

THE EFFECTS OF INTERGOVERNMENTAL TRANSFERS ON
MUNICIPALITIES' BUDGETS¹

MOMI DAHAN*

Abstract

This study estimates the effects of equalization grants and intergovernmental transfers to finance education and welfare on local government expenditures, local revenues, and local budget deficits based on panel data on 258 municipalities for the years 2005–17. I found that an increase of 100 shekels in equalization grants, which constitute one-fifth of total expenditures in disadvantaged municipalities, is associated with an increase of 82 shekels in total expenditures. That size effect is different depending on the particular expenditure. The biggest effect of equalization grants is on education and municipal spending, and in particular on transitory expenditures such as paying debt. In addition, this study reveals that equalization grants are used to reduce local budget deficits. As expected, the effects of intergovernmental transfers to finance welfare spending are greater than intergovernmental transfers to finance education. It reflects the binding matching requirement associated with welfare spending.

1. INTRODUCTION

This study explores the effects of intergovernmental transfers on total municipal expenditure and its composition, while separating the impact of equalization grants and government grants to finance education and welfare spending, which require municipal matching. The estimation of these effects faces an empirical challenge that stems from the connection between the size of intergovernmental transfers and municipality characteristics that may influence total expenditure and its composition.

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* School of Public Policy, Hebrew University of Jerusalem.

E-mail: momi.dahan@mail.huji.ac.il

The identification strategy regarding the effect of equalization grants is based on the Interior Ministry's policy, which spreads changes in equalization grants over several years, to minimize fluctuations in the municipalities' budget. The gradual change generates exogenous deviation from the equalization grants formula that is exploited in the current research. For example, the gradual shift from the Suari formula to the Gadish formula (presented below) implies that the size of the equalization grant is partially unrelated to municipality characteristics, creating a random component. The list of control variables that represent the factors included in the equalization grant formula aims to uncover the impact of the exogenous part. Spreading changes in the equalization grant formula over years has been carried out on other occasions (following changes in Socioeconomic Index). Using a novel identification strategy, the new estimates of the marginal effect of intergovernmental transfers on the budget of municipalities contribute to our knowledge on local government response.

The empirical analysis accounts for population size and its composition, to identify the effects of intergovernmental transfers to finance education and welfare services. The decision to reduce the matching rate from 25 percent to 10 percent in financing kindergarten for economically advantageous municipalities, following the Trajtenberg Committee's recommendations during the investigated period, generates exogenous variation in intergovernmental transfers. However, the interpretation of the estimated coefficients of intergovernmental transfers should be taken with a grain of salt, as the variation is not completely random.

This paper reveals that an increase of 100 shekels in equalization grant results in a rise of 82 shekels in total expenditures, and that the estimated impact is reduced to 65 shekels using a restricted balanced panel of 141 municipalities covering the entire period. The strongest effect of equalization grant is on transitory expenditures, such as lumpy outlays and paying back debt. I also find that a rise in equalization grant leads to a lower level of budget deficit, but such effect is significant only when using a balanced panel. As expected, the estimated effect of intergovernmental transfers on welfare expenditures is higher than education expenditures for economically advantaged municipalities, reflecting the binding matching formula in welfare (unlike education).

The relations between intergovernmental transfers and local government services have received extensive research attention in economics. A standard economic model predicts that a block grant of 100 to a certain municipality should have the same effect on total local spending as an equal rise in the private income of its residents. In addition, a block grant is predicted to be allocated partially to raise private consumption (Scott, 1952; Bradford and Oates, 1971a, b). Nevertheless, the empirical studies over the years fail to support that prediction which is well known as the Flypaper Effect (e.g., Gramlich 1977; Hines and Thaler 1995; Oates 1999; Gamkhar and Shah 2007).

Four main hypotheses were suggested to explain that discrepancy. First, the flypaper effect may result from the tendency of local politicians to promote their own personal

interests by maximizing the budget under their control rather than the welfare of their constituency (Cournat et al. 1979, Logan 1986, Inman 2008). Two additional conditions are required for this outcome: fiscal illusion and low political competition. Second, Hine and Thaler (1995) "blame" mental accounting for the different effect: an intergovernmental grant and private income are in different mental boxes. Third, in recent years a new explanation has emerged pointing to the lower excess burden of local taxes associated with intergovernmental grants (Dahlby 2016). Finally, not accounting for the endogenous nature of block grants leads to a biased estimate that is wrongly interpreted as the flypaper effect (Knight 2002). However, two studies found excessive response of local government spending to a block grant even after taking endogeneity into account (Dahlberg et al. 2008, Leduc and Wilson 2017)

The empirical analysis of intergovernmental grants is also important due to its effect on wellbeing inequality in the present, and income through the provision of welfare service and wealth inequality in the future, by delivering education and local public goods. The current investigation complements the research on income inequality at the individual level in Israel (Dahan, 2021) and around the world (Atkinson et al., 2011). Estimating the impact of intergovernmental grants is essential also due to their large decline in Israel (2005–17) which has been replaced by a rise in local taxes.²

The rest of the article is arranged as follows. In Section 2, the institutional background of intergovernmental grants is presented, and in Section 3, the conceptual framework that generates working hypotheses as well as the econometric model is presented. Section 4 offers the empirical analysis and Section 5 concludes with a summary, a discussion of the main findings, and relevant policy implications.

2. INSTITUTIONAL BACKGROUND

a. Equalization grant

Until the 1990s, the unconditional grant had been subject to discretion without clear criteria. The public criticism regarding the unequal and non-transparent allocation of the equalization grant was the background to forming, in 1992, a public committee headed by Yitzhak Suari. New criteria were put in place following its recommendations, which were submitted to the government in August 1993. The size of the equalization grants to municipalities for the years 1994–2003 was determined on the basis of those recommendations. While the new formula substantially improves the allocation of equalization grants, some shortcomings were left, as the State Comptroller pointed out (Annual Report of the State Comptroller 50b). In 2000, the Minister of the Interior appointed a new public committee led by Yakov Gadish to address

² Ben-Bassat and Dahan (2009) have shown that such shift in the composition of local government finances started in the 1980s.

the weaknesses in the equalization grant formula. A year and a half later, the Committee report had been submitted, and in 2004 the equalization grant was distributed according to its recommendations. Compared to the Suari formula, the new formula attributes a higher weight to the socioeconomic level of the municipality's residents and lower weight to small size municipalities. The Gadish formula also deleted the linkage between the equalization grant and the actual budget deficit, which created an incentive for a larger deficit. To prevent large fluctuations in the expenditures of affected municipalities, the shift to the new formula was applied over several years, which opens the door to better identifying the estimated effect of equalization grants on the local government budget.

