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Is property assessment really essential for taxation? Evaluating the performance of an 'Alternative Assessment' method

Ron Horne*, Daniel Felsenstein

Department of Geography, Hebrew University of Jerusalem, Mt. Scopus, 91905 Jerusalem, Israel

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ABSTRACT

Many countries evade the formal valuation of real property for taxation purposes by using qualitative and spatial criteria in order to pursue an equitable distribution of burden. This paper evaluates the performance of a prototypical setup as such, by analyzing the relationship between property value, household income and the actual tax paid, in the exact framework of which the qualitative criteria are set to determine tax assessment. Drawing on detailed data from the Israeli Household Expenditure Surveys 1997–2005, the strong correlation between the three variables is evident. Yet, the limited differences in rates, compared with large variation in property value, make it regressive. Policy implications are relevant for many other countries using non-ad valorem taxation.

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Introduction

The Israeli property tax ('Arnona') is the single most important source of self-generated income for Israeli municipalities. The current legislative framework does not tie the tax to property value in any formal manner. Instead, it precludes the costly individual property-value assessment by using a spatial and qualitative approach to determine the tax: the 'Alternative Assessment'. Annually, each local authority publishes a tax ordinance within its jurisdiction declaring the rules of taxation and exemptions. These ordinance state differential rates per sq. meter for classified zones within its municipal boundaries and building categories that characterize its own housing stock. Rates are determined so that higher quality residences in favorable locations pay more, replacing the high cost of detailed property-value assessment with common sense. The final tax assessment is actually the product of the rate per square meter by assessable meterage.

At the base of property taxation lies the notion that tax liability represents the differences in wealth of the residents and, therefore, their ability to pay and support local public expenditure. On the other hand, critics assert that the property tax is unfair given the arbitrary assessment criteria. The policy of locally based criteria does not follow the principle of equity, which demands that equal property values have the same tax in different cities (Darin, 1999). A

committee nominated by the Israeli Minister of Interior stated that standardization of criteria for quality of dwelling, measurement and inclusion should be the first step towards equity (Suari, 1993).

Despite its unique assessment method, the Israeli system is prototypical for abstaining expensive valuation procedures and commitment, making the lessons from this experiment meaningful for many other countries. Many countries tax property to fund local public expenditure and some formally specify the linkage to property value. Nevertheless, frequent exact and direct assessment hardly exists. Usually, qualitative and quantitative measures are taken to reduce the expensive procedure of property assessment.

The aim of this paper is to analyze the property tax from the perspective of households bearing the burden. This is accomplished using the Israeli Household Expenditure Survey for the years 1997–2005. The main focus of the analysis considers the efficiency of the 'Alternative Assessment' method in achieving its goal as a substitute to property valuation, within and between municipalities nationwide. The analysis performed reveals the benefits as well as the weaknesses of the assessment mechanism and suggests improvements to current taxation practice. It focuses on the main explanatory variables predicting tax payments by households, such as property value and household income. This framework allows for new insights into the distribution of the tax burden by following the original variables that the property tax attempts to capture indirectly. Three principle questions are considered in this paper: (1) To what extent is the property tax associated with the variables it implicitly follows namely: property value and household income? (2) Is the tax progressive as implied by the 'Alternative Assessment' components? and (3) Are there substantial dispari-

* Corresponding author.

E-mail addresses: ron.horne@mail.huji.ac.il (R. Horne), msdfels@mscc.huji.ac.il (D. Felsenstein).

ties in property tax between local authorities after controlling for variables mentioned above?

The analysis shows that property value is the strongest explanatory variable predicting the magnitude of the property tax. Yet, its elasticity is significantly smaller than 1.0 which reflects the regressive nature of the tax. Property of higher value is charged more in nominal terms but less in “real” measures when compared with house prices, reflecting a higher burden on dwellings of lower value. The regressive character of the tax is underscored with respect to household wealth as measured by per capita expenditure. Furthermore, controlling for property value and household wealth, the evidence suggests that national trends are stronger than local divergence of assessment criteria. This implies that the unique local assessment criteria in each municipality serve to homogenize the tax across different property values.

Over the time period examined, patterns in the data reflect stability and constant marginal adaptation. Therefore, the mechanism of annual local incremental adjustments of the rates and measurement criteria actually performs well as an inexpensive substitute for laborious property-value assessment. The tax is regressive not because it has nothing to do with property value but because the rate per sq. meter does not generate a differential capable of capturing the wide range of property values. While the tax rates across places differ in tens of percentage points, house prices vary by hundreds of percentage points, across the country. Improved equity can be achieved by simply broadening the gaps in the rates rather than revolutionizing the ‘Alternative Assessment’ system as a whole.

This paper is organized as follows. The next section presents a review of tax assessment practices contextualizing the Israeli experience. Data and method are explained in the fourth section. *Findings* section presents the descriptive and analytical results while discussing the findings and their implications. Policy conclusions with respect to substitute tax assessment procedures at the local and national levels are presented in the last section.

