BUDGET REVENUE POTENTIAL ANALYSIS: THE CASE OF UKRAINIAN ATCS

by

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Abstract

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Public budgets play one of the key roles in the economy, providing public goods and services, creating additional demand through government purchases. Mobilizing more public funds and increasing the efficiency of generating budget revenue is an important issue for policymakers. Ukraine's case of decentralization reform, providing local authorities with extended autonomy in public finance and decision making process, has already shown positive impact on fiscal revenues. However, the existing academic literature pays no attention to the question of a current budget revenue potential of the local communities – the maximum amount of budget revenue that could be raised by municipalities given the current conditions, and without changing the tax rates.

In this work, we attempt to quantitatively measure the potential of 1,437 Ukrainian amalgamated territorial communities to increase their budget revenues, that do not depend on the grants from external sources, given their current characteristics. Using the techniques of a stochastic frontier analysis we use different socio economic inputs and fiscal data provided by the Ministry of Finance of Ukraine for 2021 period at the local level to explain differences in budget revenues, budget revenue efficiency, and their potentials. We also form a first ranking of Ukrainian local communities, depending on the efficiency of budget revenue.

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LIST OF ABBREVIATIONS

ATC. Amalgamated territorial community

GDP. Gross Domestic Product

IMF. International Monetary Fund

OLS. Ordinary Least Squares

SFA. Stochastic frontier analysis

WB. World Bank.

Chapter 1

INTRODUCTION

A long and multidimensional process of decentralization reform in Ukraine started in 2014 and has been unfolding for already more than 8 years, resulting in significant changes in public governance and administrative processes. To a great extent, a voluntary amalgamation of territorial communities into so-called amalgamated territorial communities (ATCs) was the core aspect of the entire reform (Harus 2020). Prior to the start of the decentralization reform, there were almost 11,000 municipalities at the local level in Ukraine, which included cities, towns, villages, etc.

The amalgamation meant that all Ukrainian settlements should form ATCs by uniting with several communities in their neighborhood, which would be managed and administrated by a single local authority. This administrative process of the country's territorial reorganization was targeted to meet several objectives of the new Ukrainian government back in 2014: consolidate local authorities, empower communities' capacity with more financial resources, broader set of administrative functions, and obligations (Romanova and Umland 2019). These objectives should have consequently resulted in a more efficient local governance, better public goods and services provision, as well as more dynamic economic development (Oleinikova 2020).

The final stage of the lengthy amalgamation process was eventually done in 2020 – 1,469 ATCs were formed out of 10,977 local (village and city) councils – basic tier local government units in Ukraine. During the voluntary amalgamation phase of 2015-2019, 4,330 Ukrainian local communities (hromadas) have amalgamated without any compulsion from the central or regional government, or have already started this process. As a result, 982 ATCs were formed by the end of 2019, which

corresponds to 54% of the rural population and 26% of the total population of the country. Afterwards, in 2020 all remaining councils were enforced to form ATCs, which they had not manage to create before. It is notable that almost one third of all territorial communities (487 out of 1,469) were created forcibly, which is an evidence for problems with local communities willingness and confidence in the potential gains from amalgamation.

A currently functioning budget system of Ukraine (excluding territories which are occupied) generally is constituted out of two parts – national, or State budget and local budgets. Local budgets include 24 budgets of regions (oblasts), 119 budgets of districts (rayons), 1,438 budgets of ATCs and 1 budget of a city with special status – Kyiv, the capital of Ukraine. According to the Ministry of Finance of Ukraine local budgets' revenues in 2021 totaled 580.7 billion UAH – almost half of what the State budget collected and 35% of Ukrainian total budget revenues. ATCs' budgets is the main part of the local budget system as their revenues account for 68% of local budgets revenues (396.4 billion UAH) or 24% of total consolidated budget revenue.

Revenues of ATCs budgets basically consist of two core parts – so-called own revenues, and transfers from the State Budget of Ukraine or other bodies. Own revenues, which form the majority of budget revenues of hromadas – more than 65% (UAH 258.6 billion), – are collected from various sources (see Figure 1 below).

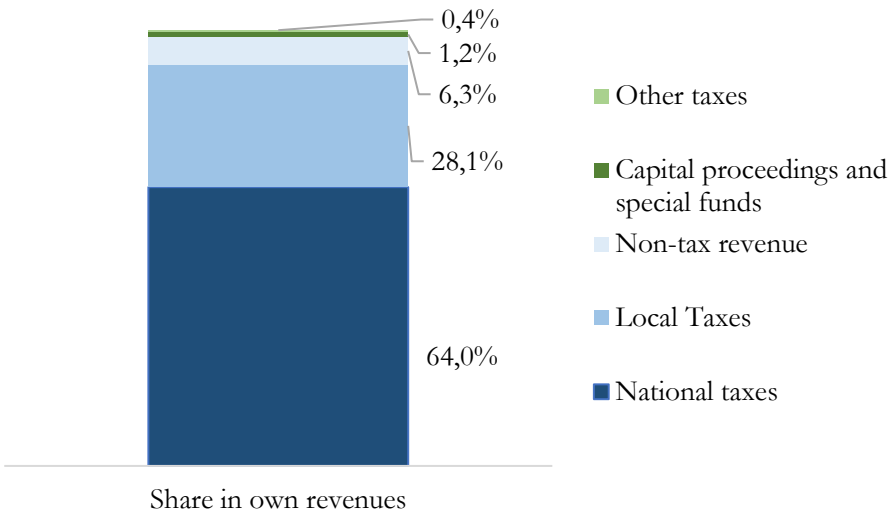

Figure 1. Own revenues structure of the Ukrainian ATCs, 2021
Source: Open Budget (Ministry of Finance of Ukraine)

Figure 1 shows that own revenues of Ukrainian ATCs in 2021 were the following:

- Tax revenue is a key component of own revenues of territorial communities, making up 92% of total own revenues. In its turn, personal income tax is the main source of tax revenue (61% of total tax revenue). Local taxes (property taxes, single tax for individual entrepreneurs, etc.) are the second largest part of tax revenue, constituting approximately 30% of the total tax revenue of local settlements.
- Non-tax revenues, which are formed from various fines and fees, licenses, permissions, dividends from owned enterprises, etc., contribute 6.3% of total own revenues of Ukrainian municipalities.
- Other sources of own revenues (proceedings from operation with capital, donors' funding, special funds, etc.) account for only slightly more than 1% of own revenues of the local communities.

On the other hand, grants from the national government, that are out of local authorities control, make up almost 35% of the total ATCs' budgets. Transfers are needed to cover the gap between own revenues and financial needs for expenditures according to the mandate of local authorities to maintain at the adequate level living standards and provide sufficient public services.

The results of an emerging empirical research provide evidence for overall positive effects of increased hromadas' budget revenues and their reliance on own revenues rather than grants from the national government as a result of amalgamations (Nivievskyi et al. 2021).

Given the high importance of amalgamated communities' budgets in Ukrainian fiscal structure and the first opportunity to analyze a complete set of formed municipalities' budgets, the key point of our empirical interest is the current budget revenue gap to be "closed" by ATCs given the current conditions and their characteristics. Estimates of own budget revenues potentials and gaps could be instrumental for the better development planning and redesigning local policy, as well as national government's assessment of further steps in decentralization reform and cooperation with municipalities. Given the substantial dependence of hromadas on financial transfers, it is crucial to determine the space for revenue increase, which could at least partially offset the need in grants from national government, loosening the burden on the State budget. In this research we will undertake a first attempt to estimate a scope for additional revenue mobilization for individual ATCs in Ukraine.