According to the current equalization grant formula, the grant size is determined by the difference between basic expenditures that reflect "objective" municipality needs and basic revenues that represent municipalities' fiscal capacity. The formula of basic expenditures is estimated based on 2002 data, declines with population, and favors regional councils and Jewish municipalities.³ The Interior Ministry sets an arbitrary ceiling to basic expenditures and thus disfavors extremely disadvantaged municipalities.

The calculation of basic local revenues is quite complicated and depends (non-linearly) negatively on socioeconomic clusters, population size, the share of immigrants, and central geographic location. The Interior Ministry sets an arbitrary floor to basic revenues and thus disfavors even more disadvantaged municipalities with very low potential of local tax collection. That floor is lower for regional councils, which offsets partially their favored position in calculating basic expenditures.⁴ In addition, the Interior Ministry puts a limit on the size of a yearly change in the equalization grant which helps the empirical identification strategy.

b. Intergovernmental transfers to finance education and welfare services

Municipalities play a key role in delivering public services such as education and welfare, but they are expected to pay 25 percent of overall welfare expenditures and a varying share in education, depending on the particular spending item. Governmental transfers to finance welfare services are conditional on matching by a municipality using its own funds. In contrast, to finance education services, the central government transfers a sum of money that is less than 100 percent of the costs, expecting the municipalities to contribute the additional resources. These two forms of financing have different consequences on the reaction function

³ In 2016, the basic expenditures per resident depends on socioeconomic cluster and type of council: 5,662 and 10,029 in socioeconomic clusters 1–4 in local and regional councils, respectively. The basic expenditures per resident are NIS 5,520 and NIS 9,706 in 5-10 socioeconomic cluster in local and regional councils, respectively. The basic expenditures per resident is higher in municipalities with Jewish majority (3 percent), a high dependency ration, a high share of immigrants and close to the borders.

⁴ In 2016, the basic revenues per resident are NIS 3,546 and NIS 6,400 in local and regional councils, respectively.

of municipalities. A rise in governmental transfers to finance welfare services is expected to result in a higher increase in total welfare spending due to the required matching by the local government, while it is not necessarily the same in education.

The share of local government in financing welfare services has been 25 percent for decades, except a few exceptions such as municipalities near the border with Gaza Strip and poor regional councils (Neve Midbar and Al-Kasom) that receive full financing. The matching grant required for welfare services puts a burden on disadvantaged municipalities that have to secure a portion of their scarce resources to finance vital national services to their residents. As a result, very poor municipalities may skip delivering welfare services or look for low quality services that are not compatible with the needs of their disadvantaged residents.

An array of matching shares of local government exists in education spending, depending on the municipality type (local versus regional council), activity type (kindergarten or commuting costs) and type of workers (13 percent for janitors, technical assistants, administrative staff, 25 percent for security guards, and 32 percent for psychologists). In general, a municipality is not forced to put in its share to be entitled to receive governmental transfers to finance education. However, municipalities have to budget their share to get a central government grant to finance commuting costs.

Most matching shares are the same over a long period, despite pressure exerted by parents and local government representatives, to the extent of even filing an appeal in a high court. Nevertheless, in 2013, there was a change in the participation share in financing kindergarten expenditures. Following the Trajtenberg Committee, the matching share went down from 25 percent to 10 percent in municipalities in high socioeconomic clusters. That change contributes some exogenous variation that helps to identify somewhat better the causal effect of intergovernmental transfers to finance education services.

3. A CONCEPTUAL FRAMEWORK

a. The impact of the equalization grant

According to a standard economic model, to maximize the welfare of local residents, a municipality receiving a block (unconditional) grant such as an equalization grant should devote part of the proceeds to local public goods, and the other part should be used to reduce taxes to allow for higher consumption of private goods and services. Thus, the predicted coefficient of an equalization grant in a total local government expenditures regression should be between zero and one. That coefficient might be one if a municipality is not allowed to change tax rates and must keep its budget balanced. A municipality in Israel is only allowed to change its local tax rates after receiving the approval of the Interior Ministry, and dozens of municipalities ask for such approval every year. In fact, the discretion over tax revenues is much higher due to the flexibility in deciding on tax base (forms of measuring area size),

in granting tax reliefs, and in collecting local taxes.⁵ Formally, municipalities have to submit a balanced budget but in practice, many municipalities were in the past, and are currently, in budget deficit.⁶

The predicted coefficient of an equalization grant discussed above assumes that its changes are random and independent of the characteristics of municipalities. In fact, the size of the equalization grant is influenced by factors such as the municipality's socioeconomic cluster and location, which may affect total local expenditures and the composition of the budget. For example, overall local spending of a certain municipality might increase following an improvement in the economic conditions of its residents, and that improvement may cause a reduction in the size of the equalization grant. The rise in total expenditure together with a fall in the size of the equalization grant, both of which are the result of better economic condition, introduces a bias in the estimated coefficient downward.

To address this potential bias, the identification strategy is based on the exogenous variation in the size of the equalization grant, created by the gradual shift in the size of the equalization grant moving from the Suari to the Gadish formula. In general, the Interior Ministry advocates smooth changes, and that policy contributes to generating random shocks. Municipalities are expected to smooth their local expenditures if some of the changes in the size of equalization grant are perceived as transitory. In that case, total expenditures are likely to increase relatively slightly as a result of an additional equalization grant or to exploit the extra resources that would be allocated to one time expenditures such as irregular payments or used for paying back debt. A reduction in an equalization grant might generate larger change in total expenditure in liquidity constrained municipalities, which results in an asymmetrical response on the part of constrained municipalities.

