoods in the capital and those that focused on the envelope of the city center, and in the latter case they are greater (in absolute values).

In summary, based on the estimations around the introduction/cancellation windows of the grants program, the percentage of the grants finding its way into the hands of the recipient landlords was between one-fifth and two-fifths, and the proportion of the grants that came into the hands of all the landlords was four-fifths.

**Table 5. The effect of the grants program for students in the center of Jerusalem on the level of rents<sup>1</sup>**

| The calculated equation : <sup>2</sup>  | Model 1   | Model 2  | Model 3   | Model 4 <sup>3</sup> |
|---|-----------|----------|-----------|----------------------|
| $\log(P_{it}) = \beta_0 + \beta_1 X_i + \beta_2 ADS_i + \sum_{y=1}^{13} \lambda_y Year_y + \sum_{l=1}^{37} \delta_l N_l + \sum_{y=1}^{13} (\gamma_y Year_y \cdot N_c) + \varepsilon_{it}$ |           |          |           |                      |
| 2000 X city center  |           |          | 0.063     | 0.054                |
| 2001 X city center  |           |          | ***0.066  | **0.056              |
| 2002 X city center  |           |          | 0.007     | -0.004               |
| 2003 X city center  |           |          | -0.036    | -0.004               |
| 2004 X city center  |           |          | 0.006     | 0.016                |
| 2005 X city center  |           |          | 0.008     | 0.009                |
| <b>2006 X city center</b>   |           |          | **0.040   | **0.039              |
| <b>2007 X city center</b>   |           |          | ***0.057  | **0.051              |
| <b>2008 X city center</b>   |           |          | 0.022     | 0.016                |
| <b>2009 X city center</b>   |           |          | 0.014     | 0.014                |
| <b>2010 X city center</b>   |           |          | -0.013    | -0.014               |
| 2011 X city center  |           |          | ***-0.071 | ***-0.014            |
| Number of rooms   | ***0.236  | ***0.236 | ***0.236  | ***0.239             |
| Socioeconomic rating  | ***0.015  | ***0.018 | ***0.018  | ***0.021             |
| Distance to the city center (km.)   | ***-0.057 |          |           |                      |
| Ultra-Orthodox neighborhood   | ***0.080  |          |           |                      |
| Notice  | ***0.116  | ***0.111 | ***0.111  | ***0.110             |
| Neighborhood FEs  |           | V        | V         | V                    |
| Year FEs  | V         | V        | V         | V                    |
| Number of observations  | 77,105    | 77,268   | 77,268    | 62,232               |
| Adjusted R <sup>2</sup>   | 0.657     | 0.677    | 0.677     | 0.643                |

\*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels.

- 1) Jewish neighborhoods only. The great majority of observations are the rent asking price in rental notices.
- 2) In Models 3-4.
- 3) Apartments of up to 4 rooms. The comparison group – non-ultra-Orthodox Jewish neighborhoods.

**Table 6. The effect of the grants program for students in the center of Jerusalem on the level of rents<sup>1</sup>**  
(Apartments of up to 4 rooms)

