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# A LINK BETWEEN MUNICIPAL SPENDING ON HOUSING AND OTHER FACTORS EXPLAINING HOUSING CONDITIONS IN A COUNTRY

Vztah mezi mírou finanční alokace do politiky bydlení na komunální úrovni a faktory vysvětlujícími kvalitu bydlení v zemi

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## Annotation

Housing policy has been for years pronounced as an important field for urban development. However, cities are rather reluctant to join in, explaining their position mainly by financial scarcity and low competence. This however does have social implications on life of the citizens. The aim of this study is to conduct a basic prove of a link between proportion of municipal spending on Housing and other factors explaining Housing conditions in a country. In other words, the goal of this brief study is to analyse what aspects of housing may be linked with the level of municipal spending on Housing and how. To do so, data about 21 countries from OECD Housing Database have been used for basic quantitative analyses (correlation matrices and linear regressions). The outputs suggest that the level of municipal spending on Housing is positively linked with the proportion of national budget designated for Housing and the GDP level of the country. It has also been found that housing costs of people, who have a mortgage, are higher in places, where municipal budget expenditure is on a higher level. Finally, the results indicate, that where proportion of municipal budget spending on Housing is higher, there the construction of new dwellings is slower and the relative expenditure of households on Housing is lower. Although the results may have interesting value for policy makers, they need to be proved by a further analysis. This study is only a brief baseline for further analysis, because of low number of observations and because further factors related to housing may need to be added.

## Key words

municipal policy, housing policy, multilevel governance, quantitative analysis

## Anotace

Politika bydlení je dlouhodobě zmiňována jako důležitý sektor pro rozvoj měst. Města se však aktivnímu podílu na této čísti veřejné správy spíše straní s odvoláním na nedostatek finančních prostředků a kompetencí v rámci zákonné působnosti. Tento postoj měst má samozřejmě důsledky. Cílem této analýzy je předložit základní důkazy o vztahu mezi mírou finanční alokace do politiky bydlení na komunální úrovni a faktory, které vysvětlují kvalitu bydlení v zemi. Jinými slovy, cílem této analýzy je prokázat které aspekty bydlení mohou být spjaty s mírou výdajů města na tento sektor a jak. Pro dosažení tohoto cíle byla provedena kvantitativní analýza dat OECD z 21 zemí formou korelačních matic a lineární regrese. Výsledky ukázaly, že míra obecních výdajů na politiku bydlení je pozitivně provázaná s národními výdaji na bydlení a slabý pozitivní vztah byl prokázán také s úrovní GDP v dané zemi. Zajímavé zjištění je, že v místech, kde jsou výdaje obecních rozpočtů na bydlení vyšší, jsou vyšší náklady na bydlení lidí, kteří vlastní hypotéku. Dále bylo zjištěno, že v místech, kde obec více utrácí za politiku bydlení, je méně dokončených bytů a relativní výdaje lidí na bydlení jsou celkově nižší. Byť jsou tyto výstupy zajímavé, aby mohly mít reálnou hodnotu pro policy-makers, musí být ověřeny mnohem hlubší analýzou. Tato studie je pro ni pouze stručným základem, vzhledem k nízkému počtu použitých dat a možné potřebě doplnění dalších faktorů, které mohou mít na výdaje obcí vliv.

## Klíčová slova

komunální politika, politika bydlení, víceúrovňová veřejná správa, kvantitativní analýza

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## 1. Introduction

Housing System means a complete range of legislations and programs across all levels of government which is deeply rooted in the society of each country. It is not the market that shapes housing but, as Hulchanski (2006, p. 225) wrote in case of Canada, housing system is the government's "approach to supplying, allocating and maintaining the nations' housing stock". The housing systems across developed western countries vary significantly (Hulchanski, 2006, p. 222; Scanlan and Whitehead, 2004, Lewis, 2016, pp. 143). Crucial aspect for the municipal government to play an active role is legitimacy in coordinating the land policy and access to money (Hulchanski, 2006, p. 236). In this brief study, we want to look whether some aspects of housing are linked with the level of municipal spending on housing and how.

It is interesting that Housing policy is in many countries a topic identified as an important topic for urban development, while at the same time, municipal governments are often seen as reluctant, for various reasons, to do much about it. (Hulchanski, 2006; Lewis, 2016; Feather, 2018). Feather (2018) points out that often, Housing spending is viewed only as a National Government's task (pp. 1) and adds that such a system is no longer sustainable (pp. 2). In his study, he set a baseline for research on municipal Housing policy which shall lead to a reassessment of cities' role "on a topic fundamental to the future of socio-economic development" (Feather, 2018, pp. 2). We therefore follow up on his study and look at possible implications of the level of Municipal spending on Housing on the city and its people.