The empirical analysis also covers a list of time-varying variables controlling for factors that are included in the equalization grant formula and municipality and year fixed effects. The changes over time in both the socioeconomic index and peripherality index are published after a lag of two or three years and tend to be relatively small. To take these two variables into account, one may include them directly in the regressions or let fixed effects (partially) pick their small variation. The population within the borders of a municipality and its demographic composition varies every year and is included in the list of control variables. Thus, the coefficient of equalization grants captures the change in particular expenditures as a result of a change in the size of equalization grants.

Theoretically, the central government may act to reduce grants to municipalities with high levels of local spending in times of change in equalization grant formulas. In that case, the estimated coefficient would be lower than its true size. However, such potential bias due to

⁵ Ben-Bassat and Dahan (2009) documented fairly large variation in effective tax collection rates even within the same socioeconomic cluster and ethnic group.

⁶ Ben-Bassat, Dahan and Klor (2013) show that many municipalities were in budget crisis with a high level of debt, which indicates the limited effectiveness of enforcing the balanced budget rule by the central government.

reverse causality seems less likely as the changes in the equalization grant's formula itself during the investigated period are quite limited. The instrumental variable approach seems less adequate as a way to identify the effects of equalization grants because the formula is very complicated, with multiple non-linear relations that may substantially reduce the prediction power of the first stage. In the early stages of this research, the population size was the only variable that came up statistically significant. In addition, socioeconomic and peripherality ranks are two key factors in determining the size of equalization grants that exhibit very small yearly changes, and reduce further the suitability of the instrumental variable approach.

b. The effect of matching grants

In addition to providing local public goods, municipalities in Israel and elsewhere are public agencies that deliver education and welfare services that are mainly financed by the central government. The predicted impact of matching grants on expenditures should be higher than that of unconditional grants such as equalization grants, especially if income elasticity of national public goods is greater than one (Gamkhar and Shah 2007). The estimated coefficient of matching grants is expected to be more than one. For example, a grant of 75 transferred from the central government to a municipality to finance welfare services, conditional on local matching fund in the amount of 25 by that municipality, implies a coefficient of 1.33, which is much higher compared to the coefficient of equalization grant.

c. The econometric model

The estimated statistical model of the impact of intergovernmental transfers is:

$$(1) Y_{it} = a_0 + a_1(\text{Equalization Grant})_{it} + a_2(\text{Matching Grant})_{it} + \mathbf{X}_{it}\mathbf{b} + c_t + d_i + u_{it}$$

Where Y_{it} represents total expenditures per resident (in shekels) or total local revenues per resident (in shekels) in certain municipality i , in year t . The key explanatory variables are equalization grant per resident in shekels (*Equalization Grant*) and two central government grants to finance education and welfare (*Matching Grant*). The estimated coefficients a_0 and a_1 reflect the change in shekels in the dependent variable as result of a rise in one shekel in each of the independent variables. Using per resident terms implies that the coefficient of population size is one in overall expenditures regression, which prove to be a plausible assumption in my data.

\mathbf{X}_{it} indicates a vector of control varying variables in certain municipality i , in year t . The list of control variables covers—other than education or welfare—intergovernmental grants for cultural activity, the size of population, share of population age 0–19, 20–64 and 65 and older. Note that education and welfare intergovernmental grants are set according to municipalities' characteristics such as population and its composition (as they determine the

number of students in each stage) which should be remembered in interpreting their coefficients.

To represent the economic conditions of a municipality's residents, I employ labor income per resident (taken from the social security database) as one of the explanatory variables. It enables us to compare the response of municipalities to a change in private income and in unconditional grant. Total local expenditures per resident is affected by automatic changes in the tax base that raise tax revenues and via discretionary changes in tax rates. Improvement in economic conditions should drive elected local officials to increase tax rates in case the expansion of the tax base is not responsive enough or if there is a high income elasticity of local public goods. A rise of income regardless of its source (private income or intergovernmental grants) should affect equally the provision of public goods.

Seemingly, as residents become economically better off, the tax base and tax revenues expand. but the relationship between the economic conditions of a municipality's residents and tax revenues is more complicated. Unlike income tax revenues at the national level, better economic conditions have an indirect effect on tax revenues and it takes time to materialize, because local property tax is linked to building size (depending on the purpose of a building) which tends to expand relatively slowly. A municipality's own revenues, which is a key source of revenues in advantaged municipality, represent the local tax base in the list of control variables. However, such a variable could be employed only in regression of expenditures for certain purpose such as education or local activities. Note that in municipalities with a balanced budget, total expenditure equals intergovernmental grants (included in the explanatory list) plus municipality own revenues (included in the explanatory list), and therefore the latter could be used as explanatory variable in total expenditures regression.

All regressions include municipality fixed effect, d_i , that captures invariable municipality's characteristics, and year fixed effect that captures aggregate developments that may affect fiscal variables across municipalities. Obviously, variables that represent ethnic affiliation and type of locality (local or regional council) are stable over time and could not be included.

4. THE EMPIRICAL ANALYSIS

a. Data

The empirical analysis is based on a new dataset that merges three different sources. The main data source for the years 2005–17 is a local authorities file prepared by the Central Bureau of Statistics (the original data from the Interior Ministry) and contains rich yearly data on municipalities, such as total spending and revenues and their composition, demographic data (population size and its composition) and ethnic and religious affiliation of the municipality's residents. A Jewish municipality is classified as ultra-Orthodox if 50

percent or more of its residents voted in national elections for Haredi (ultra-Orthodox) religious political parties (Yahadut HaTorah or Shas). In the investigated period, five national elections (2003, 2006, 2009, 2013 and 2015) took place, and the central elections committee is the source for voting data. The classification of a municipality in years without elections is according to the last elections results. A Jewish municipality is classified as non-ultra-Orthodox if 50 percent or more of its residents are non-ultra-Orthodox. In a similar fashion, a municipality is defined as Muslim (Christian/Druze) if the majority of its residents are registered as Muslim (Christian/Druze).

The chosen investigated period reflects data availability that is comparable over years. The Ministry of Education provided data for the years 2005–17 on transfers to not-for-profit institutions that deliver education together with or in addition to municipalities. That information is vital given that education in certain municipalities is provided directly while in other municipalities it is provided by not-for-profit institutions. Without such data, comparing education spending across municipalities is almost meaningless. In addition, the Ministry of Education made available data by municipality on payments to finance shuttle service for students with special needs who study outside of their place of residence.