| The calculated equation: <sup>2</sup> $\log(P_{it}) = \beta_0 + \beta_1 X_i + \beta_2 ADS_i + \sum_{y=1}^{13} \lambda_y Year_y + \sum_{l=1}^{37} \delta_l N_l + \sum_{y=1}^{13} (\gamma_y Year_y \cdot N_c) + \varepsilon_{it}$ |  |          |  |          |
|---|--|----------|--|----------|
|   | Including ultra-Orthodox neighborhoods |          | Excluding ultra-Orthodox neighborhoods |          |
|   | Model 1                                | Model 2  | Model 1                                | Model 2  |
| 2000 X city center  | 0.054                                  |          | 0.054                                  |          |
| 2001 X city center  | **0.059                                |          | **0.056                                |          |
| 2002 X city center  | -0.007                                 |          | -0.004                                 |          |
| 2003 X city center  | *-0.049                                |          | -0.004                                 |          |
| 2004 X city center  | 0.003                                  |          | 0.016                                  |          |
| 2005 X city center  | 0.003                                  |          | 0.009                                  |          |
| <b>2006 X city center</b>   | *0.035                                 |          | **0.039                                |          |
| <b>2007 X city center</b>   | **0.050                                |          | **0.051                                |          |
| <b>2008 X city center</b>   | 0.015                                  |          | 0.016                                  |          |
| <b>2009 X city center</b>   | 0.015                                  |          | 0.014                                  |          |
| <b>2010 X city center</b>   | -0.013                                 |          | -0.014                                 |          |
| 2011 X city center  | ***-0.067                              |          | ***-0.014                              |          |
| <b>The period of the grant X city center</b>  |  | **0.021  |  | **0.020  |
| The period of the grant   |  | ***0.057 |  | ***0.062 |
| Number of rooms   | ***0.243                               | ***0.243 | ***0.239                               | ***0.239 |
| Socio-economic rating   | ***0.018                               | ***0.018 | ***0.021                               | ***0.021 |
| Notice  | ***0.113                               | ***0.112 | ***0.110                               | ***0.110 |
| Neighborhood FEs  | V                                      | V        | V                                      | V        |
| Year FEs  | V                                      | V        | V                                      | V        |
| Number of observations  | 71,294                                 | 71,294   | 62,232                                 | 62,232   |
| Adjusted R <sup>2</sup>   | 0.640                                  | 0.640    | 0.643                                  | 0.643    |

\*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels.

1) Jewish neighborhoods only. The great majority of observations are the rent asking price in rental notices.

2) In Model 1. In Model 2  $\sum_{y=1}^{13} (\gamma_y Year_y \cdot N_c)$  is replaced with  $\beta_4 TP \cdot N_c$ .

**Table 7. The effect of the introduction and the cancellation of the grants program for students in the center of Jerusalem on the level of rents<sup>1</sup>**

(Apartments of up to 4 rooms)

| The calculated equation: $\log(P_{it}) = \beta_0 + \beta_1 X_i + \beta_2 ADS_i + \beta_3 TP + \sum_{l=1}^{25} \delta_l N_l + \beta_4 TP \cdot N_c + \sum_{q=1}^4 \lambda_q quarter_q + \varepsilon_{it}$ |                           |                           |
|--|---------------------------|---------------------------|
|  | Introduction <sup>2</sup> | Cancellation <sup>3</sup> |
| <b>The period of the grant X city center</b>   | **0.064                   |                           |
| <b>The period after the cancellation of the grant X city center</b>  |                           | ***-0.039                 |
| The period of the grant  | ***0.066                  |                           |
| The period after the cancellation of the grant   |                           | **0.010                   |
| Number of rooms  | ***0.232                  | ***0.243                  |
| Socioeconomic rating   | ***0.021                  | ***0.022                  |
| Notice   | ***0.066                  | ***0.109                  |
| Neighborhood FEs   | V                         | V                         |
| Quarter FEs  | V                         | V                         |
| Number of observations   | 7,526                     | 15,097                    |
| Adjusted R <sup>2</sup>  | 0.588                     | 0.505                     |

\*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels.

- 1) Apartments of up to 4 rooms in non-ultra-Orthodox Jewish neighborhoods. The great majority of observations are the rent asking price in rental notices.
- 2) The period of the grant: 2006:Q3–2007:Q2; The period preceding the award of the grant: 2004:Q3–2005:Q2.
- 3) The period after the cancellation of the grant (treatment period) 2011:Q3–2012:Q2; the period of the grant: 2010:Q3–2011:Q2.