Property tax – an overview

Most countries of the world engage in property taxation for municipal funding. The rights to use property or ownership are accepted as proxies of wealth and therefore serve to “signal” a burden of public finance liability (Hale, 1985). Real property is easy to tax in comparison to other instruments of wealth accumulation and income sources. Its presence is self-evident, making it impossible to escape charges. In rural societies, land and buildings were the main production factors and reflected most of the property and investment capacity. Once capitalism developed together with the industrial revolution, new sources of equity fundamentally violated the principle connection between real estate and wealth. The new forms of capital necessitated more sophistication on the part of the taxing authorities to trace, assess and tax. Eventually, property tax was limited to an annual ad valorem levy on land and buildings (Youngman and Malme, 2004).

Real property taxation is based on property value directly or indirectly. In some countries a property’s worth refers to its market price as negotiated between buyer and seller at arms length. In others rent equivalent or an assessor’s valuation is used for approximation. In some situations however, the tax is based on qualitative and spatial classification reflecting the price-determining attributes of property (Arnott and Petrova, 2006). In some cases the levy is based on the economic potential of the property and in others it is restricted to value of the land itself, unimproved. Another distinction can be made based on taxing the

property’s market value rather than its last purchased price or occasional estimation of its worth (Youngman and Malme, 1994; McCluskey, 1999).

While various ways of conceptualizing the value of property exist, most countries do not fully and frequently assess each property for taxation purposes. Property value is the basis for taxation in Canada, Denmark, Holland, Britain, Philippines, Brazil, and most states in the USA. In many cases, the last sale price or occasional assessed value is used. Furthermore, in some cases, property value is approximated by spatial and/or qualitative criteria. Many distortions can arise due to insufficient assessment, resulting in inequitable tax burdens. The usual causes for this are inadequate assessment, limited data availability, omission of influential variables, out dated estimations and unrepresentative samples (De Cesare and Ruddock, 1998). One extreme example is the case of Indiana, USA. In 1998, the Supreme Court declared the administrative formula-based assessment method used was unconstitutional, violating the principle of uniform and equal rate of property assessment. This prompted a major shift in the way the tax base was calculated, namely towards a value-in-use assessment. Nevertheless, by 2003, systematic assessment failures overestimated low price dwellings and underestimated the higher priced ones, unintentionally creating a perverse distribution of the tax burden (Payton, 2006).

Using spatial criteria for taxation is common in places where the housing market has not been developed due to historical circumstances. In the former communist states of Eastern Europe property was not privately owned so taxation was out of the question; privatization necessitates a fiscal mechanism. The time associated with equilibrating markets complicates assessing property values. This explains why Poland, Hungary, Bulgaria, the Czech Republic, Slovakia and the Baltic Republics use spatially based taxation (McCluskey et al., 1998; Youngman and Malme, 2004). Setting rates by a zoning system utilizes common sense and attempts to achieve an equitable tax distribution, based on the fundamental insight that location is the most important criterion determining value and associated benefits from a property.

For households the property tax burden is another component of housing expenditures. When comparing accommodation alternatives, the tax is an inseparable component. Classic economic theory predicts that such taxes produce an excess burden on landlords or tenants according to market conditions. Therefore, they disrupt market efficiency. On the other hand, Tiebout (1956) advocates that competition between municipalities promotes efficient fiscal policy and increases household utility due to the production and service of otherwise unrealizable public goods. Under this school of thought, tax and property value share a much more complicated relationship. It may make sense that raising the tax will actually increase property value through the capitalization of the public goods provided locally (Oates, 1969). Sharpening Tiebout’s model, Fischel (2001) considers homeowners as shareholders in the local authority. He predicts that residents will do all they can to ensure that their property value does not decrease, by being discriminatory with respect to location and demography and land use policy. Comparing their municipality’s performance with that of competing jurisdictions is used as a yardstick not only when considering moving but also on election day (Besley and Case, 1995). Altogether these elements cause concealed tax mimicry between local authorities that reflect diffusion of demand over space (Revelli, 2001). But Tiebout’s preconditions for a market-efficient equilibrium do not exist in reality. Therefore, it is reasonable to assume that population distribution by local authorities does not achieve efficient allocation (Percy and Hawkins, 1992; Newton, 1997). Nevertheless, residents are not randomly placed and they use their economic power to improve their utility.

General acceptance of property tax as equitable and fair is a precondition for its performance. Fairness reflects the normative perspective regarding the exemptions from tax to which certain populations are entitled. On the other hand, equity has to do with the burden distribution. Horizontal equity exists when people with the same taxable property value pay the same tax. Vertical equity stresses that the tax burden is the same across the wealth scale, neither progressive nor regressive but rather existing in fixed proportion to the value of taxable property (De Cesare and Ruddock, 1998). Even though the flat-rate tax was advocated for over decades by scholars from an eclectic collage of disciplines and political views, Fried (2002) demonstrates that any rate structure by itself cannot justify distributive justice, but rather serve as operational instruments for other moral responsibility to the role of government. Yet, for empirical purposes, the analyst may enjoy the privilege of not taking a side on the debate. Instead, he or she can compare the findings with the declared intentions of the legislator, to discuss their fulfillment.