The second source is the data on the socioeconomic index but for selected years only (2001, 2003, 2006, 2008, 2013 and 2015) and data on the peripherality index for two years (2004 and 2015). Both indices are calculated by the Central Bureau of Statistics for all municipalities. The Interior Ministry is the third source, which publishes on a yearly basis financial statements that contains detailed data on the budget of all municipalities including the composition of tax revenues from property tax on building and land.

The focus on the impact of equalization grants, the empirical analysis, is concentrated on 209 municipalities that received equalization grants in 2017 (49 municipalities did not). The empirical analysis also presents a balanced panel for 141 municipalities (local and regional) with data for the whole period. The balanced panel comes at the cost of a reduced number of municipalities: 14 municipalities were excluded due to mergers/dissolution (the Carmel city), 18 municipalities with partial coverage of financial statements for selected years (e.g., Taibe and Ein-Mahil), and an additional 36 municipalities with missing data on one of the variables. The estimation that is based on the balanced panel should be seen as a sensitivity analysis of the main results. The exclusion of 68 municipalities may result in biased estimates due to over-representation of 57 municipalities that belong to low socioeconomic clusters (1–5) and 29 non-Jewish municipalities. Tables 1–2 present expenditures and revenues across all municipalities. Total nominal expenditures increased by 36 percent during the investigated period (the rise in prices in that same period is 20 percent), reflecting a substantial increase in education, welfare and local services (Table 1). Other items of expenditure such as general costs and irregular payments did not show sizeable change. The rise in total expenditures took place despite the decline in equalization grants per resident, and it was thanks to a surge in municipalities' own revenues and intergovernmental grants to finance national services such education and welfare (Table 2).

b. The results

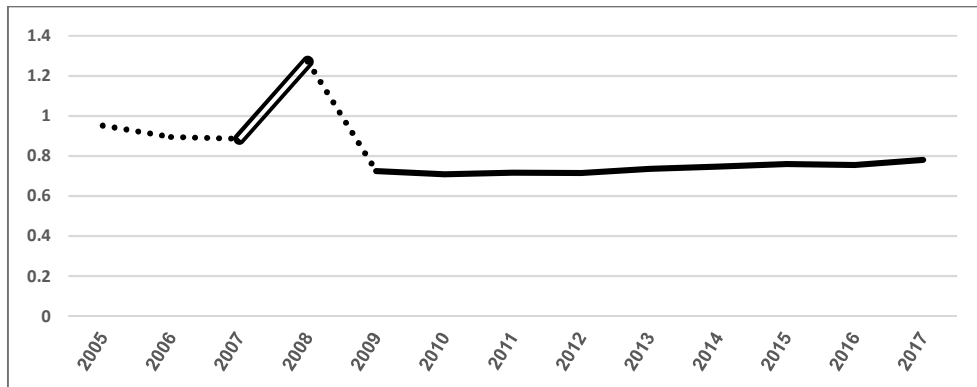
Table 3 shows the estimated effect of equalization and matching grants on aggregate expenditures, revenues, and budget deficit based on 209 municipalities that received equalization grants in 2017. The regression results indicate that equalization grants have a positive and significant effect on total expenditures (regular budget). The estimated coefficient implies that a rise of 100 shekels induces an increase of 82 shekels in total expenditures (regular budget) and 67 shekels in total expenditures excluding irregular payments.⁷ The coefficient of equalization grant in municipalities' own revenues and budget surplus are negative and positive, respectively, but both are insignificant.⁸

To illustrate the main finding regarding the impact of equalization grant on total expenditures, I employ regional council Brener, which is one out of 26 municipalities that lost equalization grants during the investigated period. Figure 1 depicts the evolution of total

Figure 1

The Impact of Equalization Grants on Total Expenditures: The Case of Regional Council Brener

This Figure presents total expenditures in regional council Brener relative to municipalities without equalization grants. The years of rising equalization grants are marked by a double line, the years of falling equalization grants are indicated by a dotted line, and years of stable equalization grants are shown in a regular line.



⁷ The results are similar replacing contemporaneous equalization grant by equalization grant in previous year, including time trend instead of year fixed effect or excluding the share of population age 0–19 from the control variable list (not reported here and can be provided upon request).

⁸ The coefficients of equalization grants are supposed to sum up to one in the three regressions in case all intergovernmental transfers are included in the list of explanatory variables. However, the sum of coefficients is 0.93 (0.821+0.027-0.079) because certain intergovernmental grants are intentionally excluded if they are in effect loans rather than revenues.

expenditures (excluding irregular payments) relative to that of a group of municipalities who have not received equalization grants during that period and serves as a control group.

The observed correlation between the change in equalization grants and the development of relative expenditures of that regional council exemplified the regression results presented in Table 3.

The coefficient of intergovernmental grants to finance education services in total expenditures per resident regression (with and without irregular payments) is slightly above one (Table 3), and in line with a theoretical prediction regarding a non-binding matching grant (i.e., the central government does not compel municipalities to pay their share to get the grant). In contrast, the coefficient of welfare grants reaches 1.44 in total expenditures regression, which is consistent with a theoretical prediction for a binding matching grant. However, the coefficient of welfare grants is smaller in total expenditures regression excluding irregular payments or when using municipality own revenues in the list of control variables. That coefficient approaches one in welfare expenditures per resident regression and might be due to accounting practices that document certain welfare expenditures under other items.

In general, the estimated impact of the control variables is in the right direction but it is not always significant (Table 3). Other intergovernment grants such as recovery grants have a positive and significant effect on total expenditure and its composition. The coefficient is around one in total expenditures (excluding irregular payments) regression. The estimated coefficient of share of young population (age 0–19) is positive and significant while that of the older population came up insignificant. The sign of the coefficient of population size is unstable which means that economics of scale are not important (see below).

