New Approach to Analysis Public Preferences for Local Financial Reforms: Greater Tel-Aviv Metropolitan Area as a Case Study

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Abstract

Central municipalities (CM) provide services and facilities to their residents and businesses. However, daily commuters also use some of these services, whilst generally avoiding participation in their upkeep as they pay their local taxes elsewhere. This situation has, since the 1980s, led many Western countries to look for new financial sources and to initiate several local financing reforms. Using a survey among residents in the Greater Tel-Aviv Metropolitan Area (GTAMA), we investigated the feasibility of replacing the current local financial system with alternatives based on various cost-sharing schemes among all CM service users. The results were analyzed using 'Cusp Catastrophe' approach. They indicated a generally low level of support for financial reforms, with residential location and academic education being the only significant variables determining support, neutrality of rejection attitudes. Unexpectedly, the strongest support for the current allocation scheme was indicated in the GTAMA core (i.e., the city of Tel-Aviv), which residents could benefit most from changes in the local financial system.

1. Introduction

Local tax revenues are crucial for local authorities' income affecting their ability to provide public services and facilities (Dye, Merriman, & David, 2000; Garcia-Milà & McGuire, 2003; Jaramillo, 2003; Lee, Gook, & Webster, 2006; Karuppusamy and Carr, 2013). In general, local revenues of municipalities are based on property taxes and business ventures. In the U.S.A., for example, local government revenues depend primarily on property taxes, although dependence on sale tax and user charges is increasing.

The income from local taxes and other locally generated fees are sensitive to socioeconomic and even political changes. Therefore, local authorities, mainly central municipalities (CMs), need time to adjust to the new realities (Storperand & Manville, 2006). So far, most of the taxes collected in CMs come from local residents and businesses. Suburbanites continue to use services and facilities provided by CMs whilst avoiding participation in their upkeep (Lee et al., 2006; Vaturi et al., 2004).

Recent studies have examined the impact of changes in governmental support schemes (Warner & Pratt, 2005) and other solutions for these needs. Researchers such as Pastor et al. (2000); Braid (2000); Zheng and Warner (2010) and Rohlin (2011), focused on changes in the tax system, or specific tax-sharing models (Rohlin (2011); Braid, 2000; Dye et al., 2000; Ritter & Oldfield, 1990); changes in the structure of local expenditures (Katz, 2000); road fees (Emmerink, Nijkamp, & Rietveld, 1995)**,** or regional tax alternatives **(**Martin & Schmidt, 1983). However, only a few studies have evaluated the public acceptance of such local financial reforms in light of political measures that need significant public support to succeed (Warner & Pratt, 2005).

Using a wide public survey among residents of *Greater Tel-Aviv Metropolitan Area (GTAMA),* the goal of this paper is to *examine public support for different intra-metropolitan cost-sharing measures in the metropolis.*

Unlike most previous studies of inter-metropolitan relationships which were based on the assumption of linearity of relationships between research variables (see *inter alia* Ritter & Oldfield, 1990), the present study is based on the 'cusp catastrophe' approach (Figure 1). The uniqueness of this approach is that it assumes that at a crucial point the public response may split into three levels: support, rejection, and neutrality (see *inter alia* Casti & Swain, 1975; Thom, 1975; Wilson, 1981).

We found that most of the interviewees, including the residents of the CM, who carry most of the metropolitan expenditures, appear to be satisfied with the current financial system and generally object potential reforms. Only the 'road toll,' 'governmental aid' and the 'redistribution of central functions' reform options received a significant degree of support from the interviewees and may thus have a chance to gain general public support in GTAMA, if implemented.
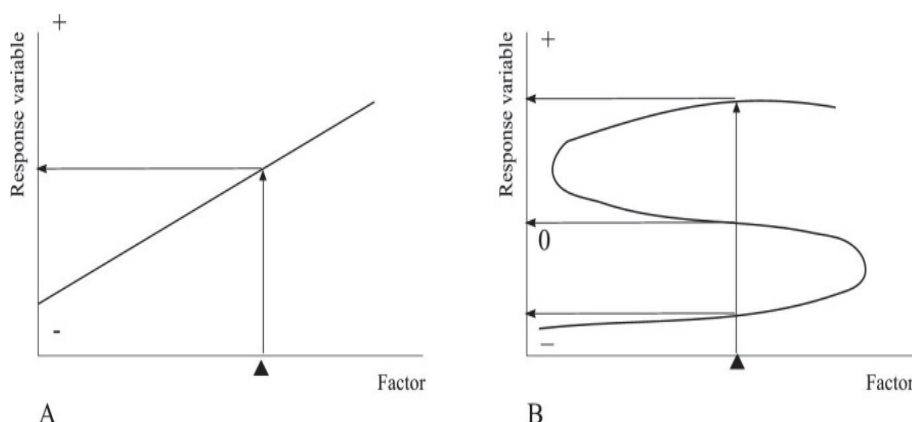
Figure 1: Linear (A) vs. 'Cusp' approach (B) to evaluating public response to changing socio- economic circumstances