The fiduciary relationship between a local authority and central government is important, for when substantial central government support is transferred it introduces another distortion known as the 'fiscal illusion'. Fiscal illusion occurs when a local authority underestimates the tax burden and may engender excess expenditure. Thus, local spending tends to be higher than in the alternative situation where it is all funded by locally generated income. The mismatch between the public spending entity (local) and the income generating entity (national) produces underestimation of tax burden. This results in excess public expenditure by municipalities. Simultaneously, it reduces self-revenue generation motivation (Grossman, 1990).

The Israeli local property tax system

Israeli property tax is an undesignated tax paid to local authorities. Anyone possessing real estate by ownership or lease, within the municipal jurisdiction is liable. Differential rates per square meter of floor space are set separately by each local authority. Properties are first classified into use categories such as commercial, industrial, residential and agricultural. These are determined by actual use and not by designated land use as outlined in statutory outline plans. Residential rates are pegged in between agricultural and commercial rates.

The heightened interest in Israel with respect to property tax is mainly due to its expanding share of the self-generated income of local authorities. Since 1980s, the central government's share in local authorities' budgets has decreased consistently while dependence on locally generated taxes and tariffs has increased. This is not a declared policy on behalf of the central government, but rather a result of a sequence of piecemeal initiatives without substantial public debate (Ben-Elia, 1999). Nationally, the share of central government support to local authorities has shrunk from 60% of regular annual income to 30% (Razin and Hazan, 2006).

Fig. 1 illustrates the most important components of municipal receipts during 1995–2006 in current prices for all municipalities across the country. The general trend reflects a parallel constant increase of total, current budget, self-generated income and the property tax (residential and non-residential) over time. Conversely, the two main portions of government participation present a different trend. Central government's contribution to the current budget increases at a diminishing rate. Furthermore, government input to the investment budget remains constant in nominal terms; this means it actually declines in both real purchasing power and per capita measures. The typical Israeli municipality is heavily dependent on government funding. Yet, the continued contraction

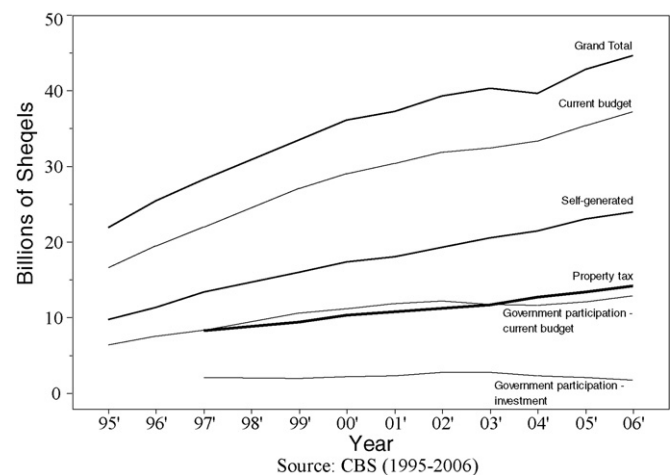


Fig. 1. Receipts of all local municipalities in Israel 1995–2006. Source: CBS (1995–2006).

of financial support will eventually lead to more independence for those who can support themselves by self-generated income and poor services for those who cannot.

As a source of income, property tax is rather convenient for local authorities. Revenue is stable and incremental adjustments are set annually. National measures to control the hyperinflation of 1985 overlooked the property tax. Recently however, consecutive years of low inflation rates have brought government to set a fixed rate of 2.73% increase in property tax rates annually. Attaching the tax to the inflation rate is much more pragmatic than linking it to fluctuations in property value, which would cause municipal receipts to be unstable. Stabilization would be impossible since it would involve frequent counter cyclical changes in tax rates which are electorally unpopular.

Locally generated income is insufficient for about 230 of the 250 (92%) local authorities in Israel. The role of deficit-balancing grants that the municipalities receive from the central government will always remain a sensitive issue. The government does not assert that these payments are designated to ensure that all local authorities provide a standard minimum basket of services. From the government's point of view, implying this kind of guarantee will increase the cost of transfers and perhaps discourage municipalities from exploiting their tax collecting potential. The balancing grant is distributed according to a formula revised every few years. In 1994, the government adopted a recommendation to re-distribute money as a function of potential tax base and compensate for socio-economic factors. Government support is an inherent component of municipal funding, perhaps nourishing a fiscal illusion.

Arab municipalities in Israel are known to be financially weaker; their peripheral location, small size, low socio-economic composition and lack of non-residential tax base have resulted in restricted potential tax collection. Furthermore, property tax collection shares are small in comparison with Jewish municipalities of equivalent social class. In contrast to Jewish municipalities, the share of self-generated income among Arab local authorities is declining. However, government support per capita is on the rise and, in this respect, narrows the gap with Jewish local authorities (Portnov et al., 2001; Razin, 2002).

Fig. 1 illustrates the 'Alternative Assessment' components. Each municipality creates its own criteria for distinguishing between properties based on qualitative and spatial logic, reflecting variation in the existing residential real estate inventory. For example, in Tel Aviv, the main criterion distinguishes between properties based on their age while in Jerusalem it is based on a size threshold.