As can be seen, the effect of equalization grants on education expenditures per resident is positive and significant (Table 4). The estimated coefficient implies that a rise of 100 shekels in equalization grants is associated with an increase of 24 shekels in education expenditures. The impact of equalization grants on welfare expenditures per resident is significant but relatively small: welfare expenditure is expected to rise 2 shekels following an increase of 100 shekels in equalization grants (Table 4). The estimated coefficient of equalization grants is also significant in local services regression implying a rise of 12 shekels in local services as a result of an increase of 100 shekels in equalization grants. Equalization grants seem to affect more expenditure items with large fluctuations such as irregular payments, and other expenditures that include general and administrative expenses, culture, and water-related expenditures. The results of managerial and debt payments regressions also lend support to the emerging pattern of using equalization grants to finance fluctuating expenses (Table 4). Thus, municipalities behave according to economic textbooks which suggest using transitory resources (fluctuations in equalization grants that stem from formula deviations) to finance irregular or one-off expenditures.

Surprisingly, total expenditures per resident is not affected by the level of residents' private income, as suggested by its estimated coefficient. This finding is in line with empirical results found in many studies that documented a different effect for other countries of income on the extent of local public goods depending on its source. In general, equalization grants have a higher impact as compared to private income, but in Israel that difference is even starker.

The effect of welfare grants on welfare expenditures per resident is positive and significant and slightly greater than one (Table 4). This finding indicates that the matching system does not achieve the goal of encouraging municipalities that receive equalization grants to pay their share in financing welfare spending.

Tables 5–9 present a series of sensitivity analyses. First, I rerun the regressions above employing a balanced panel of data of 141 municipalities. Such estimation offers better econometric precision but at the cost of lower external validity due to under-representation of Arab and Druze as well as disadvantaged Jewish municipalities. The effect of equalization grants on total expenditures (excluding irregular payments) on the balanced panel declines from 0.67 to 0.50 (Table 5). The significance and size of the coefficient of equalization grants in an education expenditures regression drop but become significant in budget deficit regression (Table 5). The latter result provides additional empirical support to the conclusion that municipalities use equalization grants as a shock absorber rather than as a source to increase regular expenditures, but that behavior is less pronounced for disadvantaged municipalities.

The next sensitivity analysis is based on splitting municipalities into two equal groups by socioeconomic clusters (1–5 versus 6–10), and municipalities with and without equalization grants (in 2017). Those estimations cover all 258 municipalities and appear in Tables 6–7. The results reveal different reaction of municipalities to matching grants conditional on the economic conditions of their residents. As can be seen, municipalities in high socioeconomic clusters raise welfare expenditures by 120 in response to a rise of 100 in welfare grants while municipalities in low socioeconomic clusters increase welfare spending by the amount of extra welfare grants (Table 6). That reaction is even stronger when comparing municipalities with and without equalization grants (Table 7). In contrast, the coefficient of education grants is the same regardless of municipalities cluster.

Why do we observe a smaller coefficient for welfare grants in municipalities in low socioeconomic clusters? It might be the result of the reaction of disadvantaged municipalities to cut welfare quality (paying lower salary and understaffed welfare bureaus) to free resources needed to meet the conditions of receiving welfare grants. To succeed in circumventing the conditions of matching grants, municipalities must hide such behavior from the central government. Note that the estimated effect is derived based on actual welfare grants and therefore could not be explained by disadvantaged municipalities (in contrast to advantaged municipalities) that chose to skip because of lack of resources which is essential to receive central government welfare grants.

Third, the impact is estimated splitting municipalities into two groups by the size of their population (below and above the median). The estimation results do not provide evidence for economics of scale, which is not in line with Reingewertz (2009). Finally, the empirical analysis allows for asymmetrical response in years of reduction compared to increase in equalization grants. Table 9 shows a negative and significant coefficient on the interaction term in total expenditures (excluding irregular payments) regression, which suggests that municipalities' spending reacts less in years of expansion than in years of cuts in equalization grants.

5. CONCLUSION

This study finds that a rise of 100 shekels in equalization grant is associated with an increase of 82 shekels in total expenditures using a panel of 209 municipalities receiving equalization grants in the years 2005–17. The size of the effect is reduced by 17 shekels when employing a balanced panel of 141 municipalities that received equalization grants in 2017. The drop in the effect of equalization grants is driven by the steep decline in the impact on education expenditures. The largest effect of equalization grants is found with regard to transitory expenses both in the baseline and balanced panel data. The analysis presented here shows that equalization grants are partially allocated to reduce budget deficits but that finding is significant based on the balanced panel only. A rise of 100 shekels in equalization grant leads to a reduction of 15 shekels in budget deficit. The policy implication of this result is that the central government should be aware that reductions in equalization grants might increase the risk of fiscal distress of disadvantaged municipalities.

Based on the balanced panel, municipalities do not use equalization grants to increase regular expenditures but to pay irregular payments and thus they work as a security cushion. In the larger panel of municipalities, the results suggest that municipalities tend to allocate equalization grants to increase regular expenditures such as education services in addition to their role as a shock absorber. The different effect between the two panels may reflect the behavior of disadvantaged municipalities, which are better represented in the larger panel data. This finding suggests that a considerable cut in equalizations grants, as took place in 2003, may lead to deterioration in education services in disadvantaged municipalities and potential widening of earnings inequality.

This study reveals that the larger effect of equalization grants on total local expenditures (compared to residents' private income) found in other countries is true also for Israeli local governments. In fact, it is found that local expenditure is insensitive to changes in residents' private income, which not in line with standard economic theory. The contribution of this paper is the novel identification strategy that reveals the estimated effect based on exogenous deviations of equalization grants from the stated formula. To advance our knowledge further, future research should focus on the question of why some municipalities are more sensitive to certain sources of income than others. This paper provides suggestive and partial direction:

the reaction function of municipalities is affected by the extent of uncertainty of income sources, as municipalities in Israel tend to use equalization grants as a shock absorber. Municipalities are expected to be more cautious in changing local tax rates in case of uncertain equalization grants which would result in excess sensitivity of local expenditures to equalization grants. Note that municipalities are not free to reduce/increase taxes and have to get permission from the Interior Ministry. Municipalities might have less appetite to submit a request to lower local taxes if it sends a signal of reduced needs that risk the likelihood of future grants from the central government, including equalization grants.