2. Previous studies of local authorities' financial systems

Recent studies advocating the concept of 'endogenous growth' indicated that central municipalities (CMs) have this kind of economic competitiveness, which helps them improve the prosperity of their cities (Bartik,1992; Glaeser & Gottelieb, 2006; Hassi, 2010). Other studies focused on outward migration of residents and businesses to suburban areas, which eroded locally generated income in many central cities in Europe and North America (Bailey, 1999; Lee et al., 2006; Pastor et al., 2000; Hanson and Rohlin, 2011.

While most often people from the suburbs enjoy the benefits of urban life in the CM without having to help pay for them, the expenditures of the central cities remain the same or even increase. Experience from large cities in the US such as Portland, Oregon, suggests that metropolitan financial management measures require some combination of taxes and charges designed to create the necessary incentives for balancing metropolitan expenditures (Leo, Beavis, Carver, & Turner, 1998).

In this sense, Bartik (1992) indicates that state and local taxes have statistically significant negative effects on the economic growth of a state or metropolitan area. However, the range of plausible tax effects is large. For small suburban jurisdictions, taxes have more powerful effects on business growth than is true for metropolitan areas or states. These effects are so powerful that a cut in business property tax rates could plausibly raise revenue for a suburb.

Regarding changes in local business model, Zheng L., and Warner (2010), found a shift from primary reliance on business incentives to use of a broader set of strategies that includes business retention and small business support.

Various possibilities of changing tax systems have been examined by several studies in the U.S.A. (Pastor et al., 2000), France (Prud'homme', 1996), Italy (Levaggi, 1996), the U.K. (Else, 1996), and Israel (Hecht, 1997). The results of these studies show that tax reform cannot solve all the CMs' financial problems and, in any case, there is no uniform financial solution suitable for all CMs, as the solutions have to fit local conditions.

Thus, Mikelbank et al. (2007) analyzed the Residential Property Tax Abatements program in Cleveland, Ohio, and found that for center cities located in stagnating economies with relatively little population growth, residential property tax abatement programs can have important positive effects.

Electronic Road Pricing (ERP) is another popular 'cost-sharing'. ERP is based on a pay-as-you-use principle and designed to be a fair system, as motorists are charged when they use the road during peak hours. It is an electronic system of road pricing used mainly in South-East Asia and in some cities in the US and Western Europe**.** Its aim is to deal with traffic congestion by use of pricing as an alternative to investment, leading to expensive solutions that might not be efficient or economical (Olszewski & Tay, 1996).

Jacobsson, Fujii, and Garling (2000) showed that the public's acceptance of this model is negatively affected by perceived infringement on freedom and unfairness, which increases with the intention to reduce car use.

A Regional Tax-Base or Revenue Sharing technique is another local financial scheme that attempts to increase the self-reliance of central cities (Imbroscio, 1993; Martin & Schmidt, 1983). This kind of scheme requires that each community designate some part of its assessed value base, or stream of tax revenues, for inclusion in a regional pool of

assessed values or tax revenues that is then divided among all localities in the pool. (Braid, 2000; Köthenbürger, 2004).

Central government support aiming to balance the anomalous financial burden of central cities is another option to deal with their financial problems. Thus, Warner and Pratt (2005), who examined the role of state policy on local revenue effort in the mid-Atlantic and East North-Central regions of the US in the late 1980s, came to conclusion that, although the average impact of state aid is negative, for more than half of the counties state aid has a complementary effect – increasing effort.

3. 'Cusp catastrophe' approach and its applications in urban policy studies

Most urban studies dealing with municipal financial systems and intra-metropolitan relationships are restricted to a linear 'factor-response' approach, which has one dependent variable and several explanatory variables (McMillen & Singell, 1992; Mikelbank et al., 2007). In essence, this approach describes a simple response surface which changes slowly and smoothly: it is flat in every direction and exhibits one reaction to each of the covariates. Unlike this 'linear factor-response' approach (Fig. 1a), the 'cusp catastrophe' approach is concerned with sudden and discrete changes in system state variables, resulting from slow, smooth, and small changes in one or more parameters (Cobb & Shelemyahu, 1985; Thom, 1975; Wilson, 1981).