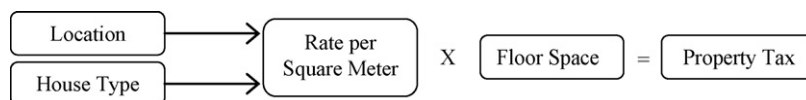


Fig. 2. The 'Alternative Assessment', method.

Measurement standards are also different across localities. In some municipalities, assessed property floor space is measured from the inside, while in others measurement includes the exterior structure. The anomalies do not end here; separate rules determine the inclusive area. For instance, in the city of Raanana underground parking is included while in Bat-Yam municipality 30% of flat roofs attached to apartments are measured for tax purposes. Scholars have failed to determine the requisite property tax burden for one main reason: qualification of property into tax rate categories and measurement standards are unique for each municipality. Under these circumstances, the property tax is viewed as arbitrary, inequitable and therefore regressive (Darin, 1999).

Tax regulation does not include any explicit measures to assure horizontal equity between households in different jurisdictions. To streamline the system, an inquiry committee recommended nationwide unification of tax criteria in order to increase transparency and prevent arbitrary taxation (Suari, 1993). Implementing this recommendation would have meant that the most important factor determining property value (i.e. location) would no longer be an assessment instrument.

Tax relief and exemptions are explicitly authorized by the Ministry of Interior, not by local authorities. Accordingly, tax relief is given to the unemployed, pensioners and others assisted by Social Security; furthermore, an income qualification applies. The tax burden distribution touches a raw nerve. Tax payments are confidential and it is usually impossible to merge such data with other relevant variables. It is impossible to receive disaggregated payment data from the local authorities and combine that with property value or personal indicators. It is not even possible to link such data to the criteria of taxation. Using aggregated data Portnov et al. (2001) discovered that within the city of Be'er-Sheva the difference between the extremes of rates per sq. meter is only 20% while differences in socio-economic indicators exceed 100%.

Data and methods

In order to analyze the actual tax burden distribution, the Household Expenditure survey for the years 1997–2005 was used. The Israeli Central Bureau of Statistics (CBS) collects this data annually using standards set by the International Labor Organization. The survey is used by the CBS to calculate the consumer basket for the national Consumer Price Index which makes it a very rich data set. Each observation in the data is a household defined by a person or a group of people that share a dwelling most days of the week and obtain a joint budget for food. Sampling is performed in two stages. First, cities are selected and then households within them are chosen. Sample size grows moderately each year beginning at 3789 and reaching 5460 by the end of the period. Posterior weights are assigned to the observations in order to assure a representative sample (Central Bureau of Statistics, 2004).

Each year re-sampling is performed which means that the same households are not repeatedly measured making this series a spatial panel. Yet, repeating the analysis over the years overcomes to a great extent the shortcoming of a onetime cross-section analysis. On the spatial side, discreet addresses of households are unavailable, but for each observation the city or district is given. Spatial reference increases with time; in 1997 households are classified by 49 locations while by 2005 71 locations can be identified. Finally,

Arab households are also classified and the indicator of 'locality type' enables identifying residents of Arab municipalities.

Respondents are asked to fill in a two-week diary that enumerates all their monetary expenses. In addition, they complete a questionnaire regarding all of their income for the previous three months, other periodical expenditures. All expenditure categories are standardized to monthly expenditure at the annual average CPI. Property value of the dwelling is also part of the survey and is reported based on self-assessment by property occupants. All figures in the data set are quality-controlled by the CBS as part of CPI calculations. This makes the data set ideal for the purpose of analyzing the property tax distribution. It allows matching the actual tax paid with the property value and per capita expenditure at the most disaggregated level.

Multiple linear regression with fixed effects for the location categories is employed.¹ This enables the simultaneous estimation of the relationship between the variables the 'Alternative Assessment' aims to capture, i.e. property value and income as well as its progressiveness with respect both factors. In addition, dummy variables are used to control the three most important criteria eligible for reductions, namely, pensioners, those assisted by Social Security and the unemployed. Due to the fact that data structure is inherently individual, performing longitudinal, time series or spatial analysis demands aggregation which is undesirable. Aggregating the data does not make it possible to explore the richness of the population in terms of the variety of households and variables. Concentrating on the actual paying entity as the unit of analysis improves consistency and makes derived interpretation more meaningful.

Findings

This section contains two distinctive sub-sections. In order to appreciate the general trends in the data, *Descriptive statistics* section provides a descriptive overview of the sample at the city level. *Inferential statistics* section presents a detailed analysis and the inferential statistics at the household level.

Descriptive statistics

The two salient variables of interest are property value and amount of tax paid. Fig. 2 presents a scatter plot of the average annual property tax and property values for the year 2005 as an example. The general impression is that property tax has a strong positive correlation with property value overall. Furthermore, it is not surprising to find the most prestigious locations such as the municipalities of Ramat HaSharon, Ra'anana, Herzliya and Mevasseret Tzion at the top right of the chart. The first three are prime housing locations situated in the northern sector of the Tel Aviv metropolis. The fourth is an affluent suburb west of Jerusalem. At the bottom left, one can find a mixture of low cost housing localities. Some of them are centrally located like Lod and Ramla in the Tel Aviv metropolitan area while others are more remote small towns

¹ Random coefficients for locations in a multilevel structure were also examined but are not reported here. The multilevel analysis did not substantially improve the estimation; therefore, the more parsimonious model is reported.