This study also shows the estimated response of municipalities to matching grants. Consistently, the coefficient of education grants is slightly above one, which is in line with non-binding matching grants. In contrast, the coefficient of welfare grants is clearly above one in total expenditures regression but close to one in welfare expenditures regression. A coefficient of one of binding matching grants is surprising and might reflect the reaction of disadvantaged municipalities to cut welfare quality to free resources required to meet the conditions of getting welfare grants. Indeed, the empirical analysis uncovers heterogeneous effect depending on economic conditions. The coefficient of welfare grants in municipalities in high socioeconomic clusters is around 1.2 while municipalities in low socioeconomic clusters increase welfare spending by a shekel for each additional shekel of welfare grants.

A biased estimate as a result of reverse causality and omitted variables are challenges that almost any empirical analysis faces, but the identification strategy in this study that is based on exogenous fluctuations in equalization grants reduces that risk. The econometric specification covers all factors that are covered in equalization formulas such as population size and its composition, and therefore the risk of omitted variables seems less of a concern here.

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Table 1
Descriptive statistics—total expenditures and its composition

	2005	2010	2011	2012	2013	2014	2015	2016	2017
Total expenditures (current budget) Number of municipalities	6,003 (250)	6,551 (251)	6,742 (248)	7,060 (248)	7,526 (248)	7,555 (248)	7,766 (251)	8,002 (254)	8,204 (254)
Education expenditures Number of municipalities	1,701 (250)	2,021 (251)	2,105 (248)	2,226 (248)	2,508 (248)	2,600 (248)	2,696 (251)	2,785 (254)	2,987 (254)
Welfare expenditures Number of municipalities	489 (250)	593 (251)	643 (248)	692 (248)	738 (248)	757 (247)	787 (251)	826 (254)	888 (254)
Local services Number of municipalities	1,012 (248)	1,216 (248)	1,289 (247)	1,357 (246)	1,395 (249)	1,434 (248)	1,429 (253)	1,506 (248)	1,490 (254)
Irregular payments Number of municipalities	926 (248)	905 (248)	907 (247)	959 (246)	1,037 (248)	918 (248)	1,012 (253)	1,065 (248)	1,042 (241)
Other expenditures Number of municipalities	1,877 (248)	1,828 (248)	1,796 (247)	1,833 (246)	1,858 (247)	1,837 (246)	1,826 (249)	1,850 (248)	1,858 (241)

Source: Central Bureau of Statistics, Local authorities file, 2005–2017.

The number of municipalities are in the parentheses. All variables are per resident.

Table 2
Descriptive statistics—total revenues and its composition

	2005	2010	2011	2012	2013	2014	2015	2016	2017
Total revenues (current budget)	5,763	6,487	6,684	7,010	7,380	7,488	7,716	8,046	8,192
Number of municipalities	(250)	(251)	(248)	(248)	(248)	(248)	(251)	(254)	(254)
Own revenues	2,911	3,601	3,715	3,835	3,887	3,985	3,995	4,067	4,134
Number of municipalities	(250)	(251)	(248)	(248)	(248)	(248)	(251)	(254)	(254)
Equalization grants	998	946	1,007	992	975	978	1,047	1,055	1,117
Number of municipalities	(234)	(206)	(203)	(205)	(204)	(198)	(200)	(200)	(202)
Education grants	1,144	,317	1,352	,462	,698	1,774	1,836	1,906	2,077
Number of municipalities	(248)	(248)	(247)	(246)	(249)	(248)	(253)	(248)	(241)
Welfare grants	323	398	434	467	501	513	533	569	613
Number of municipalities	(246)	(247)	(246)	(245)	(248)	(247)	(253)	(248)	(241)
Other ministries grants	112	125	119	145	147	151	152	173	200
Number of municipalities	(244)	(242)	(245)	(244)	(247)	(246)	(247)	(246)	(240)
All other grants	442	406	367	431	488	435	501	656	487
Number of municipalities	(243)	(243)	(246)	(244)	(246)	(244)	(248)	(244)	(237)

Source: Central Bureau of Statistics, Local authorities file, 2005–2017.

The number of municipalities are in the parentheses. All variables are per resident.

Table 3
Intergovernmental grants and fiscal aggregates—regression estimates^A

	The dependent variable (in Shekels)					
	(1) Expenditures	(2) Expenditures excluding irregular payments	(3) Expenditures excluding irregular payments	(4) Expenditures excluding irregular payments	(5) Own revenues	(6) Budget surplus
Equalization grants	0.821*** (0.199)	0.656*** (0.175)	0.672*** (0.127)	0.698*** (0.168)	-0.027 (0.116)	0.079 (0.081)
Education grants	1.025*** (0.044)	1.061*** (0.041)	1.040*** (0.029)	1.067*** (0.038)	0.034 (0.029)	-0.007 (0.017)
Welfare grants	1.442*** (0.514)	1.303*** (0.477)	1.171*** (0.286)	1.016*** (0.343)	0.210 (0.316)	-0.006 (0.090)
Other ministries grants	1.118*** (0.165)	1.032*** (0.148)	0.990*** (0.094)	0.991*** (0.158)	0.067 (0.146)	0.038 (0.067)
Share of age 0-19	48.20*** (14.67)	43.68*** (10.98)	16.43** (7.918)	42.809*** (9.914)	43.36*** (9.545)	-13.77** (6.801)
Share of age 65+	58.80 (42.73)	76.64* (39.65)	27.49 (23.21)	71.448* (36.536)	78.14** (33.64)	13.67 (13.37)
Population	0.005 (2.471)	-0.618 (2.632)	2.458** (1.047)	0.518 (2.157)	-4.900 (3.966)	-2.243* (1.174)
Own revenues			0.628*** (0.063)			
Earnings				0.075 (0.064)		
Constant	614 (792.8)	-35 (600.0)	-65 (438.8)	-88 (628.0)	51 (487.2)	217 (328.9)
Observations	2,244	2,243	2,243	1,855	2,244	2,234
Municipalities	209	209	209	209	209	209
Adjusted R ²	0.740	0.868	0.916	0.857	0.310	0.045

^A The data cover all municipalities that received equalization grants in the year 2017 and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4
Intergovernmental grants and expenditures composition—regression estimates^A

