THE DECENTRALISATION PROCESS IN UKRAINE: TAXES AND REGIONAL DEVELOPMENT

by

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Abstract

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Decentralisation policy is one of the most successful reforms in Ukraine since 2014. Extensive literature on positive effect of territorial merges on efficiency of public spending and administrative performance praise financial decentralisation in different countries. Nevertheless, existing discussion withing both academia and policy makers on capacity of amalgamated territorial communities requires input on effect of financial decentralisation on regional development.

This thesis tested for the relationship between financial decentralization and regional development using both an annual cross-section data of amalgamated territorial communities. The results showed that higher tax revenues withing amalgamated territorial communities have strong positive effect on regional development, while vice versa effect is weaker. In addition, no relation between change in revenues of different local tax types is observed.

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GLOSSARY

ATC. Amalgamated territorial community. A voluntary association of residents of several separate villages, towns, or cities into one administrative center with a new council.

PIT. Personal Income Tax. A national tax, which is (1) levied on the income of the residents of Ukraine who receive their income from the sources of origin in Ukraine and abroad; (2) levied on the income of non-residents who receive their income from the sources of origin in Ukraine. Regulated in the articles 162-179 of the Tax Code of Ukraine.

SNG. Subnational governments. Subnational government is defined as the sum of state governments and local/regional government.

Chapter 1

INTRODUCTION

Decentralisation policy is one of the most successful reforms since 2014 (Romanova, Umland 2019), which has gained support of the government, local authorities, and international donors. This reform aimed to amalgamate municipalities for empowered local authorities further to meet greater administrative and service responsibilities[1]. The decentralization reform started with the order of the Cabinet of Ministers "On approval of the Concept of reforming local self-government and territorial organization of power in Ukraine"[2] from April 1, 2014, and a number of other legislative acts.

Since 2014, the decentralization reform in Ukraine has brought about significant changes for the country's political, economic, and social system. Multiple national and foreign political actors have been involved in the reform, including but not limited to the Association of Ukrainian Cities, Ministry of Regional Development, local civil society, and international donors. According to some estimations, by 2020, western donors have provided more than €250 million to support decentralization and closely related reforms (Romanova, Umland, 2019). The main goal of the decentralization reform was to relieve state power and bring governance closer to the principle of subsidiarity in order to make the lives of the inhabitants of the regions more comfortable. Decentralization provided local governments with the resources and powers they needed to function effectively, the reform was intended as a bold and fundamental move to enhance the economic and social development of Ukraine via institutional and administrative change. After amalgamation, ATCs enjoy a broad administrative and financial

[1]https://read.oecd-ilibrary.org/urban-rural-and-regional-development/maintaining-the-momentum-of-decentralisation-in-ukraine_9789264301436-en#page5
[2] https://zakon.rada.gov.ua/laws/show/333-2014-p#Text

authority, including a more significant tax base and more expenditure sources compared to unreformed local authorities.

Decentralization process is not unique to Ukraine only. Most governments around the globe attempt to decentralize power to address political grievances. For instance, in Latin America decentralization has been viewed as a tool to improve democratization. More specifically, the corrupted autocratic regimes transferred their authority to the newly elected governments operating under new constitutions. In this sense, decentralization was seen as a crucial part of democratization. At the same time, decentralization is also associated with economic efficiency, public accountability, and empowerment[3]. Although the decentralisation process is widely studied both for Western and Post-Soviet countries, the political economy of why and how the amalgamated units were formed is often understudied.

For example, both local and central authorities in Ukraine are still debating the strategies of how territorial units should be formed. [4]. These debates, however, lack rigorous data and models. To contribute to the discussion on the need of political decentralisation and contribute to the cause-effect relation of development and fiscal performance on the local level, I will investigate the cause-effect relationship between regional development and amount of tax collected. My study demonstrates the premiere targets for the regional development strategies and allows to formalize the policy recommendations.

Although pundits and political actors argue that decentralization has improved regional development in Ukraine, the exact extent of such improvement is still unknown. Moreover, there is no consensus on defining and measuring the success of ATCs and the reform in general. My research aims to check relation between regional development and tax revenues to diagnose key aspects that

[3]https://www.worldbank.org/en/topic/communitydrivendevelopment/brief/Decentralization
[4] https://decentralization.gov.ua/news/10591

accelerate the decentralization process and increase the capacity of the amalgamated territorial communities.

The focus of the thesis is the cause-effect relation between the amount of taxes collected and regional development. The research question is the following: what is the cause-effect relation of the amount of taxes collected and the level of regional development? As the amalgamation process has ended policy makers and experts actively bring up the discussion on increasing capacity of the Amalgamated Territorial Communities. To address the phenomena of "capacity" of the community on the scientific level, the cause-effect relationship on the amount of the material resources and regional development is an important framework to develop.

This thesis addresses this limitation of existing literature and contributes to the ongoing debate on the cause-effect relationship between tax collection (as an indicator of decentralization) and regional development. By doing this, my work addresses two gaps. The first is the lack of rigorous evidence that decentralization improved development in Ukraine. The second is the gap of knowledge in international scholarship about the strategies of local unit formations.