To maximize flexibility in the variables, the 'cusp' model introduces two additional degrees of freedom by defining three 'control factors'. Each is a scalar-

valued function of the vector of independent variables (Cobb & Shelemyahu, 1985). Thus, in a 'cusp' model, the bifurcation curve loops back on itself, giving a second branch where this new solution itself loses stability. Possibly, later on it can return to its original position (Fig. 1b).

4. Sources of income and expenditures of local authorities in Israel

As many other countries, Israel has a two-tier system of government. The central government is responsible for defense, law and order, medical care, higher education, and other country-wide functions and services. Municipalities (251 as of 2005) bear responsibility for local matters including sanitation, sewage, local parks and recreation, housing renewal, planning, issuing building permits, and provision of other services and facilities to residents of the areas under their jurisdiction. Schooling and social services are provided jointly by municipal authorities and the central government (Vaturi et al., 2004).

Arnona (the local property tax) is the single largest source of income of most local authorities (LAs) in Israel. It amounted to 42 per cent of the total budget income of LA municipalities in 2009. The second largest source of the LAs' municipalities' income was transfers from the central government – 29 per cent in 2009 (ICBS 2010).

As Hecht (1997) argues, local authorities in Israel do not have great flexibility regarding expenditures. He suggests that, regarding local property taxes, there is a need to convert the general municipal property tax on commercial property into a turnover tax, so that all those who benefit from municipal services, including those who do not live within the jurisdiction of the local authority, participate in its funding.

5. Research scope and methodology

To identify the degree of fairness of the current financial system and ways of improving it, we carried out a public survey among 400 residents of GTAMA. The questionnaire examined overall satisfaction from the current allocation of Tel-Aviv (TA)'s expenditures between residents and non-residents and evaluated support of six financial alternatives for the current financial system, under which *no* inter-municipal cost-sharing occurs. The survey was carried out in central areas of TA, in business centers, cultural centers, health centers, and leisure centers at different times of the day, to ensure the maximal representation of different social groups. Of the 400 interviewees, 55% were male and 45% were female, compared to 52% males and 48% females in the GTAMA as a whole. Regarding age groupings, about 14% of people were above the age of 55, 24% between 25 and 54, and 18% between the ages of 19 to 24, which generally corresponds to the age structure of the metropolitan population. The sample kept the representative structure of residents (35%) and non-residents (65%) in TA (Tel-Aviv–Yafo Municipality, 2011).

5.1 Statistical modeling

In the first phase of the analysis, descriptive statistics (means, frequencies, etc.) were used to analyze the public attitudes towards potential reforms in GTAMA. Next, logistic regression models were used to identify factors affecting public attitudes' split into support, rejection, and indifference (neutrality). As we assumed from the outset of the analysis, public response to policy options does not develop linearly as a simple 'factor-response' relationship. Therefore, there is a need to evaluate different attitudes, and to identify the factors that may affect each of them separately.

5.2 Dependent variables

The following evaluation options were offered to survey participants to assess the *level of their satisfaction with the current distribution* of the CM's expenditure burden between residents and non-residents:

Support – the current allocation scheme is fair and even gives advantage to non-residents; Neutrality – the current allocation is neither fair nor unfair and Rejection – the current allocation gives advantage to CM residents and should be corrected.

In order to estimate what type of attitude to various cost-sharing alternatives the GTMA residents are likely to exhibit, depending on their residential location and an array of personal characteristics, the following explanatory variables were used in the analysis: AGE [the age of the respondent];SEX [male; female]; EDUCATION [academic degree, high school education or less];INCOME [less than NIS4,000 (the minimal national salary), NIS4,000–10,000, and NIS10,000 +];[1] WORK [employed, unemployed]; WORK COMMUTING [visits to Tel Aviv for work-related purposes at least once in two weeks vs. less than once in two weeks]; LEISURE COMMUTING [the same for entertainment and leisure].

In addition, four categorical (dummy) variables – Core, Inner ring, Middle ring, and Outer ring of GTAMA[2] – were used to represent the residential location of a respondent. As assumed, residential location may have distinctive effects on public preferences regarding tax reform options.