We also aim to rank Ukrainian ATC by the budget own revenues efforts. This would provide more insights about not only quantitative estimates of the space for the increase in budget revenues and respective cut in governmental subsidies, but allow for efficiency comparison among individual ATCs on regional, subregional, and national levels.

The thesis is structured in the following way. In the second chapter a literature review on the revenue effort estimation for public budgets and positive effects of the amalgamation process on ATCs' budgets in Ukraine is conducted. The third chapter describes the methodology used in this thesis. The fourth chapter is devoted to the data description. The fifth chapter discusses the empirical results and ranking of Ukrainian ATCs. The last chapter summarizes the core findings and provides policy implications.

Chapter 2

LITERATURE REVIEW

An emerging empirical evidence suggests that there are overall positive effects of amalgamations for the ATCs in Ukraine. Nivievskyi et al. (2021) investigated the budget indicators of the settlements before and after the amalgamation, using the World Bank BOOST data on local governments, financial data of all local communities in Ukraine over 2012-2018, supplemented with the data on population, land, and rural/urban type of communities. The results of the empirical analysis demonstrate a positive effect of amalgamations on own revenues in all three years since the start of the reform, and on land revenues in particular. There is also a learning curve demonstrating that the earlier the communities have amalgamated, the bigger is the effect of the reform. Similar effect was observed for the expenditures. It looks like only in the third year of the reform ATCs become more efficient in local finance management as they start relying less on the special grant transfers from the central government and spend relatively less on wages, though a longer panel and more years after the reform needed to investigate the effect of amalgamations more in details. On the other hand, the identified negative effect on the revenue-expenditure ratio for the ATCs implies a growing bottom-up initiatives and catching efforts to improve local living conditions.

International empirical evidence on territorial amalgamations effect is somewhat more conservative and ambiguous in its assessments. A comprehensive academic literature review by Tavares (2018) provides detailed description of empirical effects in economic, democratic, and managerial dimensions obtained by various academic contributors worldwide over the last two decades. Author summarizes that amalgamation may positively affect cost savings for formerly small

settlements, which is associated with the economy of scale effect. Still, it is noted in the paper that many authors conclude that amalgamations have no statistically significant effects on cost efficiency. Moreover, authorities of relatively larger territorial communities tend to provide public services of better quality. On the contrary, amalgamation, as any other centralization of decision-making process, may adversely affect democracy – studies provide evidence of less diverse election process and less active involvement of local citizens in public governance for amalgamated territories (Zeedan 2017).

However, Ukrainian case is somewhat different because there is clearer positive revenue effect – particular taxes (personal income tax, land tax etc.) are streamed fully in amalgamated communities' budgets instead of their partial distribution between smaller councils and subregional government. Therefore, it may have a subsequent positive democratic effect – larger financial resources include higher responsibility as well as the ability (at least financial) to provide better public goods in a municipality, rather than expecting for actions from the national, regional, or subregional authorities (Oleinikova 2020).

Local public administration process with an increased responsibility aimed to enhance development and improve both prosperity and quality of life needs sufficient funds. Thus, it is vital to assess how efficiently current financial resources are being raised and find the space to generate more given the current conditions. In other words, an issue of revenue potential arises – by how much could a budget been increased by simply better utilizing available 'inputs'. Fenochietto and Pessino (2013) in a research for the IMF define in this context a tax capacity: "the maximum level of tax revenue that a country can achieve". Meanwhile Minh Le et al. (2012) formulate a taxable capacity : "the predicted tax-to-gross domestic product ratio that can be estimated empirically, taking into account a country's specific macroeconomic, demographic, and institutional features, which all change through time". This explanation differs from the one

given by Fenochietto and Pessino (2013) as it is primarily focused on the ratio of collected tax to GDP, which is a more convenient measure for a cross-country comparison. However, both definitions follow the same pattern that tax capacity is developed around the idea of the maximum amount of tax revenue collected by a budget given the current characteristics, and we will focus exactly on this features in our analysis. In addition, tax effort is another topic of academic interest. This measure most of authors (McNabb et al. 2021, Brun and Diakite 2016, Fenochietto and Pessino 2013, Langford and Ohlenburg 2016) define as the ratio between the current tax revenue raised and the tax potential we have discussed already. Thus, it shows how efficient the current economic, demographic and institutional features are being mobilized and transferred into budget revenues.

There are different methodological and instrumental strategies of estimating tax effort and tax capacity in the empirical literature. Langford and Ohlenburg (2016) estimated tax efforts for 89 countries, applying a stochastic frontier analysis (SFA) methodology. Authors find significant effect of such economic determinants as imports and inflation on tax revenues. In addition, institutional variables characterizing the level of corruption, democracy, and the rule of law also have an impact on tax collection. Ukraine was among the countries in the sample observed and its tax revenue effort was estimated in the range of 0.74-0.75 (in general the measure varies from 0 to 1), which we could use as a checkpoint for our own estimates. However, authors note that their estimates should be taken with a grain of salt – precise quantitative estimates may not sufficiently represent the actual space for revenue generation increase. Given the fact that there still could be a lot of omitted and/or unobserved variables, we may rather rely on a ranking of respective territorial communities based on the estimated efforts.

Alternatively, tax efforts may be estimated using more traditional regression approaches. Minh Le et al. (2013) applied ordinary least squares (OLS) method

for panel data of 110 countries over the period of 1994–2009 to find potential tax revenues. In this framework tax effort may exceed 1, meaning a country could in fact outperform its predicted tax revenue. Authors find positive relation between tax revenue and such economic determinants as the share of agriculture value added and trade openness, as well as some other demographic characteristics (population growth rate), and institutional indexes (bureaucracy and corruption). Empirical results' robustness check, which was performed through alternative specifications estimations, lead the authors to a conclusion that estimates may vary a lot, meaning such modeling strategy may be considered more as a supplement to other quantitative analysis methodologies of tax revenue mobilization.

Additional economic determinants that turned out statistically significant in affecting tax effort on a country-level are GDP per capita (Mawejje and Sebudde 2019, Cyan et al. 2013, Fenochietto and Pessino 2013), and income inequality (Cyan et al. 2013, Fenochietto and Pessino 2013). Other demographic variables that appeared significant in tax effort analysis were population density and education index in Cyan et al. (2013) study, health expenditures in Fenochietto and Pessino (2013) research.

However, most of the empirical studies focus on a cross-country analysis of tax effort and potential, lacking an evidence at the level of local communities – regions, districts and/or municipalities. Moreover, as long as the papers are mostly devoted to the country-level data, it is hard to apply a similar economic and institutional explanatory inputs for local level estimations. In addition, only tax revenue is frequently determined as a dependent variable, while various non-tax sources of revenue are omitted from the modeling. Given the fact that other than tax sources constitute almost one tenth of revenues of territorial communities in Ukraine that they could raise by themselves (excluding grants from the central government), estimations of budget revenue potential and effort

without those non-tax and other revenues may sufficiently worsen the quality of empirical modeling and distort an actual room for further revenue mobilization. This thesis will be an attempt to fill in this gap in academic literature.