It stems from the calculations of Feather (2018) that only 1,35% of municipal budgets are designated for housing programmes. This indicator is taken as a starting point for this analysis. A link between proportion of Municipality spending on Housing (dependent variable, further on only 'Municipal Spending') and other variables related to housing is tested. The selection of explanatory variables is explained in the following section.

### 1.1 Theoretical framework for variables' selection

Feather (2018) makes it clear in his article, that Housing is a crucial phenomenon a city needs to get significantly involved in, if they want to develop in a sustainable manner (p. 2). Who is to sustain a city? Its people. It is therefore clear that social factors matter significantly when talking about Housing Policy (Hulchanski, 2006).

As the first reference point of how deep the pockets of local people are, the expenditure of a household on Housing with respect to their income has been added to the analysis. A second social factor is whether the level of Municipal spending has different implications for renters and owners. The reason why this matters presented Hulchanski (2006) in his work on Canadian housing sector, where he shows how the government's adhering to owners of apartments, rather than renters, led to significant social implications (Hulchanski, 2006). In order to provide the whole picture of the people's socio-economic situation, the well-being of a country was added to the analysis by GDP per capita.

Second group of variables reflect rather the political will of a country and its public policy levels to do something about Housing. As it is clear, that financial support of housing is executed across all levels of governance (DiGaetano and Strom, 2003; Feather 2018), it is relevant to check the link between municipal and national adherence to Housing support because a prove of this link has not been found in any literature. Therefore, the proportion of spending in Housing within National Budgets has been added to the analysis. The direct link between city and nation may be reflected by the link with GDP proportion of national expenditures on housing allowances. It may be possible to see whether cities only reflect the national situation or whether they are becoming individual policy-makers.

The rich cities and declining cities have different approaches to housing policies even in the same country (Lewis 2016), however, it is not necessarily true that the poor cities give a smaller priority to housing than the rich ones. The opposite may prove right, when reading evidence from Lewis (2016), that declining cities often spend relatively more on "expensive and possibly ineffective economic incentives" (Lewis, 2016, pp. 145, referring to Rubin and Rubin, 1987). It is therefore not possible to state clearly, whether GDP of a city means higher proportion on housing. For that reason, including an indicator of a city well-being makes sense. For this purpose, the data on household's housing expenditure over income seem right.

Housing Policy on municipal level has a lot to do with Land policy (Debrunner & Hartmann, 2020; Kang & Groetelaers, 2018; Lawson & Ruonavaara, 2020; Turner, 2017, Lewis, 2016). However, inclusion into a quantitative analysis is a bit tricky. To estimate the municipal budget potential, spending can be well related to quality of construction office and demand for housing in the city. Therefore, as a reference point, which can reflect

all that has been mention, might well be the speed of dwellings' construction in the country appears to be a relevant variable to be added.

As a summary of the literature review, Table 1 shows variables, which are to be used for modelling of Municipal Housing.

**Tab 1: Summary of variables with impact on Housing Policy**

Variable type	Abbreviation	Relevance for inclusion in the model	Source of data
Dependent variable	% Housing in Local Budget	City spending on affordable housing (Basolo, 2016) Need for Municipal involvement in Housing (Feather, 2018)	Calculated as a proportion of Local Government Spending on Housing and amenities / Total Local Government Expenditure, data for 2018; National Accounts of OECD countries (2020)
Explanatory variables – social	% Household's expenditure on Housing	Social aspect – well-being of people (Hulchanski, 2006)	Housing expenditure as share of final consumption expenditure of households, data for 2017 or last available year; OECD Housing Database
	Mortgage owner - %Household Cost/Income	Support for upper class (Hulchanski, 2006)	Households' housing cost burden (mortgage and rent cost) as a share of disposable income, 2018 or latest year available - Owner with mortgage; OECD Housing Database
	Rent - %Household Cost/Income	Support for lower class (Hulchanski, 2006)	Households' housing cost burden (mortgage and rent cost) as a share of disposable income, 2018 or latest year available - Rent (private and subsidized); OECD Housing Database
	% GDP on Housing Allowances	A social factor of housing policy (Hulchanski, 2006)	Total government spending on housing allowances in OECD countries; data for 2018 or last available year; OECD Housing Database
	GDP per capita	Author's addition	Level of GDP per capita and productivity, data for 2018; OECD (2021)
Explanatory variables – political priority	% Housing in National Budget	Various levels of Government and their role in Housing (Hulchanski, 2006; Feather, 2018)	Calculated as a proportion of National Government Spending on Housing and amenities / Total National Government Expenditure, data for 2018; National Accounts of OECD countries (2020)
	Construction - % New Dwellings/All	Land policy as a crucial factor for development Debrunner & Hartmann (2020); Kang & Groetelaers, (2018); Lawson & Ruonavaara, (2020); Turner, 2017, Lewis, (2016)	Housing construction (completed dwellings in a year / all dwellings), data for 2018 or last available year; OECD Housing Database