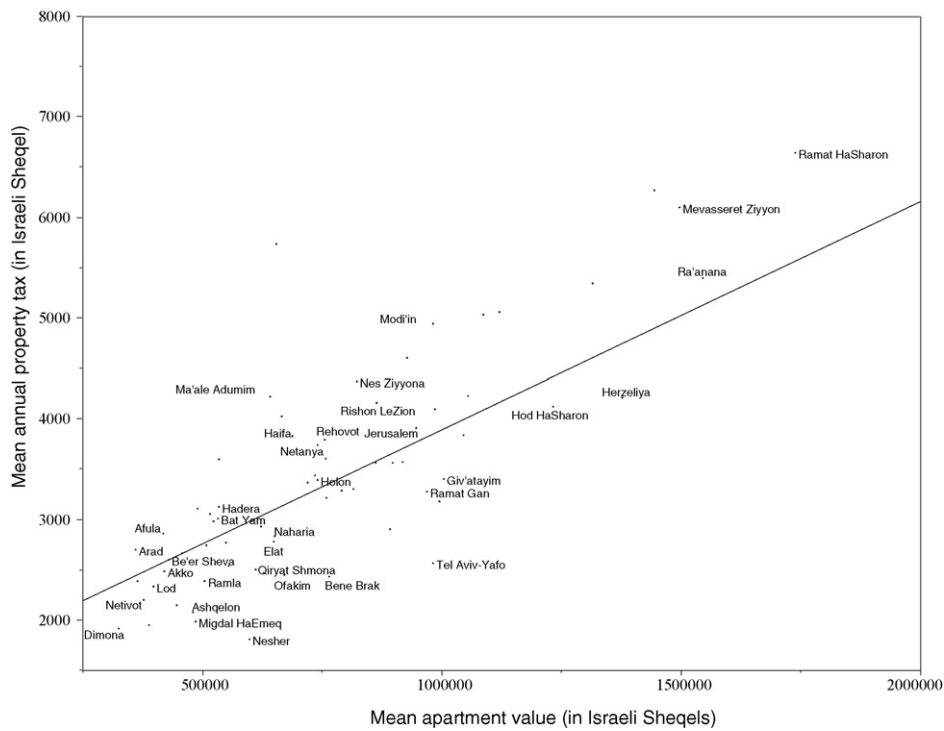


Fig. 3. Average property tax and property value in Sheqels 2005.

like Afula in the north and Arad and Dimona in the south. The cities of Tel Aviv and Bene Brak are outliers for having very low average property tax. The city of Tel Aviv is privileged to have the highest concentration of high-rate non-residential properties, allowing for low residential rates relatively to property value. Despite its central location, Bene Brak is dominated by an ultra-orthodox population which, as a collective, is ranked on the lower rungs of the socio-

economic ladder. Using this picture it is tempting to conclude that the property tax ostensibly performs better than expected in terms of attaching a differential tax based to property value. However, Fig. 3 shows the average ratio of property tax to property value, as a function of property value. From this perspective, things look quite different. The share of property tax out of property value significantly decreases as property value goes up. The location of the

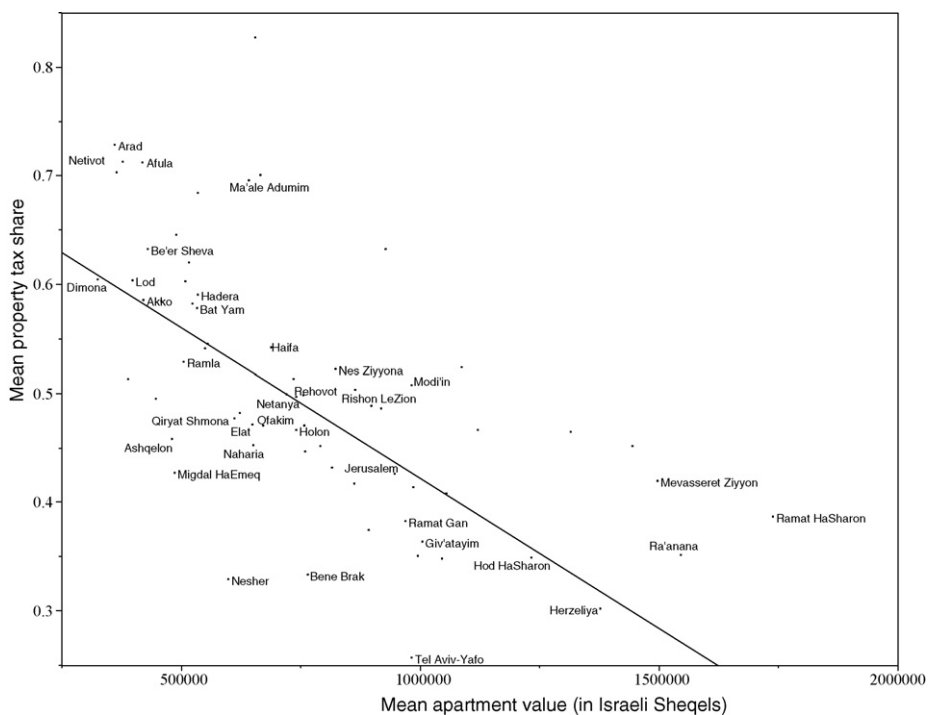


Fig. 4. Average annual property tax share and property value, 2005.