**Table 8. The effect of the grants program for students in the center of Jerusalem on the level of the rent asking price:<sup>1</sup>**

The city center envelope<sup>2</sup> used as the comparison group  
(Apartments of up to 4 rooms)

| The calculated equation: <sup>3</sup>  |   |                 |   |                 |
|--|---|-----------------|---|-----------------|
| $\log(P_{it}) = \beta_0 + \beta_1 X_i + \sum_{y=1}^{13} \lambda_y Year_y + \sum_{l=1}^5 \delta_l N_l + \sum_{y=1}^{13} (\gamma_y Year_y \cdot N_c) + \varepsilon_{it}$ |   |                 |   |                 |
|  | City center in comparison with the envelope |                 | The envelope in comparison with other non-city center areas |                 |
|  | Model 1                                     | Model 2         | Model 1   | Model 2         |
| 2000 X city center (or envelope <sup>4</sup> )   | 0.010                                       |                 | **0.049   |                 |
| 2001 X city center (or envelope <sup>4</sup> )   | ***0.084                                    |                 | -0.018  |                 |
| 2002 X city center (or envelope <sup>4</sup> )   | -0.016                                      |                 | -0.018  |                 |
| 2003 X city center (or envelope <sup>4</sup> )   | -0.030                                      |                 | 0.004   |                 |
| 2004 X city center (or envelope <sup>4</sup> )   | 0.049                                       |                 | -0.005  |                 |
| 2005 X city center (or envelope <sup>4</sup> )   | 0.039                                       |                 | -0.003  |                 |
| <b>2006 X city center (or envelope<sup>4</sup>)</b>  | <b>**0.060</b>                              |                 | <b>-0.004</b>   |                 |
| <b>2007 X city center (or envelope<sup>4</sup>)</b>  | <b>***0.086</b>                             |                 | <b>-0.017</b>   |                 |
| <b>2008 X city center (or envelope<sup>4</sup>)</b>  | <b>0.022</b>                                |                 | <b>0.008</b>  |                 |
| <b>2009 X city center (or envelope<sup>4</sup>)</b>  | <b>-0.000</b>                               |                 | <b>**0.026</b>  |                 |
| <b>2010 X city center (or envelope<sup>4</sup>)</b>  | <b>-0.006</b>                               |                 | <b>0.011</b>  |                 |
| 2011 X city center (or envelope <sup>4</sup> )   | ** -0.061                                   |                 | 0.001   |                 |
| <b>The period of the grant X city center (or envelope<sup>4</sup>)</b>   |   | <b>*0.027</b>   |   | <b>0.006</b>    |
| The period of the grant  |   | <b>*0.052</b>   |   | <b>***0.064</b> |
| Number of rooms  | <b>***0.263</b>                             | <b>***0.264</b> | <b>***0.240</b>   | <b>***0.240</b> |
| Socio-economic rating  | <b>***0.013</b>                             | <b>***0.014</b> | <b>***0.021</b>   | <b>***0.021</b> |
| Neighborhood FEs   | V   | V               | V   | V               |
| Year FEs   | V   | V               | V   | V               |
| Number of observations   | 5,235                                       | 5,235           | 55,969  | 55,969          |
| Adjusted R <sup>2</sup>  | 0.520                                       | 0.519           | 0.656   | 0.656           |

\*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels.

1) Non-ultra-Orthodox Jewish neighborhoods. The great majority of observations are the rent asking price in rental notices.

3) The city center envelope—the area outside the city center qualifying for a grant and at a distance of up to 100 meters from it. Model 1 in the right side of the table. In model 2  $\sum_{y=1}^{13} (\gamma_y Year_y \cdot N_c)$  is replaced with

$\beta_4 TP \cdot N_c$ . The left part of the table contains the corresponding estimations, where  $N_c$  is replaced with the envelope neighborhoods and the envelope neighborhoods are replaced with the non-ultra-Orthodox Jewish neighborhoods.

4) In the left part of the table—interaction between the year (or the period of the grant) and the envelope.