	The dependent variable						
	(1) Education expenditures	(2) Welfare expenditures	(3) Local services expenditures	(4) Irregular patments	(5) All other expenditures	(5.1) General and managerial expenses	(5.2) Debt patments
Equalization grants	0.237*** (0.054)	0.020** (0.010)	0.121*** (0.045)	0.174* (0.091)	0.300*** (0.079)	0.227*** (0.070)	0.114*** (0.030)
Education grants	1.034*** (0.027)	-0.001 (0.003)	0.010 (0.010)	-0.048** (0.023)	-0.004 (0.021)	-0.006 (0.018)	-0.019** (0.007)
Welfare grants	-0.140 (0.189)	1.046*** (0.029)	0.118 (0.081)	0.062 (0.101)	0.153* (0.078)	0.044 (0.070)	-0.018 (0.059)
Other ministries grants	0.260* (0.141)	0.054** (0.026)	0.212** (0.091)	0.062 (0.120)	0.464** (0.191)	0.109** (0.049)	0.064** (0.027)
Share of age 0-19	5.175 (4.221)	-2.086* (1.199)	0.640 (3.554)	-11.240 (8.420)	12.894* (7.389)	0.089*** (0.024)	0.005 (0.013)
Share of age 65+	2.913 (11.888)	-0.303 (3.428)	15.383 (10.899)	-46.258** (20.461)	10.165 (19.019)	-6.338 (4.344)	-8.049** (3.212)
Population	-0.198 (0.541)	0.004 (0.210)	-0.715 (0.727)	2.401 (2.379)	3.371** (1.429)	11.191 (11.819)	-9.162 (8.758)
Own revenues	0.162*** (0.025)	0.015*** (0.005)	0.134*** (0.021)	0.363*** (0.059)	0.316*** (0.033)	1.453 (1.035)	0.814 (0.808)
Constant	-387* (226.505)	179*** (54.140)	219 (173.074)	633 (385.558)	-92 (385.642)	632** (253.766)	575*** (145.112)
Observations	2,244	2,244	2,244	2,243	2,243	2,245	2,230
Municipalities	209	209	209	209	209	209	209
Adjusted R ²	0.962	0.938	0.522	0.127	0.355	0.183	0.213

^A The data cover all municipalities that received equalization grants in the year 2017 and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5
Intergovernmental grants and fiscal aggregates—balanced panel regression estimates^A

	The dependent variable							
	(1) Expenditures excluding irregular payments	(2) Education expenditures	(3) Welfare expenditures	(4) Local services expenditures	(5) Irregular payments	(6) All other expenditures	(7) Own revenues	(8) Budget surplus
Equalization grants	0.504*** (0.076)	0.080** (0.040)	0.028* (0.014)	0.126*** (0.038)	0.238** (0.091)	0.270*** (0.071)	-0.225* (0.125)	0.152** (0.059)
Education grants	1.027*** (0.053)	0.939*** (0.033)	-0.002 (0.009)	0.030 (0.028)	0.066 (0.057)	0.060 (0.059)	-0.090 (0.070)	-0.085* (0.044)
Welfare grants	1.409*** (0.236)	0.175** (0.084)	1.021*** (0.052)	0.095 (0.069)	-0.236 (0.182)	0.118 (0.142)	0.716** (0.318)	-0.039 (0.091)
Other ministries grants	0.870*** (0.079)	0.123 (0.096)	0.035 (0.025)	0.198* (0.113)	0.108 (0.125)	0.514** (0.222)	-0.006 (0.122)	0.024 (0.048)
Share of age 0-19	14.575** (5.652)	7.116 (4.473)	-2.566* (1.482)	3.110 (3.474)	1.414 (9.261)	6.916 (6.808)	30.848*** (10.669)	-19.138*** (6.416)
Share of age 65+	19.824 (21.020)	1.734 (14.013)	-2.067 (3.854)	8.101 (9.999)	-32.766 (21.074)	12.056 (21.435)	60.174* (36.256)	-1.549 (12.853)
Population	1.943* (1.064)	-0.493 (0.725)	0.051 (0.233)	-1.125 (0.930)	1.974 (2.093)	3.510** (1.375)	-4.336 (3.720)	-1.925** (0.778)
Own revenues	0.530*** (0.051)	0.118*** (0.019)	0.014*** (0.005)	0.106*** (0.017)	0.414*** (0.064)	0.291*** (0.031)		
Constant	449 (328)	-175 (251)	220*** (73)	240 (162)	-269 (471)	163 (374)	898 (583)	565* (330)
Observations	1,833	1,833	1,833	1,833	1,833	1,833	1,833	1,833
Municipalities	141	141	141	141	141	141	141	141
Adjusted R ²	0.855	0.899	0.909	0.540	0.160	0.357	0.313	0.070

^A The data cover all municipalities that receive equalization grants in the year 2017 and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6
Intergovernmental grants and fiscal aggregates by socioeconomic clusters—regression estimates^{A, B}

	The dependent variable					
	Expenditures excluding irregular payments		Education expenditures		Welfare expenditures	
	SE clusters 1-5	SE clusters 6-10	SE clusters 1-5	SE clusters 6-10	SE clusters 1-5	SE clusters 6-10
Equalization grants	0.635*** (0.172)	0.724*** (0.143)	0.269*** (0.062)	0.088 (0.067)	0.010 (0.012)	0.016 (0.018)
Education grants	1.048*** (0.040)	1.073*** (0.070)	1.032*** (0.023)	0.976*** (0.043)	0.002 (0.003)	0.004 (0.010)
Welfare grants	1.087*** (0.267)	1.354*** (0.305)	-0.166 (0.178)	0.289 (0.201)	1.028*** (0.026)	1.198*** (0.051)
Other ministries grants	1.050*** (0.130)	1.105*** (0.190)	0.246 (0.189)	0.344** (0.139)	0.054 (0.038)	0.038 (0.024)
Share of age 0-19	12.23 (9.892)	7.127 (16.25)	-0.443 (4.599)	18.24* (9.254)	-0.818 (1.311)	-1.821 (1.977)
Share of age 65+	88.57* (46.77)	-2.870 (20.39)	-6.370 (18.69)	12.35 (16.81)	6.506 (8.009)	3.576 (3.330)
Population	2.502** (1.024)	2.851 (2.813)	-0.128 (0.498)	1.502 (2.093)	0.0767 (0.210)	0.104 (0.499)
Own revenues	0.669*** (0.095)	0.769*** (0.012)	0.216*** (0.043)	0.102*** (0.005)	0.012 (0.009)	0.003** (0.001)
Constant	-435.4 (612.3)	202.1 (602.7)	-293.4 (222.7)	-568.5 (392.0)	115.8 (74.04)	118.0 (84.50)
Observations	1,456	1,387	1,457	1,387	1,457	1,387
Municipalities	142	117	142	117	142	117
Adjusted R ²	0.933	0.952	0.971	0.914	0.948	0.889

^A The data cover all municipalities and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

^B The classification of municipalities by socioeconomic clusters is according to 2015.