Table 1
Simple regressions on aggregated data.

Dependent variable	Year	Intercept		Property value		R ²	Obs.
		Estimate	Prob > t	Estimate	Prob > t		
Annual property tax (in Israeli Sheqels)	1997	1780.4	<.0001	0.001	0.002	0.18	49
	1998	1482.5	<.0001	0.002	<.0001	0.38	51
	1999	1371.2	<.0001	0.002	<.0001	0.38	53
	2000	1706.0	<.0001	0.001	<.0001	0.30	54
	2001	1995.9	<.0001	0.001	.0006	0.21	54
	2002	1830.6	<.0001	0.002	<.0001	0.27	57
	2003	1641.8	<.0001	0.002	<.0001	0.48	69
	2004	1587.3	<.0001	0.002	<.0001	0.38	69
	2005	1800.0	<.0001	0.002	<.0001	0.42	70
Tax share (% of property value)	1997	0.66	<.0001	-3.291e-7	<.0001	0.26	49
	1998	0.61	<.0001	-2.473e-7	.0011	0.19	51
	1999	0.54	<.0001	-1.895e-7	.0027	0.16	53
	2000	0.60	<.0001	-2.504e-7	<.0001	0.27	54
	2001	0.67	<.0001	-3.074e-7	<.0001	0.33	54
	2002	0.64	<.0001	-2.497e-7	<.0001	0.25	57
	2003	0.62	<.0001	-2.323e-7	<.0001	0.35	69
	2004	0.7	<.0001	-2.768e-7	<.0001	0.27	69
	2005	0.7	<.0001	-2.394e-7	<.0001	0.35	70

points on the horizontal axis is the same as in Fig. 2, so in relative terms the high monetary valued locations bear a smaller burden when compared to locations of lesser value.

The patterns described in Figs. 3 and 4 are consistent for the whole time span examined, as evident from Table 1 which lays out the simple regression plots for each year. Alternative calibration using transformations does not seem to improve prediction, but rather draws the trend line towards the outliers.

The descriptive statistics presented above provide a simple illustration of general trends in the data at an aggregated level. It is very possible that these patterns are the consequences of an uneven distribution of households and socio-economic groups across localities. However, it is not possible to conclude that these trends prevail at the household level within each locality.

Inferential statistics

The following presents a detailed analysis of the relationship between property tax payment and property value at the

household level. Beginning with descriptive statistics of the variables of interest at the household level, Table 2 reveals three main trends over time. First, it is evident that in monetary terms gross tax receipts are increasing over time reflecting both the inflation and the real growth of the Israeli economy. Second, the variance of the continuous variables is very high compared to the corresponding averages, reflecting the Lognormal distributions which are common in these cases. Third, the constant increase in the share of Arab households and local authorities is mainly due to better representation in the survey over time.

Table 3 lays out the results of regressing the level of property tax on property value and other explanatory variables for each year separately. These models estimate the influence of five independent effects simultaneously. Aside from property value, we analyze the effects of per capita expenditure of the household, dummy variables for unemployed, pensioners, recipients of other Social Security assistance, Arabs residing in Jewish and mixed cities, Arab municipalities and location.

Table 2
Descriptive statistics at the household level.

Annual property tax	Apartment value	Per capita expenditure	Unemployed	Pensioner	Assisted	Arab local authority	Arab household	Obs.
2494.2 (29683.9)	691096.2 (8196058.6)	2218.6 (27615.2)	9.73%	8.81%	7.66%	8.07%	8.13%	3789
2709.9 (33052.7)	750166.2 (9472977.5)	2303.6 (30098.0)	11.32%	9.27%	7.99%	9.38%	9.04%	4021
2608.1 (34724.3)	785360.3 (10411446.0)	2620.0 (35842.4)	11.99%	11.09%	9.88%	11.01%	11.85%	5228
2815.2 (38574.3)	764127.8 (8857622.3)	2815.8 (39337.3)	13.27%	11.34%	10.42%	10.28%	9.08%	5203
2911.2 (40447.3)	740310.3 (8580737.0)	2874.6 (39431.1)	14.24%	11.23%	11.08%	12.18%	10.87%	5089
3142.4 (41887.3)	803101.4 (9839520.3)	2900.0 (38105.3)	14.37%	11.52%	12.61%	12.38%	12.92%	5438
3051.0 (43379.1)	782133.5 (9751429.5)	2906.8 (39389.9)	8.41%	11.69%	13.25%	11.95%	12.71%	5388
3267.2 (40627.3)	771108.4 (8350155.8)	3018.5 (41524.4)	8.74%	12.33%	12.87%	12.31%	12.26%	5307
3444.6 (45435.8)	803972.9 (9734379.1)	3110.5 (42789.8)	7.93%	12.71%	14.23%	12.45%	13.16%	5460

Note: Standard deviations in parenthesis.