Chapter 3

METHODOLOGY

Building upon a substantial stock of literature (Lotz and Morss 1967, Le et al. 2012, Cyan et al. 2013, Fenochietto and Pessino 2013, Langford and Ohlenburg 2015), we define a budget revenue potential as the maximum amount of budget revenue a local council/ATC could reasonably raise at a given point in time, conditional on its prevailing characteristics and resources available. Given our definition, budget revenue potential should be subject to only revenues that are coming from own sources, not external subsidies from the national government. Thus, we determine our main dependent variable as the budget own revenue. In this work we will be focusing primarily at individual ATC level. Budget revenue potential or budget frontier is inherently unobservable – but can be estimated empirically (Fenochieto and Pessino 2013). We will compose it by employing SFA techniques.

Employing the methodology of Aigner et al (1977), Meeusen and van den Broeck (1977), and accounting for additional explanatory variables that affect revenue effort (technical efficiency in the SFA methodology) directly, stochastic frontier model is formulated generally as following:

$$\ln y = \alpha_0 + \sum_i \alpha_i \ln x_i + \gamma_0 - u + v, \quad u \geq 0 \tag{1}$$

where:

y represents the budget revenue;

x is a vector of variables affecting budget revenues;

u or $(-u < 0)$ accounts for budget revenue inefficiency or how far ATC's budget revenue is located from a budget frontier or from a maximum level of revenue collection, which is ln $f(x) + v$, following truncated half-normal distribution, and is affected by z (a vector of variables that have impact budget revenue inefficiency);

v accounts for statistical noise and is assumed to have a symmetric distribution, e.g. normal one, and is independent from u.

In this framework budget's own revenue effort is defined as the ratio between actual own revenue and the corresponding revenue value on the own revenue stochastic frontier (own revenue potential or capacity, see Figure 2).

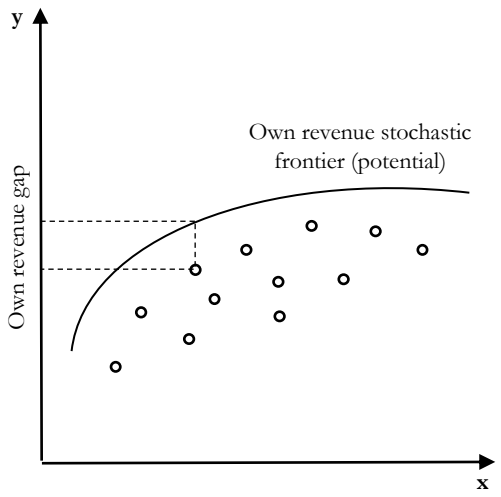

Figure 2. Budget own revenue stochastic frontier and own revenue gap
Source: Bogetoft and Otto (2011)

This measure ranges from zero to one. In this framework, own revenue effort is set to depend on various explanatory variables (so-called Z-variables). Thus, budget own revenue gap is the additional revenue, that can be generated by the ATC.

However, to the best of our knowledge there are no empirical models that would estimate budget efforts using stochastic frontier model at a local level, as well as for a single country only. Therefore, our work will contribute to the development of such models – especially in the context of finding explanatory variables applicable for tax potential estimation.

In terms of the variables (or inputs) that should define a tax frontier and tax effort, there is a general agreement in the literature that tax frontier should be defined by a prevailing set of 'structural' economic, demographic and institutional factors, as well as the factors under government control (Langford and Ohlenburg, 2015).

Focusing on the idea that own revenues of the ATC's budget may vary depending on social and economic characteristics, and taking into account data availability we decided to include population, area, number of legal entities and individual entrepreneurs, as well as the total revenue of legal entities for explaining differences in own budget revenues. These variables are connected to the core revenue sources of hromadas – personal income tax, corporate tax, land tax, etc.

As additional variables that are related to the "controlled by local authorities" group for improving revenue collection we include general administrative expenditures and capital expenditures of amalgamated territories. They may serve as proxies of infrastructure and governance quality in local communities, which may also positively affect revenue mobilization.

In addition, this thesis aims at explaining the differences in tax efforts among individual ATCs. Our initial hypothesis is that urban hromadas may be more efficient in collecting taxes ceteris paribus. The intuition behind is that, firstly, urban municipalities are more economically active – people may commute and

work in neighborhood with larger city inside while living in the other ATC. Given the fact that personal income tax is paid based on the location of the company where an individual works, and substantial share (56%) of this tax in total own revenues, labour migration becomes an important factor to consider in budget efforts' variation. Secondly, positions in urban local councils and services may be more attractive for better qualified specialists to work in, which would also increase the gap in budget revenue collection efficiency (own revenue effort) between rural and urban amalgamated settlements. Following the same logic we assume that hromadas that include cities of regional importance may be more efficient in revenue mobilization if compared to the urban ATCs.

Number of settlements in ATC meanwhile may be positively associated with own revenue effort. It could be a proxy for identifying more active hromadas – the larger the community is the more attractive it was during the amalgamation process. Consequently, we may expect that communities with more villages, towns or cities inside would have higher tax effort.

Geographic dummy could be instrumental for controlling migration activity and other, unobserved variables. Primarily, following common conditional division of Ukraine into Central Ukraine, East, South and West, we will test if regional differences are present in terms of different budget revenue efforts of territorial communities in Ukraine. Moreover, given the important role of the personal income tax in the hromadas' collected income, labour migration, especially migration abroad, may increase revenue gap. Due to the territorial proximity to the European Union countries, the Western region of Ukraine accounts for 71.6% of all migrant workers (ILO 2017).

Thus, following Battese and Coelli (1995) model (1) above is formulated as a Cobb-Douglas stochastic frontier and we allow tax efforts (efficiency) to be affected by a set of Z-variables, being defined as follows:

$$\begin{aligned}\ln Own\_rev = {} & \alpha_0 + \alpha_1 \ln(Area) + \alpha_2 \ln(Popul) + \alpha_3 \ln(Ent) \\ & + \alpha_4 \ln(Entrep) + \alpha_5 \ln(Ent\_rev) \\ & + \alpha_6 \ln(Exp\_admin) - u + v, \; u_i \\ & = z_0 + z_i \delta + w_i \geq 0\end{aligned} \tag{2}$$

where:

Own_rev represents own budget revenue of an ATC;

$Area$ is an area of the ATC;

$Popul$ is a population of the ATC;

Ent is a number of legal entities in the ATC;

$Entrep$ is a number of individual entrepreneurs in the ATC;

Ent_rev is a reported total revenue of 2020 of legal entities in the ATC;

Exp_admin are general administrative expenditures of the ATC;

Exp_cap are capital expenditures of the ATC;

u depends on $Settl$ (number of settlements in the ATC), $Urban$ (dummy whether ATC is urban), Reg_center (dummy whether ATC contains a city of regional importance), $West$ (dummy whether ATC is located in Western Ukraine), $East$ (dummy whether ATC is located in Eastern Ukraine), $South$ (dummy whether ATC is located in Southern Ukraine).