Table 7
Intergovernmental grants and fiscal aggregates by equalization grants—regression estimates^A

	The dependent variable					
	Expenditures excluding irregular payments		Education expenditures		Welfare expenditures	
	Municipalities with equalization grants	Municipalities without equalization grants	Municipalities with equalization grants	Municipalities without equalization grants	Municipalities with equalization grants	Municipalities without equalization grants
Equalization grants	0.672*** (0.127)	0.856** (0.370)	0.237*** (0.054)	-0.083 (0.298)	0.020** (0.010)	-0.076** (0.036)
Education grants	1.040*** (0.029)	1.002*** (0.098)	1.034*** (0.027)	1.071*** (0.082)	-0.001 (0.003)	0.009 (0.013)
Welfare grants	1.171*** (0.286)	0.247 (0.885)	-0.140 (0.189)	0.441 (0.575)	1.046*** (0.029)	1.306*** (0.077)
Other ministries grants	0.990*** (0.094)	1.560*** (0.219)	0.260* (0.141)	0.445*** (0.102)	0.054** (0.026)	0.039 (0.029)
Share of age 0-19	16.43** (7.918)	-36.68 (27.65)	5.175 (4.221)	30.47 (19.94)	-2.086* (1.199)	-5.059*** (1.845)
Share of age 65+	27.49 (23.21)	-5.370 (34.15)	2.913 (11.89)	9.946 (24.93)	-0.303 (3.428)	0.806 (4.446)
Population	2.458** (1.047)	-0.682 (4.701)	-0.198 (0.541)	1.104 (3.360)	0.004 (0.210)	0.793 (0.570)
Own revenues	0.628*** (0.063)	0.773*** (0.009)	0.162*** (0.026)	0.096*** (0.006)	0.015*** (0.005)	0.003** (0.001)
Constant	-65.49 (438.8)	2,106** (970.5)	-387.8* (226.5)	-1,039 (708.3)	179.7*** (54.14)	201.4** (94.95)
Observations	2,243	600	2,244	600	2,244	600
Municipalities	209	49	209	49	209	49
Adjusted R ²	0.916	0.968	0.962	0.925	0.938	0.915

^A The data cover all municipalities and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8
Intergovernmental grants and fiscal aggregates by equalization grants—regression estimates^A

	The dependent variable					
	Expenditures excluding irregular payments		Education expenditures		Welfare expenditures	
	Below median population	Above median population	Below median population	Above median population	Below median population	Above median population
Equalization grants	0.716*** (0.152)	0.344*** (0.106)	0.133*** (0.041)	0.093 (0.059)	0.004 (0.013)	0.017 (0.014)
Education grants	1.037*** (0.055)	0.958*** (0.060)	0.925*** (0.047)	0.890*** (0.040)	0.005 (0.009)	0.010 (0.010)
Welfare grants	1.566*** (0.328)	1.371*** (0.372)	0.202*** (0.076)	0.112 (0.184)	1.039*** (0.056)	1.295*** (0.070)
Other ministries grants	1.205*** (0.208)	0.863*** (0.107)	0.481*** (0.166)	0.064 (0.061)	0.088*** (0.030)	0.007 (0.012)
Share of age 0-19	8.168 (13.77)	8.797 (7.754)	8.542 (6.276)	3.390 (4.315)	-1.497 (1.742)	-1.297 (1.318)
Share of age 65+	25.58 (27.34)	12.52 (17.68)	0.244 (16.63)	13.77 (11.60)	-3.324 (4.344)	0.649 (2.736)
Population	-9.525 (44.29)	0.461 (1.331)	15.23 (22.02)	-0.0107 (0.634)	-22.37*** (7.481)	0.101 (0.152)
Own revenues	0.771*** (0.010)	0.584*** (0.055)	0.106*** (0.005)	0.123*** (0.022)	0.001* (0.0008)	0.012*** (0.0035)
Constant	146.7 (694.4)	546.2 (369.7)	-352.3 (369.7)	-70.92 (212.5)	335.6*** (76.10)	72.08 (76.43)
Observations	1,367	1,465	1,368	1,465	1,368	1,465
Municipalities	127	127	127	127	127	127
Adjusted R ²	0.937	0.892	0.894	0.921	0.901	0.954

^A The data cover all municipalities and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9
Intergovernmental grants and fiscal aggregates with asymmetrical response—regression estimates^{A, B}

	The dependent variable	
	Total expenditures excluding irregular payments	Total expenditures
Equalization grants	0.914*** (0.152)	0.752*** (0.119)
Education grants	0.985*** (0.033)	1.025*** (0.025)
Welfare grants	1.218*** (0.196)	1.138*** (0.224)
Other ministries grants	1.188*** (0.174)	1.075*** (0.106)
Share of age 0-19	7.034 (10.31)	6.114 (7.923)
Share of age 65+	-5.564 (20.77)	13.36 (18.29)
Population	5.501* (2.950)	2.334** (1.087)
Dummy variable	71.70** (29.05)	30.04 (25.68)
Interaction	-0.090*** (0.032)	-0.071*** (0.025)
Own revenues	0.983*** (0.005)	0.770*** (0.013)
Constant	203.5 (497.4)	100.9 (361.5)
Observations	2,844	2,843
Municipalities	258	258

^A The data cover all municipalities and all variables are per resident. All regressions include year and municipality fixed effects. Robust standard errors clustered at the municipality level appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1

^B Municipalities get the value of one if equalization grants per resident are greater or equal to its size in previous year and zero otherwise. The interaction variable is the product of dummy variable and the size of equalization grants per resident.