Source: author with use of collected data

## 2. Quantitative Analysis of Municipal Spending on Housing Policy

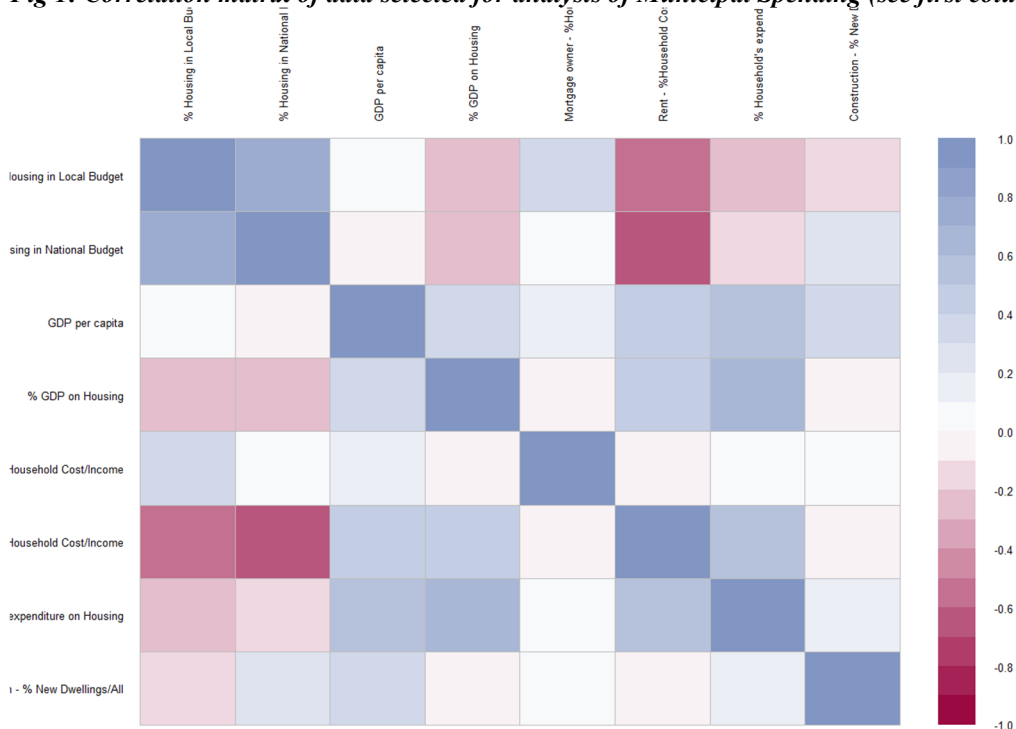
As mentioned before, this study is to provide a general basic prove of a link between proportion of municipal spending on Housing and other factors explaining Housing conditions in a country. The following chapter describes two steps, which lead to such outputs. Firstly, there are two correlation matrices which provide baseline information on the relationships between Municipal Spending and other variables. This leads to the second step, a production of a quantitative model, which is tested by a linear regression. Finally, an improved model gives an output, which is then discussed in the conclusion.

The data originates from OECD database on Housing (OECD, 2020a, 2020b), collected mainly in the years 2017 and 2018. A drawback for this analysis is the fact, that only data for 21 observations (countries) have been complete and thus it is important to clearly state that this study is just to set a baseline for further investigation.

By looking at simple correlation matrices (Fig 1, Fig 2), specifically on the first column (row), we observe a relationship between Municipal Spending and other variables. From the initial overview it is apparent, that Municipal Spending is positively correlated with National Housing expenditure and the proportion of income dedicated to housing for people with mortgage. A significant negative correlation is observed with proportion of national GDP spent on Housing Allowances as well as with the households' total expenditure on housing. A strong negative correlation is apparent between Municipal Spending and the proportion of households' income dedicated