The above framework, however, does not allow for multiple sources of own budget revenues as there is just an aggregated measure for own revenue on the left hand side in model (1). For this reason, we extend the current framework by using Shepard distance functions that allow for multiple outputs or sources of tax revenues. Output oriented Shephard's distance function is defined as (Shephard, 1970):

$$(x, y) = \min\{\lambda > 0 \mid (x, y/\lambda)\, \epsilon\, T\}, \qquad (3)$$

where:

x is a vector of input quantities;

y is a vector of output quantities (various own budget revenues);

T is the 'technology set';

λ is a measure of output inefficiency or own revenue effort.

Then, the model above could be also expressed and estimated as a traditional stochastic frontier model. But for the distance function we would treat own revenue as three separate financial streams: tax revenues, non-tax revenues and capital proceedings as core components of own revenues. Then, for the defined three own revenue sources the SFA equivalent of a Cobb-Douglas Shepard distance function is (Henningsen 2019):

$$
\begin{aligned}
-\ln Tax = {} & \alpha_0 + \alpha_1 \ln(Area) + \alpha_2 \ln(Popul) + \alpha_3 \ln(Ent) \\
& + \alpha_4 \ln(Entrep) + \alpha_5 \ln(Ent\_rev) \\
& + \alpha_6 \ln(Exp\_admin) + \alpha_7 \ln(Exp\_cap) \\
& + \alpha_8 \ln(Nontax/Tax) + \alpha_9 \ln(Cap\_proc/Tax) \\
& - u + v,
\end{aligned} \tag{4}
$$

where:

Tax represents tax revenue of an ATC;

$Nontax$ is a non-tax revenue;

Cap_proc is revenue from capital proceedings;

u depends on $Settl$ (number of settlements in the ATC), $Urban$ (dummy whether ATC is urban), Reg_center (dummy whether ATC contains a city of regional importance), $West$ (dummy whether ATC is located in Western Ukraine), $East$ (dummy whether ATC is located in Eastern Ukraine), $South$ (dummy whether ATC is located in Southern Ukraine).

To have consistent and robust estimates our two core models were tested through the likelihood tests when comparing to simple OLS model, to the model with half normal distribution of inefficiency estimates, and the model without Z-intercept term. Distance function would also help to compare results obtained and following ranks of communities based on the budget revenue efforts estimated.

Chapter 4

DATA

The data used to estimate tax efforts for Ukrainian ATCs include local budgets, socio-economic characteristics of these municipalities and the financial information of legal entities in these communities in 2021.

Revenues and expenditures of 1,469 ATC budgets for 2021 were obtained from the Open Budget database, which is compiled by the Ministry of Finance of Ukraine, using the World Bank BOOST-analysis methodology. The data contains budget revenues according to the budget classification approved by the Order of the Ministry of Finance of Ukraine (N.11 of 14.01.2011). Communities' budget expenditures were obtained in functional (i.e., expenditures on healthcare system, education, public order, administrative etc.) and economic (capital and current expenditures) classification formats.

Socio-economic characteristics of local communities – their population, area, and number of settlements were collected from the "Decentralization" portal, governed by the Ministry of Community Development and Territories of Ukraine. Population and area are used among other explanatory variables to estimate revenue efforts among ATCs. Meanwhile the number of settlements in the community would be an instrument to explain differences in tax gap among different communities across the country.

In addition, using the information from the Unified State Registry of Legal Entities, Individual Entrepreneurs and Public Associations, data on the number of registered legal entities and individual entrepreneurs in Ukraine was obtained. Then, after processing the database containing information on legal entities, we formed a data frame on more than 941,000 legal entities engaged in commercial activity, and being officially registered as of the end of 2021.

Using financial statements of nearly 402,000 Ukrainian legal entities for 2020, stored on the website of the State Tax Service of Ukraine, a consolidated database with data on business entities was compressed (their address, current registration status, organizational and legal form, consolidated financial statement if present).

Similarly, using the database with the information about individual entrepreneurs in Ukraine, we obtained the number of such individuals for every settlement available.

Afterwards, using the handbook of the local budgets issued by the Ministry of Finance of Ukraine, and the database with legal bodies, we attached to each settlement (over 27,000 territorial units) its respective amount of active entities, their aggregated consolidate financial positions for the year of 2020. Then, a subsequent aggregation to the ATC-level was performed.

To explain the differences in the revenue gap of local governments, a dummy-variable for urban hromadas was generated (to check the efficiency differences among rural and urban communities), as well as dummy-variable for ATCs which include cities of regional significance (central cities of Ukrainian regions).

Merging all separate data sets together we have obtained the database containing communities' budget revenues and expenditures, their socio-economic indicators, aggregated economic data on legal entities. In total 1,437 observations at the ATC-level were finally formed to analyze budget revenues efforts (excluding temporarily occupied regions).

Descriptive statistics of core variables used for budget own revenue gap estimation is provided in the Table 1 below.

Table 1. Descriptive statistics of variables in the dataset

	Mean	St. Dev.	Min	Max
Own revenue, thsd. UAH	176,283	736,858	48,985.00	14,504,241
Tax revenue, thsd. UAH	162,954	687,784	48,985.00	13,750,372
Non-tax revenue, thsd. UAH	11,166	41,427	0	718,956
Capital proceedings, thsd. UAH	1,909	13,759	-169.18	413,222
General administrative expenditures, thsd. UAH	37,940	122,620	2,950.23	2,212,150
Capital expenditures, thsd. UAH	43,213	259,805	0	5,891,306
Population, persons	24,259	71,051	1,814	1,433,886
Area, ha	385	299	2	2,497
Number of settlements in ATC, units	19	15.75	1	125
Number of individual entrepreneurs, persons	1,056	4,942	0	117,724
Number of legal entities, units	402	2,382	0	44,457
Total revenue of legal entities, thsd. UAH	3,199	36,239	0	1,232,570
Urban ATC dummy	0.278	0.448	0	1
Regional center dummy	0.014	0.119	0	1

Source: Own estimation based on the data from the Ministry of Finance of Ukraine, Ministry of Justice of Ukraine, State Tax Service of Ukraine

The Kharkiv urban territorial community, which includes the regional center of the Kharkiv region, has the largest own budget revenues – 14.5 billion UAH. It is noteworthy that out of the top-20 communities with highest own revenues 18 are the ones that include cities of regional significance. The other two communities,

that do not include such settlements, are the Kryvyi Rih urban territorial community (6.6 billion UAH), which is a major industrial center of the Dnipropetrovsk region, and the Mariupol urban territorial community (4.3 billion UAH), which became an important center of the Donetsk region after the occupation of some parts of the territories of the Donetsk and Luhansk regions in 2014-2015.

For a more detailed analysis and in order not to be mislead by previous numbers it is tenable to also look at ATCs' own revenues per capita. In fact, territorial communities which include cities of regional significance are completely dropped out of the highest values, if ranking by the budget own revenue per capita – the top-50 communities surprisingly do not include any communities with large cities or towns inside. On the other hand, we find highest values among the hromadas concentrated around the capital of Ukraine, Kyiv city. These are Hirska territorial community (61 thousand UAH per capita), Borshchahivska territorial community (47.6 thousand UAH per capita), Kozynska territorial community (44.1 thousand UAH per capita) and Prystolychna territorial community (33.5 thousand UAH per capita) population). The same territorial communities can be noted as those that mostly rely on their own revenues and do not require substantial transfers from the central government (the share of own revenues in total budget revenues for each is about 88%).