6. Research results

6.1 Satisfaction with the current cost-allocation

Table 1 shows the factors affecting each of the three assessments of the current inter-municipal cost-allocation scheme, offered to the survey participants for evaluation, – 'favoring periphery', 'fair allocation', and 'favoring TA.' As Table 1 shows, factors significantly influencing each of the evaluation options are not identical. Thus, the high level of education appears to influence the respondent's decision to vote for the 'favoring periphery' option (Exp(b)=1.803; P<0.1), while reducing the probability of choosing alternative assessments ('fair allocation': Exp(b)=0.555; P<0.05, and 'favoring TA': Exp(B)=0.887; P>0.05). This implies that a certain level knowledge (or education in general) is needed to realize that the current system of minter-municipal cost allocation, under which resident taxes are paid to local municipalities but many services are provided by the CM, falls short of complete fairness.

Table 1: Factors affecting the public attitude towards current cost-allocation scheme in GTAMA (method: logistic regression; maximum likelihood ratio)

Variable	'Favoring periphery'		'Fair allocation'		'Favoring TA'	
	B	Exp(B)	B	Exp(B)	B	Exp(B)
Intercept	-1.309		2.065		0.757	
TA	-1.876	0.153	0.253	1.288	-1.623 [b]	0.191
Inner ring	0.533	1.705	0.788	2.198	1.321	3.747
Middle ring	-0.712	0.591	0.312	1.366	-0.400	0.670
Outer ring	-0.817	0.442	0.044	1.045	-0.773	0.462
Age	-0.034	0.967	-0.020	0.980	-0.054 [b]	0.948
Education	0.589 [c]	1.803	-0.589 [c]	0.555	-0.119	0.887
Gender	0.303	1.226	0.382	1.466	0.586	1.797
Income	-0.031	0.969	0.159	1.170	0.125	1.134

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[1] New Israeli Shekel (NIS3.7=ca.US$1).

[2] These variables are 'contrasted' with 'other' areas which refer to any place in the country outside GTAMA.

Work	1.524	4.590	0.314	1.848	2.138 [b]	8.481
TA-work	-1.041	0.353	0.096	1.101	-0.945	0.389
TA-leisure	0.591	1.807	-0.581	0.559	0.010	1.010
Number of cases	400(171)					
-2 Log likelihood	313.466					
Chi-square	48.073					
Sig.	0.001					

[a]$P<0.001$; [b]$P <0.01$; [c] $P<0.05$

Favoring periphery (Support) = the current allocation scheme gives advantage to non-residents;

Fair allocation (Neutrality) = the current allocation is neither fair nor unfair;

Favoring TA (Rejection) = the current allocation gives advantage to CM residents and should be corrected

Unsurprisingly, living in TA reduces significantly the interviewee's propensity to vote for the 'favoring TA' option (Exp(B)=0.191: P<0.01; Table 1), so does the age of the respondent (Exp(B)=0.948; P<0.01). Concurrently, working in TA increases the odds ratio of voting for the 'favoring TA' option, apparently because of the high costs of parking services work-commuters are forced to pay in TA. Characteristically, none of these factors (i.e., age group, living in TA and working their) emerged as statistically significant in the 'favoring periphery' and 'fair allocation' models.

6.2 Public support for cost-sharing alternatives

Living in the Inner ring appears to reduce significantly support for most tax reform options, viz. *additional VAT, additional labor tax*, *regional tax*, *cars fees*, and even *governmental grants*. Inner ring also emerges as the main factor in most 'rejection' models. Apparently the close proximity of the Inner Ring to the CM enables its residents to 'use CM's free services (e.g., public beaches, open spaces, etc.) often. As a result, they may fear that any new tax for non-resident users will be levied mainly upon them. However, the Inner Ring variable does not emerge as statistically significant in most 'neutrality' models, except for the last one – 'redistribution of central functions' .This indicates that the residents of this ring are clearly 'opinionated,' taking a clear stance against any change in the *status quo*.

Table 2: Factors affecting acceptance of the 'Car fees' option by survey respondents. (Dependent variable – reform acceptance; method: binary logistic regression/likelihood ratio)

Variable	Support Model		Neutrality Model		Rejection Model	
	B	Exp(B)	B	Exp(B)	B	Exp(B)
Intercept	-3.418		-1.648		3.418	
TA	0.372	1.450	0.421	1.524	-0.372	0.690
Inner ring	-1.575 [c]	0.207	-0.283	0.753	1.575 [c]	4.832
Middle ring	-0.430	0.650	-0.293	0.746	0.430	1.538
Outer ring	0.409	1.506	-0.781	0.458	-0.409	0.664
Age	0.028 [c]	1.029	0.006	1.006	-0.028 [c]	0.972
Education	0.610 [b]	1.842	0.438 [c]	1.549	-0.611 [b]	0.543
Gender	-0.296	0.744	-0.309	0.734	0.296	1.344
Income	-0.062	0.940	-0.493 [c]	0.611	0.062	1.064
Work	-0.630	0.532	0.456	1.577	0.630	1.878
TA-work	0.752 [c]	2.120	0.630	1.878	-0.752 [c]	0.472
TA-leisure	-0.157	0.856	-0.732	0.481	0.157	1.170
Number	400					
of cases	(280)					
-2 Log likelihood	479.614					
Chi-square	45.884					
Sig.	0.002					