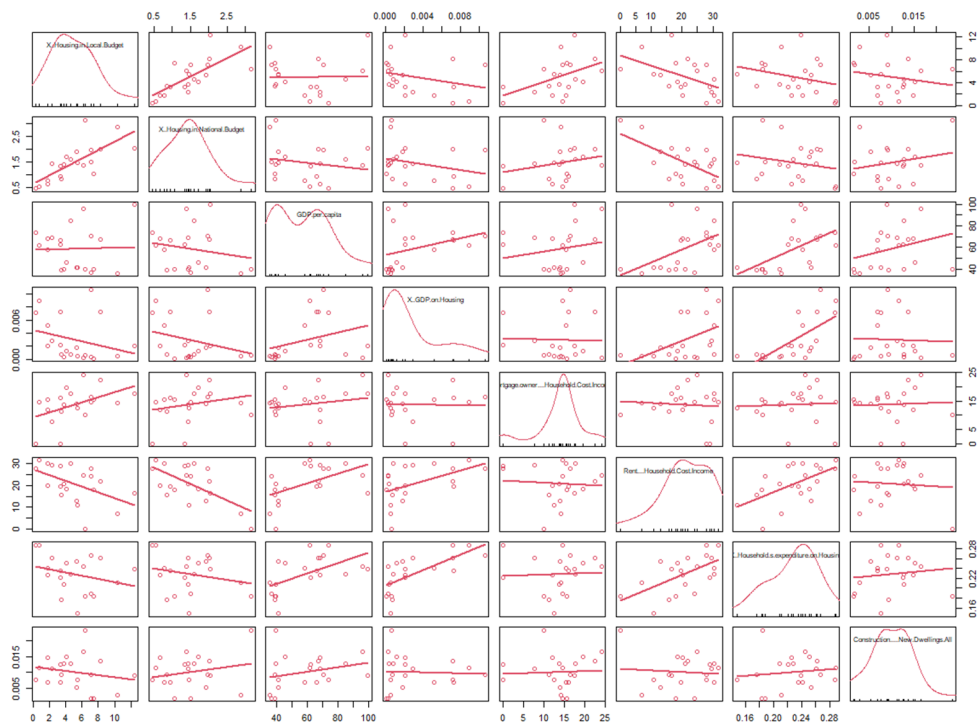
to housing for people with rented apartments From the scatterplots in Fig. 2, it is important to zoom those, where a non-linear relationship is apparent and take the relationships into account in further analyses.

**Fig 1: Correlation matrix of data selected for analysis of Municipal Spending (see first column/row)**



Source: author's calculation with use of data from OECD (2020a,b)

**Fig 2: Scatterplot Matrix of data selected for analysis of Municipal Spending (see first column/row)**



Source: author's calculation with use of data from OECD (2020a,b)

The initial statistical tests have proved that the selection of variables as well as their use may be rather correct, however, as has been already apparent from the initial scatterplot overview, several variables are not in linear

relationship with the dependent variable and some of them are correlated with one another, which might lead to endogeneity. The %GDP on Housing allowance and the Housing Expenditures of Mortgage Owners seem to have a non-linear relationship with the Municipal Spending level. The expenditure of a Households living in rented apartments is highly correlated with Total National Spending on Housing.

### Linear Regression Model no. 1

H0: The variation of dependent variable is sufficiently explained by the total variation of selected adjusted explanatory variables

$$\begin{aligned} \% \text{ Housing in Local Budget} = & \text{const} + \beta_1 \% \text{ Housing in National Budget} \\ & + \beta_2 (\% \text{ GDP on Housing Allowances})^2 \\ & + \beta_3 \text{ GDP per capita} \\ & + \beta_4 (\% \text{ Household Cost/Income (Mortgage owner)})^2 \\ & + \beta_5 \% \text{ Household Cost/Income (Rent)} \\ & + \beta_6 \% \text{ Household's expenditure on Housing} \\ & + \beta_7 \text{ Construction - \% New Dwellings/All dwellings in year} \end{aligned}$$

Fig 3: Linear Regression of Municipal Spending

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Model 3: OLS, using observations 1-28 (n = 21)
Missing or incomplete observations dropped: 7
Dependent variable: HousinginLocalBudget
Heteroskedasticity-robust standard errors, variant HCl

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	coefficient	std. error	t-ratio	p-value	
const	4.82823	2.32836	2.074	0.0585	*
HousinginNationa~	3.07638	0.496534	6.196	3.24e-05	***
GDPpercapita	0.0682336	0.0306019	2.230	0.0440	**
RentHouseholdCos~	-0.0614014	0.0674782	-0.9099	0.3794	
Householdsexpend~	-25.1106	9.50889	-2.641	0.0204	**
ConstructionNewD~	-277.254	55.6073	-4.986	0.0002	***
sq_GDPonHousing	5387.22	8957.26	0.6014	0.5579	
sq_Mortgageowner~	0.00604119	0.00165098	3.659	0.0029	***