Mean ATCs' budget own revenue per capita is 6.3 thousand UAH (~225 USD). Meanwhile, municipalities that include regional centers on average have 9.6 thousand UAH of own revenue per capita (52% higher than the aggregated mean for all territorial communities).

Among budget items that are instrumental for estimating tax effort and potential we took administrative expenditures, which include expenses on local councils, public administration, financing and fiscal activities. On average hromadas spend

almost 38 million UAH on such purposes, while the share of these expenditures in total budget revenues varies from 5.5% to even 30-50%. However, larger communities may tend to have lower share of such spendings to total revenues due to economy of scale (Blesse and Baskaran 2016).

Capital expenditures is an important budget component, that ensures a long-term development of territorial units, providing investments in infrastructure, overhaul, purchasing various equipment (Triyanto et al. 2017, Susetyo et al. 2019). It also used in our analysis as an indicator for local authorities activity and involvement into modernization and life quality improvements, as well as an investment into economic develepoment.

Among 1,469 territorial communities, 409 (27.8% of the total number) are urban municipalities. In addition, 21 of them are also ATCs that include cities of regional importance). 1,060 (72.2% of all territorial communities) are rural. In other words, almost three quarters of hromadas do not include cities or towns at all, which we would analyze more in details in the context of impact on the ATCs' efficiency in generating own revenues.

Chapter 5

ESTIMATION RESULTS

Based on the methodological background and data described in the previous chapters estimation results and its discussion are presented in this chapter. All results of estimated models are showed in the following chapter's tables.

5.1 Stochastic frontier model and distance function model results

In the first phase of our analysis we estimated a Cobb-Douglas stochastic frontier model with only one aggregated total own budget revenue of territorial communities (Model 1). In this framework, we assume inefficiency term follows truncated half-normal distribution. We also allow own revenue effort depend on additional variables, discussed in the previous chapter.

In the second stage we estimated a model, using a distance function, that allows for a more disaggregated modelling of multiple sources of own budget revenues, i.e. tax revenues, revenues from non-tax sources, and revenues from capital proceedings (Model 2). Tax revenue is set as dependent variable in this framework. The Model 2 as well as the Model 1 allows revenue effort depend on additional, so-called Z-variables.

Table 2 demonstrates the estimates for the two model specifications we used in this work.

Table 2. Stochastic tax frontier and tax distance function estimates

	Own revenue frontier (Model 1)	Distance function (Model 2)
Variable	log(Own_rev)	-log(Tax)
(Intercept)	2.907***	-2.600***
	(0.220)	(0.222)
log(Area)	-0.002	0.006
	(0.010)	(0.010)
log(Popul)	0.155***	-0.212***
	(0.023)	(0.020)
log(Ent)	0.114***	-0.115***
	(0.016)	(0.016)
log(Entrep)	-0.016	0.018
	(0.019)	(0.018)
log(Ent_rev)	0.012***	-0.012***
	(0.002)	(0.001)
log(Exp_admin)	0.685***	-0.655***
	(0.018)	(0.018)
log(Exp_cap)	0.117***	-0.113***
	(0.001)	(0.001)
log(Nontax/Tax)		0.125***
		(0.009)
log(Cap_proc/Tax)		0.003**
		(0.001)
Z-variables		
Z-intercept	0.336***	0.360***
	(0.059)	(0.056)
Settl	-0.013***	-0.012***
	(0.003)	(0.002)
Urban	-0.480***	-0.445***
	(0.096)	(0.083)
Reg_center	-0.230	-0.103
	(0.364)	(0.253)
West	0.312***	0.296***
	(0.047)	(0.041)
East	0.054	0.072
	(0.054)	(0.048)
South	0.037	0.042
	(0.047)	(0.044)
sigmaSq	0.100***	0.096***
	(0.012)	(0.010)

TABLE 2 – Continued

Variable	Own revenue frontier (Model 1)	Distance function (Model 2)
gamma	0.687*** (0.049)	0.740*** (0.043)
loglikelihood	-22.49	16.34
observations	1437	1437
Min revenue effort	0.328	0.317
Mean revenue effort	0.781	0.765
Max revenue effort	0.965	0.962

Standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01

The effect of explanatory variables is quite similar across the two specifications. We can't have a direct interpretation of marginal effects of the explanatory variables in both models (Henningsen 2019). Marginal products are downscaled by the technical inefficiency (revenue gap) which is unique for every single ATC. However, estimated parameters for variables affecting the amount of revenue (either aggregated own revenue for Model 1 or disaggregated own revenue for Model 2) are partial budget (output) elasticities (Henningsen 2019). We should also note that interpretation of estimates for the distance function should be reversed, i.e. minus sign near variables explaining variation in revenue is associated with a positive effect.

Most of the variables turned out to be statistically significant except for the area of ATC as well as the number of individual entrepreneurs. The effect of the area size on own revenues of a territorial community is not statistical different from zero. This may be explained by the fact that land tax accounts for 14% of total own revenues as well as by the inclusion of the number of settlements in the ATC, which is also a size proxy, to explain variation in own revenue efforts. The correlation between these two measures is quite strong (0.77), but doesn't introduce perfect multicollinearity into models.

The size of hromada's population turned out to be by far dominating among the socio-economic characteristics considered in the analysis. In fact, this is not surprising taking into account that personal income tax is fundamental in local budgets revenues. The partial elasticity of own budget revenue to population varies from 0.16 for the own revenue frontier to 0.21 for the distance function.

General administrative expenditures are positively correlated with own revenues of ATCs budgets. Our assumption was that higher spendings on public governance may be associated with better functioning of local community that serves as a proxy for more active community. This may facilitate development in the ATC and allow people to work where they live and, therefore, pay personal income tax to home hromada. Strong correlation (0.75) between the total reported revenue of legal entities in ATC and general administrative expenditures may serve as an evidence for this logic. The partial elasticity of own budget revenues to general administrative expenditures is in the range of 0.66-0.69 depending on the model.

The number of legal entities in territorial community and their total revenue is associated with higher own budget revenues. Active companies pay corporate tax directly to the budget, increase employment, therefore, enhancing personal income tax collection, as well as creating positive externalities for business functioning in the municipality. This would also lead to lower labour migration and economic multiplier effects. Elasticity of own budget revenue to the number of legal bodies in the ATC is 0.11-0.12 depending on the model. Meanwhile, elasticity of own budget revenue to the reported total revenue of legal bodies in the ATC is 0.01 for both own revenue frontier and the distance function models.

Capital expenditures of local council have also positive effect on own revenue. Investments in fixed assets, infrastructure in our case serve as proxy for how well a particular ATC develops. If local authorities invest more they introduce positive signals and confidence for local citizens who would be more willing to live

permanently in their area, work there, create own business, purchase real estate, land etc. The partial elasticity of own budget revenue to budget capital expenditures varies from 0.11 for Model 2 to 0.12 for Model 1.