**Table 9. The effect of the introduction and the cancellation of the grants program for students in the center of Jerusalem on the level of rents:**

The city center envelope<sup>1</sup> used as the comparison group  
(Apartments of up to 4 rooms)

| The calculated equation:<br>$\log(P_{it}) = \beta_0 + \beta_1 X_i + \beta_2 ADS_i + \beta_3 TP + \sum_{l=1}^5 \delta_l N_l + \beta_4 TP \cdot N_c + \sum_{q=1}^4 \lambda_q quarter_q + \varepsilon_{it}$ |                           |                           |
|--|---------------------------|---------------------------|
|  | Introduction <sup>3</sup> | Cancellation <sup>4</sup> |
| <b>The period of the grant X city center</b>   | *0.071                    |                           |
| <b>The period after the cancellation of the grant X city center</b>  |                           | *-0.047                   |
| The period of the grant  | *0.050                    |                           |
| The period after the cancellation of the grant   |                           | -0.000                    |
| Number of rooms  | ***0.260                  | ***0.240                  |
| Socioeconomic rating   | *0.014                    | *0.009                    |
| Notice   | *0.075                    | *0.065                    |
| Neighborhood FEs   | V                         | V                         |
| Quarter FEs  | V                         | V                         |
| Number of observations   | 593                       | 1,694                     |
| Adjusted R <sup>2</sup>  | 0.499                     | 0.324                     |

\*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels.

- 1) Apartments of up to 4 rooms in non-ultra-Orthodox Jewish neighborhoods. The great majority of observations are the rent asking price in rental notices.
- 2) The city center envelope—apartments in non-ultra-Orthodox Jewish neighborhoods outside the city center qualifying for a grant and at a distance of up to 100 meters from it.
- 3) The period of the grant: 2006:Q3–2007:Q2; the period preceding the award of the grant: 2004:Q3–2005:Q2.
- 4) The period after the cancellation of the grant (treatment period): 2011:Q3–2012:Q2; the period of the grant: 2010:Q3–2011:Q2.

**Table 10. Summary of the results**

(Comparison group: apartments of up to 4 rooms in non-ultra-Orthodox Jewish neighborhoods)

| Clause | Comparison group         | Period                              | Change in rent in the city center compared with the comparison group (%) | The recipients' rent increase as share of the grant (%) | The rent increase as share of the grant (%) |
|--------|--------------------------|-------------------------------------|--|---|---|
| 2      | Total                    | The entire period of the grants     | 2.1  | 9   | 36  |
| 3      |                          | <i>Entry</i> to the grants program  | 6.4  | 18  | 85  |
|        |                          | <i>Exit</i> from the grants program | -3.9   | 36  | 71  |
| 4      | The city center envelope | The entire period of the grants     | 2.7  | 12  | 46  |
| 5      |                          | <i>Entry</i> to the grants program  | 7.1  | 20  | 94  |
|        |                          | <i>Exit</i> from the grants program | -4.7   | 37  | 86  |

## F. Alternative explanations for the results of the estimations

Identifying the effect of the grants program on rents in the center of Jerusalem in comparison with rents in the other neighborhoods relies on the assumption that during the period under investigation there were no other circumstances that contributed to the differential development of rents between the city center and the other areas. We will briefly discuss possible alternative explanations for the relative increase in rents in the center of Jerusalem during the period of the grants, beginning with the demand for rented accommodation in the city center.

During the second Palestinian uprising (Second Intifada), which broke out in 2000, there were many terror attacks in Jerusalem (Appendix Figure A1). Hazan and Felsenstein (2007) found that rents in Jerusalem declined in the areas where the attacks occurred during the Intifada. Hence the spatial spread of the attacks may have affected rents in the city center compared with those in other neighborhoods. Until the beginning of 2002, most of the attacks occurred in the city center, claiming the lives of many

people (all the more so relative to the size of the population living in the area). From then on the attacks claimed many victims in other parts of the city. (The geographic dispersion of the attacks is described at length in Hazan and Felsenstein, 2007). However, the attacks in Jerusalem ceased in the first half of 2004, more than a year before the initiation of the grants program.<sup>27</sup>

The plan for urban renewal in the center of Jerusalem included the building of the light railway that began to carry passengers in August 2011, physical rehabilitation of the public space, production of cultural events and so on. The work of constructing the light railway in Jaffa (Yafo in Hebrew) street—and with it the disruption to public transport in the city center—could have led to a decline in rents there during the period of the grants, among other reasons because the proportion of students among those renting in the city center was high and they made a lot of use of public transport. On the other hand, the other parts of the urban renewal plan were likely to increase rents. Ultimately the overall effect of the plan on rents in the center of Jerusalem during the period of the grant is unclear.