Table 3
Multiple regression plots for Ln annual property tax 1997–2005.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Intercept	−2.726 (0.000)	−2.224 (0.000)	−3.174 (0.000)	−3.659 (0.000)	−3.716 (0.000)	−3.842 (0.000)	−3.822 (0.000)	−3.695 (0.000)	−2.726 (0.000)
Ln property value	0.724 (0.000)	0.667 (0.000)	0.732 (0.000)	0.788 (0.000)	0.777 (0.000)	0.785 (0.000)	0.780 (0.000)	0.747 (0.000)	0.724 (0.000)
Ln per capita expenditure	0.105 (0.000)	0.147 (0.000)	0.139 (0.000)	0.117 (0.000)	0.148 (0.000)	0.150 (0.000)	0.161 (0.000)	0.215 (0.000)	0.105 (0.000)
Unemployed	0.007 (0.870)	−0.020 (0.619)	0.178 (0.000)	0.084 (0.049)	0.018 (0.676)	0.055 (0.174)	0.060 (0.264)	−0.043 (0.409)	0.007 (0.870)
Pensioner	−0.289 (0.000)	−0.326 (0.000)	−0.283 (0.000)	−0.261 (0.000)	−0.274 (0.000)	−0.282 (0.000)	−0.304 (0.000)	−0.249 (0.000)	−0.289 (0.000)
Assisted	−0.351 (0.000)	−0.296 (0.000)	−0.318 (0.000)	−0.258 (0.000)	−0.414 (0.000)	−0.328 (0.000)	−0.311 (0.000)	−0.343 (0.000)	−0.351 (0.000)
Arab household	2.457 (0.054)	3.698 (0.003)	3.712 (0.015)	13.463 (0.000)	8.187 (0.000)	−0.096 (0.950)	4.046 (0.001)	1.807 (0.169)	2.457 (0.054)
Arab household × Ln property value	−0.168 (0.091)	−0.255 (0.009)	−0.246 (0.035)	−1.009 (0.000)	−0.612 (0.000)	0.013 (0.908)	−0.330 (0.000)	−0.116 (0.241)	−0.168 (0.091)
Arab municipality	6.541 (0.000)	2.590 (0.064)	4.031 (0.022)	−5.238 (0.174)	−1.099 (0.624)	7.824 (0.000)	5.327 (0.000)	6.746 (0.000)	6.541 (0.000)
Arab municipality × Ln property value	−0.490 (0.000)	−0.203 (0.064)	−0.315 (0.020)	0.404 (0.165)	0.095 (0.576)	−0.588 (0.000)	−0.368 (0.001)	−0.527 (0.000)	−0.490 (0.000)
Location dummies	48	50	52	53	53	56	68	68	69
R ²	0.38	0.37	0.33	0.32	0.32	0.36	0.34	0.39	0.42
R ² adjusted	0.37	0.36	0.32	0.31	0.31	0.35	0.33	0.38	0.41
Obs.	3789	4021	5228	5203	5089	5438	5388	5307	5460

Note: *P* values in parenthesis.

The output and two continuous input variables were transformed using the natural logarithm to improve the goodness of fit and the normality of residuals. Within the double log framework, estimates represent the elasticity instead of the marginal increase in the dependent variable. Reading the row presenting the estimate of property value over time, it is evident that the elasticity of property tax with respect to this variable slightly varies between 0.667 and 0.788. This means that a 1% increase in property value is expected to increase the tax payments by 0.667–0.788% reflecting a regressive tendency. Auxiliary statistics confirm that these parameter estimates are significantly different from 1.0 which means that the unitary elasticity hypothesis is rejected. Property value is also the most important variable in terms of its refined contribution to the explained variance in the observed tax payments. Comparing type III sum of squares of the effects, the contribution of property value is at least seven times larger than the second-ranked variable, per capita expenditure.

With respect to per capita expenditure, the tax is even more regressive. The parameter estimates for this predictive variable lie in the range of 0.105–0.161. Additional *t*-tests for unit elasticity significantly reject the null hypothesis. The simultaneous contribution of these two variables to the explanation of the actual property tax paid reflects the complex nature of the tax which determines liability based on property and modifies it by income. This shows the will to compromise between taxing wealth in terms of fixed property and income flow.

Two other important variables are those of pensioners and those receiving other Social Security benefits. The net effective reductions estimated for these range between 25–32% and 25–35% respectively. These parameters tend to be significantly different from zero. On the other hand, parameter estimates for the unemployed are not consistently significant over the examined time period. In only twice out of nine years, this effect was significant at the 5% level.

Regarding the Arab households that reside in Jewish and mixed cities, the findings suggest unstable parameter estimates. The intercept for this group is significantly positive (more than Jewish households) in five out of nine times and marginally significant twice more. On the other hand, the slope is significantly negative (smaller from Jewish households) in the same five occasions, reflecting a more horizontal trend and regressive tax distribution. For Arab households living in Arab municipalities, this is amplified. This group's intercept is significantly the highest among all three different groups examined in five of the models estimated. As for the slopes, they are significantly negative (smaller from Jewish households) in six out regressions and marginally significant in one more, reflecting a very gentle positive slope yet not quite a horizontal trend line. This almost flat relationship may very well be caused by two different reasons. First, work in this area has noticed an inconsistent tax collection pattern in the Arab sector (Razin, 1999a). Second, property markets are not well developed in these locations which may result in inadequate property values in the sample.