Additionally for the distance function specification we should devote our attention to the coefficients near the relation of different revenue sources. These estimates would indicate change in a distance measure (Henningsen 2019). The coefficient near $ln(Nontax/Tax)$ is the distance elasticity with respect to budgets' tax revenues. Estimate of 0.13 means that a 1% increase in non-tax revenues would on average result in a 0.13% increase in the distance measure, meaning that efficiency increases while inefficiency decreases. Similarly, The coefficient near $ln(Cap\_proc/Tax)$ of 0.003 indicates that a 1% increase in revenues from capital proceedings (ceteris paribus) is associated with a 0.003% increase in the distance measure. The effect of inflows from capital proceedings is approximately 40 times less if compared to the respective effect of non-tax financial sources. This is not a surprise if taking into account the fact that revenues from capital proceeding constitute only 1.2% of aggregated own revenues, while non-tax revenues contribute 28.1%.

In the second stage of our empirical results discussion we focus on the effects of so-called Z-variables, which serve as additional instruments to explain variation in revenue efforts among territorial communities. However, the estimated and displayed coefficients near Z-variables cannot be interpreted directly, except for the general effect (positive/negative) (Henningsen 2019). We may only extract joint marginal effect for every single observation.

The highest effect on the efficiency in own revenue collection is observed for the dummy variable for urban ATCs. Thus, estimates of -0.48 for the own revenue frontier and -0.45 for the distance function model and their respective standard deviations (0.096 and 0.083 respectively) mean that urban territorial communities

have statistically significant higher own revenue efforts than rural hromadas. We will discuss in details differences in revenue efforts among various groups of territorial communities, including the gap between urban and rural ones, later in the chapter. Still, our hypothesis of higher revenue generation efficiency for urban ATCs is confirmed.

Communities that contain cities of regional importance despite negative sign of estimated coefficient (indicating positive effect on own revenue effort) cannot be determined statistically different from zero. High standard deviation doesn't let us to do an opposite inference. However, this could be reasonably explained by a relatively low share of such ATCs – only 21 communities out of 1,437 (<1.5%) used for the modelling.

In addition, we have an evidence that hromadas formed out of more settlements tend to be have higher own revenue effort. The estimated coefficient for this category is -0.01 for both model specifications.

Southern and Eastern territorial communities' revenue efforts statistically do not differ from the Central ones in terms of budget revenue efficiency. However, Western communities are associated with statistically lower tax efforts if compared to the Central ATCs. The estimated coefficient for the dummy indicating Western territorial community is 0.30 for the distance function specification and 0.31 for own revenue frontier, which confirms the significance of the effect of labour migration.

Estimated *gamma* parameters of 0.69 for own revenue frontier and 0.74 for distance function indicate that both inefficiency term and statistical noise term are significant in explaining why individual ATCs lay below the revenue frontier (Henningsen 2019). Moreover, estimates of >0.5 mean that the inefficiency term contributes more to explaining those differences rather than statistical noise (Henningsen 2019).

As it was already mentioned, the core element of this thesis is budget revenues effort estimation for Ukrainian local communities. Both models provide us with quite similar budget efforts estimates (see Figure 3).

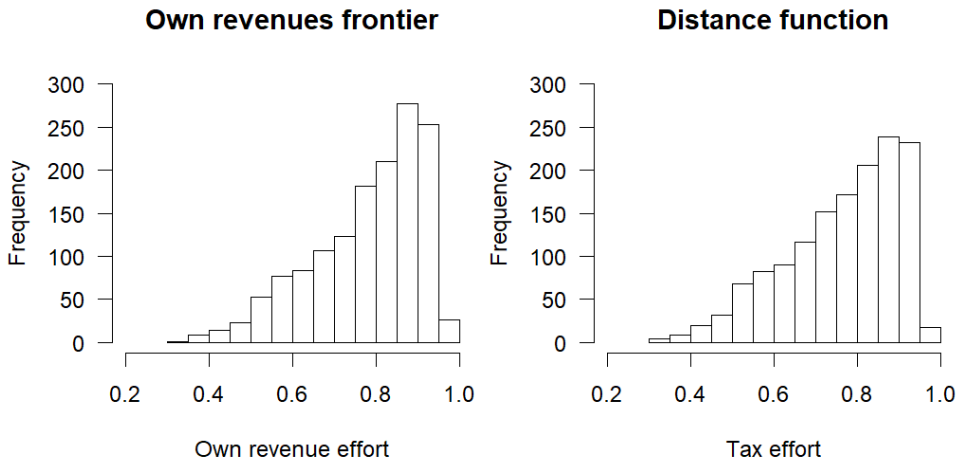

Figure 3. Estimated budget revenue efforts

Figure 3 depicts that budget revenue efforts' distribution follows a truncated half-normal distribution. Budget efficiencies lie in the range from 32.8% to 96.5% in the stochastic own revenue frontier model, while distance function's efforts lie in the range from 31.7% to 96.2%. Efforts in the Model 1 are slightly more concentrated near 90% rate, while tax efforts in the Model 2 are generally lower and distributed more smoothly along the whole range. These histograms also show that territorial communities' budget revenues are rather efficiently generated.

Mean budget revenue effort varies from 76.5% in the distance function model to 78.1% in the stochastic own revenue frontier model. This implies that local governments could increase their own revenues almost by a quarter, on average, by simply better utilizing existing tax and non-tax base without changing tax

system. In money value this additional resource means approximately 44 billion UAH (~1.5 billion USD) streamed to the ATCs budgets' own revenues. This could be a significant help for local governments, taking into account that currently their own resources cover approximately 65% of the actual needs. In fact, grants from the national government then could be cut to nearly 24% of ATCs' total budget revenues, decreasing grants to local communities by nearly a third. Depending on the region, every oblast in Ukraine may increase aggregated own revenues of territorial communities by 10-31%. Total aggregated own revenue gap is 17.1%.

As we have already mentioned, urban ATCs have statistically higher budget's revenue effort if compared to rural communities. In addition, revenue effort positively correlates with urban ATC dummy (0.48 for the own revenue frontier and 0.46 for the distance function). Mean own budget revenues effort is 88.5% for urban hromadas and more than 14 percentage points less for rural communities – only 74.4%. Meanwhile, tax revenue effort from the distance function specification is 86.9% for urban ATCs and, similarly, 14 percentage points less for the rural ones – only 72.8%. We may also separately have a look at the budget efforts of the ATCs that include cities of regional importance. Despite our suggestions on the potential effect of large cities on the budget efficiency, it has not been proved by our models. Moreover, mean own revenue effort for such communities is 89.4% and their mean tax effort is 86.1% – both are fairly close to the urban ATCs estimates, indicating no special effects of large cities on urban territorial communities.

Budget revenue effort also varies across local communities of different size, already proved by our empirical models (statistically significant positive effect of the number of settlements in the ATC on the own revenue effort and tax effort). If we conditionally split our ATCs into three groups by the number of settlements included in the particular municipality we may define small communities (1-15 settlements inside, 52% of all ATCs), medium communities (16-30 settlements inside, 30% of all ATCs), and large communities (>30 settlements inside, 18% of

all ATCs). Small hromadas have on average 73.5% of own revenue effort and 71.9% of tax revenue effort. Meanwhile, medium-sized communities own revenue effort is 80.2% and tax effort is 78.4%. Eventually, mean own revenue effort of large ATCs is 88.2% and mean tax revenue effort of such communities is 86.8%. Thus, we may see a clear pattern: larger territorial communities tend to better utilize their resources and socio-economic characteristics into generated budget revenues. We may also recall the assumption of a reverse causality – better performing settlements may be a kind of 'magnets', having attracted more settlements to amalgamate into their territorial community.