Changes in the number of students in the institutions of higher education could have affected demand for rented accommodation. In the period of the grants the number of students at institutes of higher education (under the responsibility of the Council for Higher Education) in Jerusalem increased by a modest aggregate of about 12 percent—from 31.6 thousand in the 2005/06 academic year to 35.2 thousand in the 2010/11 academic year.<sup>28</sup> There are two establishments in the center of the city—the Hadassah Academic College of Jerusalem and Bezalel's Department of Architecture.<sup>29</sup> The number of students at Hadassah College increased steadily in the years of the grants from 900 to 1900. However the number of grant-recipients at Hadassah College reached only 250 (about one-seventh of the total number of recipients) in the 2009/10 academic year (Table 1 above) when the number of students at the college reached its peak. A calculation shows that the number of students from the college who lived in the center of Jerusalem increased by around 180 from the 2004/05 academic year, just prior to the

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<sup>27</sup> Suicide attacks as a share of all attacks in the city center were higher than the comparable percentages in other parts of the capital. This could have had a strong negative effect on rents in the city center. However, Hazan and Felsenstein (2007) found that other types of attacks (such as shootings and throwing Molotov cocktails) had a greater negative effect on rents in the capital.

<sup>28</sup> The Council for Higher Education, [http://che.org.il/?page\\_id=6802](http://che.org.il/?page_id=6802).

<sup>29</sup> The historic Bezalel building in the city center was renovated during part of the grant period but architecture studies continued in alternative buildings in the city center. In any event, the number of students in the Bezalel architecture program increased from 333 in the 2005/06 academic year to 414 in the 2009/10 academic year.

implementation of the grants program, until the 2009/10 academic year before it was cancelled<sup>30</sup>, so that the overall effect on demand for accommodation in the city center was apparently limited. It should also be remembered that at the peak of the grants program the number of recipients at all the institutes of higher learning in Jerusalem was far from exhausting the full potential of rentals in the city center.

The supply of beds in student dormitories in Jerusalem belongs for the most part to the Hebrew University. In the 1999/00 to 2005/06 academic years, the number of beds in the dormitories remained unchanged—4,562. In the 2006/07 academic year, a student village opened in Giv'at Mordechai (French Hill) in which there were 1,621 beds. Rent there was only slightly lower than in the private market. The opening of the village was expected to make rents in the nearby neighborhoods cheaper, especially in French Hill. Accordingly, a reestimation was made of the difference-in-differences equations—once for the entire period investigated (Table 6 Model 2) and once for the entry/exit periods of the grants program (Table 7)—where the French Hill observations were taken out of the comparison group to the city center. The results of the estimations remained almost unchanged.

We have no information on changes in supply of apartments for rent in the open market throughout Jerusalem. However, an examination of the development of apartment purchases by local investors—apartments mostly offered for rent—shows that the share of these apartments in the center of Jerusalem out of the total number of apartments purchased by investors in the Jewish neighborhoods in the capital did not register any clear tendency during the period of the grants (Figure Appendix A2), and in any case, only 20–40 apartments a year were purchased in the city center. It should be stressed that we have no reliable information on the sale of apartments purchased by local investors, so that it is impossible to know what happened to the inventory of apartments for investment.

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<sup>30</sup> The Hadassah College put at our disposal anonymous data of the addresses of students at the college in each of the academic years from 2002/03 until 2011/12, as reported by the students. The reliability of the addresses is limited since some of the students apparently reported their parents' addresses (and some of the students, also in Jerusalem, live at home and are not renting). In any case, if we assume that the missing coverage percentage of the actual address in the center of Jerusalem in the 2009/10 academic year—the ratio between the number of students from the college who reported living there and the number of those receiving grants from the college in the same year— was also maintained in other years, then the number of students from Hadassah College who were living in the center of Jerusalem in the 2004/05 academic year is estimated at 65.