Being employed reduces significantly the interviewee's propensity to vote for regional tax (Exp(B) =0.286; P<0.05;), but does not emerge as a statistically significant factor in the neutrality model (P>0.1). Concurrently, the neutrality model for this reform option is affected by education (Exp (B) = 1.773; P<0.01), working in TA (Exp(B)=3.092; P<0.1) and age (Exp (B) = 1.043; P<0.05; This indicates that older and educated people do not necessary have more propensity to support reforms, being rather indifferent to any potential changes.

Notably, the respondents' support and rejection of *cars fees* are affected significantly by several factors, which include, in addition to 'living in the Inner ring' (P<0.1; Table 2), age (Exp (B) =1.029; P<0.05), education (Exp (B) =1.842; P<0.01) and work commuting (Exp (B) =2.120; P<0.05). Thus, more educated, older people and those who commute to TA to work are possibly more familiar with the advantages of this option that would not only improve the financial performance of the CM, but also achieve environmental gains. On the other hand, the car fees' neutrality model is effected only by the income variable (Exp (B) =0.611; P<0.05;) and education (Exp (B) =1.549; P<0.05;). This indicates that higher income population groups are less likely to be indifferent to this option, being apparently concerned that it may adversely affect them, while more educated may tend to exhibit a more balanced attitude to it, seeing not only its drawbacks, but also its environmental advantages (i.e., reduction in transport-generated pollution).

7. Conclusion

CMs are heavily dependent on local taxes paid by residents and businesses as main sources of their revenues**.**
Our examination of the responses of GTAMA residents to possibilities of changing the current financial system in a way that financial burden is shared more equally between all the residents of the metropolitan area, showed a very low support in this direction.

Somewhat unexpectedly, the *highest support* for the *current* cost-allocation scheme was indicated by the residents of the GTAMA core (59%) compared to an average of only 44% among non-residents. This indicates that despite the high taxes CM residents pay, they appear to be satisfied with the present-day prosperity which the city's economy brings to them.

Examination of the public responses regarding specific cost-sharing options shows that *'cars fees'* (road tolls) and the *'distribution of central functions'* alternatives received the highest support by most of the respondents accept those residing in TA and the *Inner Ring*. The relative large support for the *'distribution of central functions'* option indicates that many residents of the metropolis would prefer to have more jobs and services in their home towns. In contrast, the residents of TA and the *Inner Ring*, rather naturally, reject this option, being reluctant to lose the advantages of being CMs, such as a large pool of jobs and economic growth.

In general, the *road toll* option was found to be relatively popular among survey participants. It may be due to its potential public benefits, such as environmental improvement attributed to reduced transport congestion.

The advantage of using a three-tier evaluation approach was indicated also in this part. For example, it helped to identify not only the social groups that are likely to support or reject each cost-sharing alternative, but also those who may be neutral to them. Working with such 'neutral groups' may help to understand what should be done to improve a particular cost-sharing option and thus gain their support. The identification of the population groups, 'inclined to neutrality' may also help to identify weaknesses of the proposed policy alternatives, which cannot be done by using a more 'straightforward' linear response approach.

Another interesting finding of this study is that the *Inner Ring* residency is the dominant factor that affects public attitudes regarding most reform alternatives. However, it impacts mainly the support or rejection levels in each option, while having no significant impact on the neutrality choice. This can be explained by the fact that the residents of this metropolitan ring are clearly 'opinionated,' taking a clear stance against any change in the *status quo*.

Unlike popular options such as 'governmental grants,' which depends on political agreement between the central and local authorities, *'redistribution of central functions,'* or 'road tolls,' the study suggests that these options are likely to gain a fair degree of public support if implemented in GTAMA. In particular, the study shows that the public can support a demanding policy measure such as car fees much more easily when they are convinced that it gives them an advantage as well, such as environmental improvement. This is a clear advantage that can be seen in the short term, unlike the goal of the just cost-sharing which is more abstract and its real impact will (or will not) be shown in the long term.

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