We may also note that our estimated budget efforts are positively correlated (0.66) with the share of own revenues in total ATC's budget, which represents how well a community is endowed with its own financial resources. Thus, our estimates are consistent with current hromadas' levels of need in subsidies from the national government.

Mean own revenue efforts are distributed smoothly for the entire country, except for the Western part of Ukraine. All Western regions have significantly lower mean own revenue efforts (see Figure 4 below).

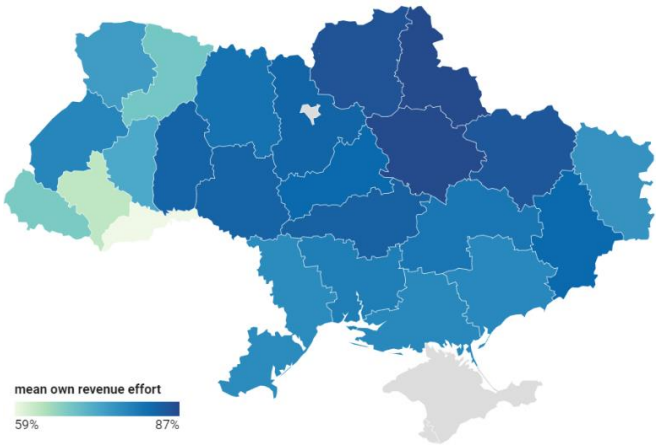

Figure 4. Ukrainian regions' mean own revenue efforts

Five worst regional performers by own revenue effort indicator are only Western regions. These are Chernivetska oblast (59.4% mean own revenue effort), Ivano-Frankivska oblast (63.2%), Zakarpatska oblast (68.1%), Rivnenska oblast (68.7%), and Ternopilska oblast (72.9%). These regions have substantial inefficiencies in revenue generation, although meaning that they also have the highest potential to increase own budget revenues given the current prevailing characteristics and resources available. On the contrary, the most efficient own revenue is collected in Sumska oblast (86.7%), Poltavska oblast (86.7%), and Chernihivska oblast (85.3%). On the aggregated level of rayons (districts) own revenue effort would vary from 61.3% (Kosivskyi rayon, Ivano-Frankivsk region) to 93.8% (Bohoduhivskyi rayon, Kharkiv region). Thus, there is a gap between mean own revenue efforts among Ukrainian regions of 14-27 percentage points.

Empirical results show problems in public finance generation in the West. Significantly lower budget efforts for the hromadas of the Western regions show the effect of the active short-term labour migration in these regions to the EU-members like Poland, Slovakia, Hungary and Romania (ILO 2017). This migration would substitute employment across ATCs, and consequently would result into forgone personal income tax collection, which is a core element in local budgets own revenue structure.

Depending on the region, every oblast in Ukraine may increase aggregated own revenues of territorial communities by 10-31%. Total aggregated own revenue gap is 17.1%.

5.2 Own revenue effort rank of Ukrainian ATCs

Another important aim of this research was to construct a rank of individual ATCs based on the estimated own revenue efforts. In such manner it's also possible to see which communities perform better if compared to each other (see Table 2

below). Moreover, we have formed a table with maximum efforts for each rayon in Ukraine, so that every ATC could benchmarks against (see Annex A).

Table 3. ATCs rank by own revenue effort

Rank	ATC	Region (oblast)	Type	Own revenue in 2021, mln UAH	Own revenue effort	Potential own revenue, mln UAH
1	Lebedynska	Sumska	Urban	213,4	96,5%	221,0
2	Starovirska	Kharkivska	Rural	200,4	96,5%	207,6
3	Apostolivska	Dnipropetrovska	Urban	301,7	96,5%	312,7
4	Romenska	Sumska	Urban	400,1	96,1%	416,2
5	Sokalska	Lvivska	Urban	248,3	95,9%	258,8
6	Krolevetska	Sumska	Urban	209,8	95,7%	219,1
7	Khrystynivska	Cherkaska	Urban	183,5	95,7%	191,8
8	Zinkivska	Poltavska	Urban	199,3	95,6%	208,4
9	Lozivska	Kharkivska	Urban	513,4	95,6%	537,0
10	Yavorivska	Lvivska	Urban	301,6	95,6%	315,5
…	…	…	…	…	…	…
1428	Kolochakivska	Zakarpatska	Rural	12,1	40,7%	29,6
1429	Krasnoiilska	Chernivetska	Rural	16,8	39,7%	42,4
1430	Kosmatska	Ivano-Frankivska	Rural	11,2	39,6%	28,2
1431	Stepnenska	Zaporizka	Rural	13,0	38,8%	33,6
1432	Dubivska	Volynska	Rural	26,9	38,7%	69,4
1433	Vytvytska	Ivano-Frankivska	Rural	8,1	38,3%	21,2
1434	Sartanska	Donetska	Rural	73,9	37,6%	196,9
1435	Lanchynska	Ivano-Frankivska	Rural	13,4	36,4%	36,7
1436	Lymanska	Odeska	Rural	37,3	35,7%	104,6
1437	Toporivska	Chernivetska	Rural	19,3	32,8%	58,9

The lowest own revenue gaps are observed among urban territorial communities. 9 out of 10 top-performers are urban ATCs, while all 10 poorest performers are

rural hromadas. Top-10 territorial communities with nearly 96% own revenue effort may be considered as national benchmarks for all local councils. However, there is still a space to increase their revenues by nearly 4%. These are Lebedynska, Starovirska, Apostolivska, Romenska, Sokalska, Krolevetska, Khrystynivska, Zinkivska, Lozivska, and Yavorivska hromadas. Moreover, Starovirska ATC is a rural one, meaning we can't argue that rural communities cannot perform efficiently. However, as we have mentioned before, there is a clear statistically significant pattern that urban ATCs are better-performers on average. Aggregated own revenue effort for urban territorial communities is 88.5%, while it is 11 percentage points lower for rural municipalities – 77.5%. On the contrary, highest revenue gaps are observed amid Kolochakivska, Krasnoiilska, Kosmatska, Stepnenska, Dubivska, Vytvytska, Sartanska, Lanchynska, Lymanska, and Toporivska ATCs. They are all rural communities, and 7 out of 10 are situated in the Western Ukraine. In total, 46 local communities (3% of all ATCs) may increase their own revenues by more than two times, and 288 of them (20% of total ATC number) may generate 1.5 times more in case of better resources utilization.

Chapter 6

CONCLUSIONS AND POLICY IMPLICATIONS

In this thesis a first attempt to estimate a scope for additional revenue mobilization for local amalgamated territorial communities budgets in Ukraine was undertaken. Building upon recent advances in the literature, we applied a stochastic frontier approach to a local community level data on budgets own revenues in 2021 – the first year after a long-lasting process of voluntary and forced amalgamation of territorial communities, which has finalized the territorial administration reform as one of the key elements of the decentralization reform in Ukraine. Moreover, we introduced a distance function approach to perform more disaggregated analysis of multiple tax and non-tax sources.