## **G. Conclusion**

The public sector in Israel provides more than NIS 3 billion a year in housing assistance. Until now there has been no systematic examination of the question of how the benefits are shared between the apartment buyers or tenants and the contractors or landlords, and so it is also unclear to what extent they help in finding housing solutions for the beneficiaries.

From 2006 to 2011, with the aim of encouraging urban development, the Jerusalem Development Authority awarded grants to students who lived in rented accommodation in the city center. Their number there increased greatly and so the Authority's aim was achieved. The study examined the distribution of the grants between the tenants and the landlords. It relied to a very great extent on data from rental notices, as well as on the Survey of Rents by the Central Bureau of Statistics, and on administrative data on the apartments that grant students rented. Hedonic estimations were made of the rents using the difference-in-differences method—comparing rents in the city center during the period of the grants to rents during other periods, vis-à-vis this difference in the same periods in other Jewish neighborhoods in the capital or adjacent to the city center.

The main finding is that between one-fifth and two-fifths of the grants find their way into the hands of the recipients' landlords. The grants led to an increase in rents in the city center for recipients and others so that the increase in income from the rent is equivalent to roughly four-fifths of the amount of the grants. This was all on the assumption that the change in actual rents was identical to the change in the rent asking price in rental notices.

It may be that the calculation of the portion of the grants that came into the hands of the landlords is an underestimation, since the rents outside the city center might have increased to a certain extent following the award of the grants, so that the estimations of the increase in rents in the city center during the period of the grants relative to the rents in the other neighborhoods are lower than those that would have been obtained if the comparison group had been a control group that was not affected by the treatment.

Some limitations of the study should be noted. Due to a lack of information, the study relies for the most part on rental notices, although it would have been preferable to rely only on the actual rents. We have no way of directly examining the increase in the rents of the recipients, and we therefore presume that their rents were identical to those of other tenants in the city center. It was not possible to examine the effect of the grants

program on rents outside the city center due to the lack of a suitable comparison group. We have no reliable information on the supply of apartments for rent and the demand for them throughout the capital during the period examined.

Finally, the grants program concentrated on a specific group of tenants in a restricted geographical area, and a considerable part of the tenants there benefited from it. When trying to estimate the incidence of the housing assistance in other programs, these features should be taken into consideration as well as other factors—the type of market (sales/rental) and its structure, the population benefiting and its size, the elasticity of supply and demand, and so forth.