Source: author's calculation with use of data from OECD (2020a,b)

The model has been proved relevant and in line with basic necessary GM conditions for linear regression, as shown by testing. The variables with coefficients  $\beta_1$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_6$  and  $\beta_7$  have been proved to be significantly linked with the dependent variable and therefore a new model no. 2 has been drafted, which could better explain variation in municipal spending:

### Linear Regression Model no. 2

$$\begin{aligned} \% \text{ Housing in Local Budget} = & \text{const} + \beta_1 \% \text{ Housing in National Budget} \\ & + \beta_3 \text{ GDP per capita} \\ & + \beta_4 \% \text{ Household Cost/Income (Mortgage owner)} \\ & + \beta_6 \% \text{ Household's expenditure on Housing} \\ & + \beta_7 \text{ Construction - \% New Dwellings/All dwellings in year} \end{aligned}$$

Fig 4: Linear Regression of Municipal Spending – improved model

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Model 8: OLS, using observations 1-28 (n = 24)
Missing or incomplete observations dropped: 4
Dependent variable: HousinginLocalBudget

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	coefficient	std. error	t-ratio	p-value	
const	2.29484	2.05156	1.119	0.2780	
HousinginNationa~	3.39157	0.455721	7.442	6.75e-07	***
GDPpercapita	0.0585976	0.0188218	3.113	0.0060	***
Householdsexpend~	-22.0686	9.32029	-2.368	0.0293	**
ConstructionNewD~	-251.102	59.0133	-4.255	0.0005	***
MortgageownerHou~	0.138023	0.0512182	2.695	0.0148	**

Source: author's calculation with use of data from OECD (2020a,b)

Despite proving relevance, problems have been spotted in REMSEY Reset Tests, which indicates either a functional problem or omitted variables. This needs to be taken into consideration in interpretation as well as in



suggestions for further research. Given this output and since number of observations is low, it is important to take the output only as a base for further investigation.

### 3. Conclusion

If we go back to the beginning and say, that the proportion of budget a municipality designates for a Housing Policy, reflects the level of priority they give to Housing, our results may have interesting implications for policy makers.

Let us first look at cases when municipal spending grows. From our analysis, it is clear, that the level of priority that the national government gives to Housing is strongly reflected on city level. One possible explanation may be, that Housing policies are set by law and municipal governments use only limited power to act on their own in this field (Hulchanski, 2006; Feather 2018; OECD, 2019).

What is interesting, the well-being of a country (GDP) does have a positive, but only very limited link with municipal will to spend on Housing.

A result, which is rather revelatory, and the relevance of which is to be further investigated on, is the positive non-linear relationship between municipal spending on Housing and Expenditures on Housing of people who have a mortgage. Owners of mortgage spend more money on housing in cities, which spend on Housing relatively more. That, in real life, can lead to various questions the answer to which may have contradictory implications:

- Does it mean, that the more a city spends on housing, the more high-quality (expensive) apartments people buy? This assumption would be supported if construction rate was positively and significantly linked with municipal spending on Housing. The exact opposite, however, has proved to be true.
- Does it mean that the city invests in public housing, which causes presence of less private dwellings and consequently more difficult and expensive possibility to buy an apartment? This assumption is supported by the fact, that also total expenditure of households on housing is negatively and significantly linked with municipal spending on housing. In such a place then there might be more public dwellings, which are generally less costly for their renters.
- Does it mean, that cities, which spend more on Housing, are inhabited by rather poorer people, and those who can afford a mortgage pay relatively more for it than rich people in rich cities? This construct would be supported by a negative relationship with Households' expenditure.

Which one of these assumptions is correct, needs to be further investigated on. What we can however clearly state here is, that the level of municipal spending on Housing does matter for life in a city.

As already mentioned at the beginning, it needs to be taken into consideration, that the outputs of this study are only a baseline or a simple hint for further research. This is because of the data quality is rather low (causing a low number of observations) and because further factors related to housing need to be added to the analysis (identified during functional testing in our regression).

The analysis has provided some information, which shall be further investigated on. It has also shown, that there are other very important variables, which explain the consequences of municipal involvement in Housing Policy. These may be investigated on in further research.

The performed analysis has used a very low number of observations and therefore, it is very important to prove the results. The possible methods are either collection of further data or performance of case studies and their comparative analysis. A framework by DiGaetano and Strom (2003) developed for comparison of urban governance among countries, is a relevant starting point for such a task.

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