Our estimation results suggest that there are substantial reserves to be utilized by local government in raising the revenues. In particular, ATCs could increase their own revenues by 21.8% (on average). These results also give a space for further cut in expenditures from the national budget on grants for financing local communities spendings – approximately by a quarter. This may consequently result in a more self-reliable public finance system on the local level – potential shift in the share of own revenues in the total budget revenues from 65% to 74%.

In addition, our empirical results shows a statistically significant gap between urban and rural local communities. Economic activity and labor migration between ATCs may play a key role in budget revenue efforts differences. As far as personal income tax is a backbone in own revenue generation process for the local budgets, and given the legal mechanism that this tax is streamed to the local budget where the legal entity is registered, not to the budget where an employee lives, these indicators would be important determinants of ATCs revenue.

We have also made a first attempt to form a rank of 1,437 individual ATCs (97.8% of total amount) depending on the current own revenue effort, that includes current own revenue, own revenue effort, and potential own revenue in 2021. Moreover, this ranking is supplemented with a table containing the best performing territorial communities for each rayon (district) to benchmark against.

Given the quantitative analysis conducted in this thesis we may note the following policy implications for the public governance in Ukraine:

- Increase general administrative expenditures in ATCs with large own revenue gap. Low salaries in public governance sector, especially in rural communities, may maintain worst efficiency in public finance management. Better-qualified staff should be encouraged to work not only in large towns and cities, but in poor performing rural municipalities too.
- Introduce special educational and training courses, programs for local authorities to increase governance capabilities on local level.
- Increase capital expenditures that would encourage economic growth and provide positive signals for both labor force and entrepreneurs. Estimation results shows positive correlation between own revenue raising and capital expenditures, number of legal entities, total revenue of legal entities.
- Introduce special cooperation and coordination between national, regional and local authorities concerning reaching determined goals, based on rayon-level own revenue effort benchmarks as well as transfers from the State budget share of total revenue.

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APPENDIX A

EFFICIENCY RANKING

Table 4. ATCs own revenue efforts benchmarks by rayon (district)

Rayon (district) by oblast (region)	Own revenue effort benchmark
Vinnytska oblast	
Vinnytskyi	94.0%
Haiisynskyi	95.0%
Zhmerynskyi	93.7%
Mohyliv-Podilskyi	91.9%
Tulchynskyi	94.3%
Khelmyntskyi	94.7%
Volynska oblast	
Volodymyr-Volynskyi	91.9%
Kamin-Kashyrskyi	91.3%
Kovelskyi	94.2%
Lutskyi	92.4%
Dnipropetrovska oblast	
Dniporvskyi	87.8%
Kamianskyi	94.4%
Kryvorizkyi	96.5%
Nikopolskyi	93.7%
Novomoskovksyi	92.9%
Pavlohradskyi	92.5%
Synelnikivskyi	90.1%
Donetska oblast	
Bakhmutskyi	91.0%
Volnovaskyi	94.9%
Kramatorskyi	92.3%
Mariupolskyi	94.9%
Pokrovskyi	94.1%
Zhytomyrska oblast	
Berdychivskyi	93.2%
Korostenskyi	95.0%
Novohrad-Volynskyi	94.0%
Zakarpatska oblast	
Beregivskyi	92.9%
Mukachivskyi	93.0%
Rakhivskyi	86.9%

TABLE 4 – Continued

Rayon (district) by oblast (region)	Own revenue effort benchmark
Uzhgorodksyi	86.4%
Khustskyi	92.2%
Zaporizka oblast	
Berdianskyi	91.9%
Vasylkivskyi	90.0%
Zaporizkyi	95.1%
Melitopolskyi	88.1%
Polohivskyi	92.8%
Ivano-Frankivska oblast	
Verkhovysnkyi	68.4%
Ivano-Frankivskyi	89.1%
Kaluskyi	91.7%
Kolomyiskyi	87.5%
Kosivskyi	78.1%
Naddvirnianskyi	86.2%
Kyivska oblast	
Bilotesrkivskyi	93.6%
Boryspilskyi	93.2%
Brovarskyi	91.4%
Buchanskyi	92.7%
Vyshgorodskyi	89.6%
Obukhivskyi	93.9%
Fastivskyi	92.5%
Kirovohradska oblast	
Holovanivskyi	92.1%
Kropyvnytskyi	92.8%
Novoukraiinskyi	94.7%
Oleksandriivskyi	92.2%
Luhanska oblast	
Svativskyi	92.2%
Severodonetskyi	93.7%
Starobilskyi	91.3%
Schiastianskyi	89.0%
Lvivska oblast	95.9%
Drohobytskyi	88.0%
Zolochivskyi	94.3%
Lvivskyi	92.2%
Sambirskyi	87.7%

TABLE 4 – Continued

Rayon (district) by oblast (region)	Own revenue effort benchmark
Stryiiskyi	93.6%
Chervonohradskyi	95.9%
Yavorivskyi	95.6%
Mykolaiivska oblast	
Bashtanskyi	93.0%
Voznesenskyi	92.1%
Mykolaiivskyi	91.9%
Pervomaiiskyi	91.6%
Odeska oblast	93.6%
Berezivskyi	90.4%
Bilhorod-Dnistrvoskyi	89.4%
Bolhradskyi	89.2%
Izmaiilskyi	93.6%
Odeskyi	89.8%
Podilskyi	92.9%
Rozdilnianskyi	91.9%
Poltavska oblast	
Kremenchutskyi	95.1%
Lubenskyi	95.6%
Myrhorodskyi	94.8%
Poltavskyi	95.6%
Rivnenska oblast	
Varaskyi	87.2%
Dybenskyi	89.2%
Rivnenskyi	92.0%
Sarnenskyi	90.1%
Sumska oblast	
Konotopskyi	95.7%
Okhtyrskii	93.0%
Romenskyi	96.1%
Sumskyi	96.5%
Shostkinskyi	91.5%
Ternopilska oblast	
Kremenetskyi	93.8%
Ternopilskyi	91.7%
Chortkivskyi	91.6%
Kharkivska oblast	
Bohoduhivsky	95.6%

TABLE 4 – Continued

Rayon (district) by oblast (region)	Own revenue effort benchmark
Iziumskyi	94.2%
Krasnogradskyi	96.5%
Kupianskyi	92.7%
Lozivskyi	95.6%
Kharkivskyi	91.9%
Chuhuiivksyi	95.0%
Khersonska oblast	
Beryslavskyi	87.6%
Henichevskyi	91.8%
Kakhovskyi	91.6%
Skadovskyi	91.7%
Khersonskyi	90.9%
Khmelnytska oblast	
Kamianets-Podilskyi	94.5%
Khmelnytskyi	94.8%
Shepetivskyi	93.9%
Cherkaska oblast	
Zvenyhorodskyi	95.5%
Zlotoniskyi	92.9%
Umanskyi	95.7%
Cherkaskyi	95.1%
Chernivetska oblast	
Vyzhnytskyi	83.2%
Dnistrovskyi	79.7%
Chernivetskyi	92.1%
Chernihivska oblast	
Koriukivskyi	95.2%
Nizhynskyi	94.3%
Novhorod-Siverskyi	95.0%
Prylutskyi	94.8%
Chernihivskyi	94.9%