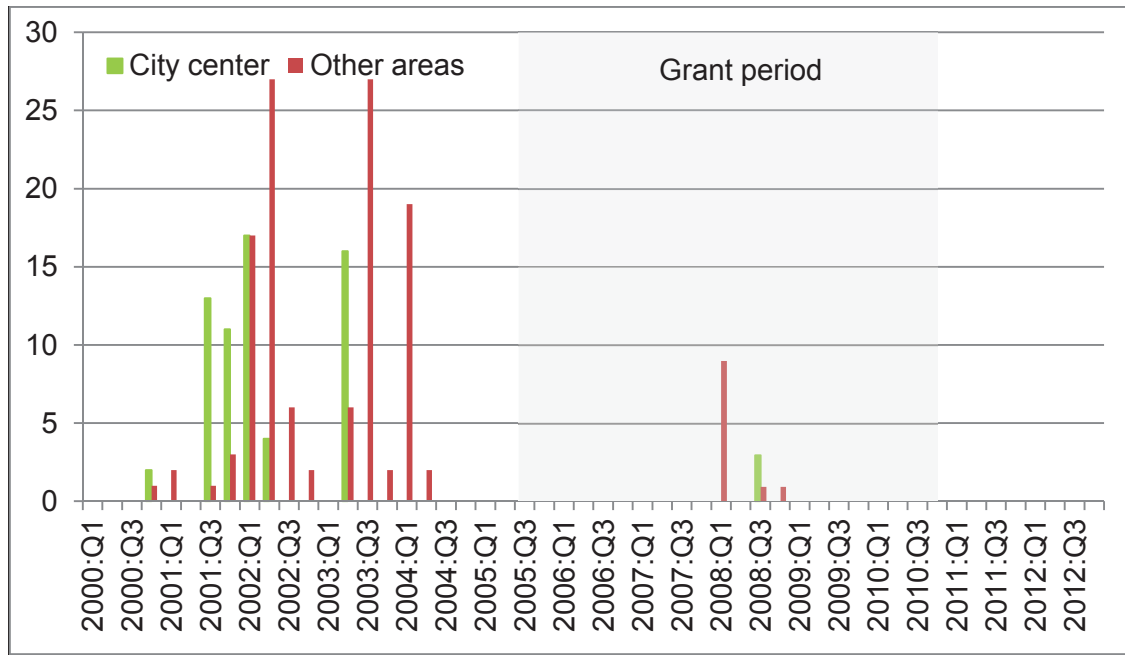
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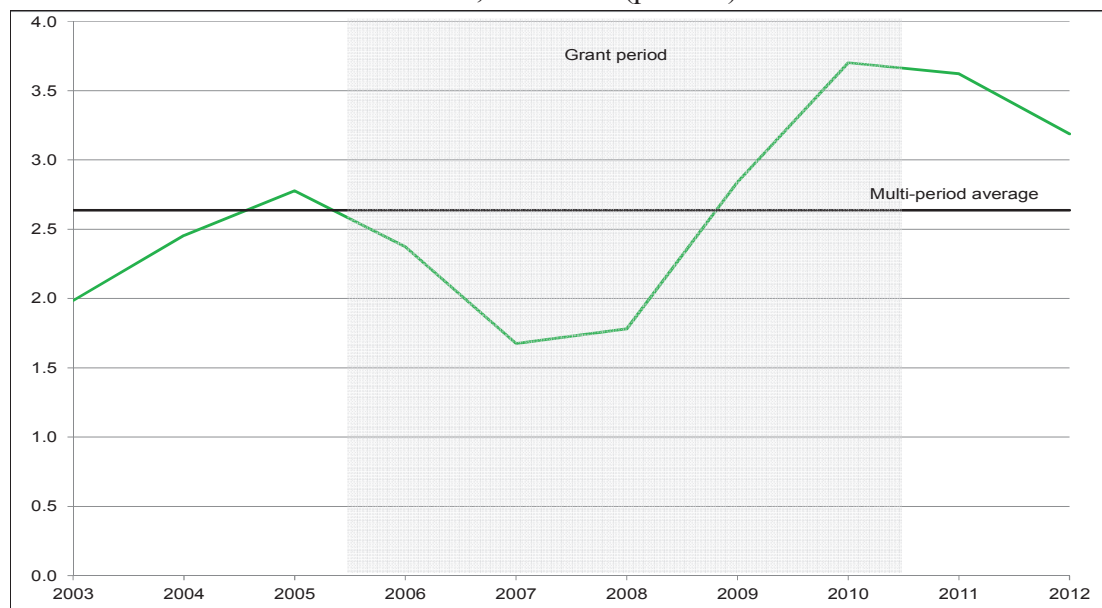
**Figure A1: Number of Israelis killed in terrorist attacks in Jerusalem,<sup>1</sup> 2000–12**



1) Israelis (civilians and security personnel) murdered in terrorist attacks that took place in the jurisdiction of Jerusalem. City center: the area subject to the student grants.

**SOURCE:** Israeli Ministry of Foreign Affairs; B'Tselem - The Israeli Information Center for Human Rights in the Territories; International Institute for Counter-Terrorism–Herzliya Interdisciplinary Center.

**Figure A2: Homes purchased by local investors in the center of Jerusalem as a share of total homes purchased by local investors in Jewish neighborhoods in Jerusalem, 2003–12<sup>1</sup> (percent)**



1) There are no data from before 2003.

**SOURCE:** Israel Tax Authority and authors' calculations.