The impact of household location by city and/or sub-district is estimated in the model as one categorical factor comprised of dummy variables measuring the difference from the national average. Overall, 517 parameters were estimated, 57 per year on average. Amongst these coefficients, 65% are insignificant at the 5% level and 76% insignificant at the 1% level. No location has consistently significant parameter estimates for more than three out of the nine years estimated. This means that all other factors equal, property tax will remain similar between jurisdictions. This is somewhat surprising since the 'Alternative Assessment' formula is set uniquely in each municipality and there is no legal base for coordination between them. If property tax assessment set locally is arbitrary, then location rather than other factors, should play a meaningful role in explaining variance of property tax payments.

The R^2 of the various models are not very high yet stable over time. Our estimation strategy is aimed at evaluating the marginal contribution of the various variables precluded by the 'Alternative Assessment' method, rather than optimizing prediction. Our results reflect some distortions at the micro-level and the imperfect relationship between the tax and property value. Repeating the models over the years enables further validation of annual cross-sections results.

Conclusions

Property taxation in Israel and other countries is unique in its divergent criteria for assessment. The use of qualitative and spatial criteria – 'Alternative Assessment' – instead of discrete property valuation aims to reduce costs and to increase implementation simplicity for local authorities. The criteria chosen by the legislator (i.e. house type, location and size) admit the attempt to distribute burden according to ability to pay rather than any other principle. This study examines household expenditure on property tax by using national expenditure surveys from Israel for the years 1997–2005. This provides a unique opportunity to investigate the relationship between the actual tax paid, self-assessed value of the dwelling and household economic well being; the actual variables bypassed by the 'Alternative Assessment'.

The statistical analysis suggests that property value is the most significant predictive variable of the tax, followed by expenditure per capita. The importance of both variables reflects a surprisingly well performing tax mechanism that captures the meaningful aspects of factors defining property value and strikes a balance between liability based on the dwelling as a fixed asset and income as a flow. This clearly shows that the criteria are not arbitrary; common sense and basic geography of residence are efficient tools for taxation assessment. However, the national trend linking the two predictors with the endogenous variable is stronger than the local effect. Perhaps it is the very existence of a distinctive assessment in each locality that enables linking the *de facto* tax paid to property value nationwide.

Elasticity with respect to both predictors is smaller than 1, reflecting the regressive nature of tax burden. This means that as property value goes up, households are predicted to pay a higher sum in monetary terms. On the other hand, the burden they bear will be reduced since the tax as a share of property value and per capita expenditure tends to decrease. Combining the importance of property as a predictor of tax with the regressive pattern suggests a conclusion that the weakest link of property taxation is the differential rates attached to the different taxation criteria. It seems that rates are not diverse enough to reflect the immense range of property values within and between municipalities. Significant improvement in equity can be achieved simply by expanding the rates of the existing tax criteria, so that they bear a better relation to the large disparity in property value and income. This in turn, may require political skills to generate the support in the right sequence and manner.

Regressive property taxation is not at all unique for Israel. It prevails in many other places around the world. It is true for the USA, where property is formally assessed, and for European countries which combine estimation with qualitative criteria to measure liability. A straightforward regressive tax with diminishing ratios as property value increases would be extremely unpopular making it almost impossible to legislate in a democratic context.

Between full property assessment and diverse qualitative criteria there is the intermediate option of nationwide unified criteria and rates. This is sometimes suggested as a populist quick-fix alternative. The unique set of criteria in each locality is what binds property value with the tax. If criteria and associated rates will be

set nationally, they would have to be different across high and low land-price municipalities in order to assure that the most important factor in property value, namely location, is not overlooked. Additionally, a comprehensive reform to implement property-value assessment is redundant since the existing mechanism already achieves this goal. The annual tax legislation issued by the local authorities enables incremental updates to the criteria. Since the housing stock does not change dramatically from year to year, it allows a continuous matching process within and between local municipalities.

Despite the micro-level imperfections, the overall marginal contribution of local factors to the explanatory model suggests that local authorities tend to converge towards the national relationship between property value and tax. Since this is not formally stated in legislation, municipalities are not authorized to manipulate this relationship; however, they do possess tools to modify criteria and rates as well as re-measure dwellings. Apparently, they use these instruments to incrementally adjust taxation annually. Bearing in mind that most dwellings do not change from one year to the next, it should not be very difficult for someone familiar with the local housing market to mimic neighboring jurisdictions. Mimicry in this case is also a substitute for formal explicit legislation. The fact that mimicry prevails actually saves a lot of effort through legislation and enforcement on behalf of the central government. Only if there were no governmental support towards municipal funding, the question of regressivity across municipalities would be irrelevant.

The Israeli experience with the property tax can serve as a helpful example for other countries that do not explicitly assess the property for taxation but instead use qualitative and spatial criteria. Embedding assessment in a few generally accepted price-determining factors in a simple manner can prove to be sufficient. This should be complemented with marginal corrections from time to time.

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