The primary source of data for the index of regional development for 2020-2021 is the website of the decentralization reform, which includes 16 criteria in Demographic (e.g. population dynamics of territorial communities, proportion of labor, number of preschoolers), Economy (e.g. tax index, basic and reverse subsidy of territorial communities) and Infrastructure (e.g. number of general secondary education institutions in the communities, the number of signed declarations with family doctors in the community) parts. The open budget portal provides data on the amount collected in taxes in each amalgamated territorial community for 2019-2021.

Chapter 2

LITERATURE REVIEW

The discussion about the principle of subsidiarity is extensive among both economists and political scientists. Authors investigate whether administrative reforms and facilitation of local authorities increase the efficiency of community management and the overall satisfaction of citizens. There is a wide range of academic papers on the effect of amalgamation on local development. Unfortunately, there is a shortage of such papers within Ukrainian Academia employing country specific data. Furthermore, existing discussion withing both academia and policy makers on capacity of amalgamated territorial communities requires input on effect of financial decentralisation on regional development.

The German economic school has developed a solid literature base on local management efficiency and the country's territorial organization. Dollery and Fleming (2006) suggest that a more extensive local government staff creates an excessive administrative burden. Roesel (2017) investigates economies of scale achieved by states merging local governments and demonstrates no reductions in total expenditures for administration, education, or social care, suggesting no noticeable increase in local government efficiency. Bird and Slack (2013) reveal that the amalgamation of a city has some benefits considering its effects on municipal costs, local taxes, governance, and citizen participation.

OECD (2018) suggests that new approaches are needed for planning the division of local funds and expenditures due to the agglomeration tendency in Ukraine. Also, the primary sources are a package of bills on expanding the powers of local governments and optimizing the provision of administrative services, National strategy of regional development 2021-2027.

Anna Harus (2020) finds that the amalgamations of local communities led to the increase of only a few types of local taxes, which are real estate tax, single business taxes on legal entities and individuals, and tourist fee. The case of Albania has revealed that the local communities with a big-share of local financing received more benefits (from decentralisation) relative to units with a smaller share of their own resources (Koxhaj 2018).

Considering the financial capacity of the territorial communities the Subnational governments in industrialized countries account for about twice the share of total government expenditures as in developing countries (Wallace and Bahl 2005). Transition countries also assign more expenditure responsibilities to SNGs than do the developing countries. SNG expenditure share is significantly higher in countries with higher incomes, larger populations, and a lower degree of corruption. The conclusion about financial decentralisation referring to countries with higher development (developed or in transition) may be made.

Relation between taxation and development became a more prominent topic as prior early 00s researchers examined taxation in scope of state and private equities relations. Recent studies bring to the table financial decentralization which may have both positive and negative effects on development of local communities (Bahl 1999). Theoretical studies on fiscal decentralisation critiques the relevance of the standard theory of federalism as it applies to emerging economies. It is argued that the macroeconomic benefits of fiscal centralization, the absence of good instruments of local government finance, and the centralist politics that characterize most low-income countries have been strong enough to hold back increased emphasis on local government finance.

Bahl (1999) also argues that the individual income tax and excise meet the tests for a good sub-national government tax. TPI can be relatively easy to administer, especially if it focuses on payroll employment and is linked to the central

government income tax base. If not levied on monopoly production excise tax meets the test to be good for forming local level budget.

On the one hand, self-funding increases efficiency of money management and supports the principle "the more community generated - more spent". On the other hand, decentralization in finance creates the state of inequality within the communities that historically have been developing in different conditions and with different dynamics (Wallace and Bahl 2005). The last is a great challenge for research aimed to investigate the effect of financial independence (even partial) on regional development.

Although the literature is rich in empirical studies on decentralization, most of these papers have dealt with its effect on economic growth or governance. Fewer studies have studied its effect on income inequality. Some of these studies found evidence that decentralization tends to decrease inequality, but these papers used data from developed countries (Banting 2010; Lessmann 2009; Canaleta 2004; Ezcurra and Pascual 2008; Kyriacou 2017). Hence, poor regions experience no disadvantages from decentralization and, instead, appear to benefit.

Recent working paper tested for the relationship between decentralization and inequality using data from countries of varying incomes and levels of development (Canare, Tristan and Francisco 2019). The paper contributes to the literature by including countries of different income levels and developing countries in the analysis. The results showed that revenue decentralization and fiscal independence were weakly associated with lower income inequality, while expenditure decentralization had no significant relationship with inequality.

Above studies suggest that effect of decentralization onto communities is an important subject to bring up the best principles of good governance. The most engaging topic for scalars has been efficiency of fund allocations so far. Nevertheless, robust tax revenues and its better management is not the point of the study for the case of partial decentralisation, which implies absence of full

potence of the community to satisfy its financial needs. In the case of Ukraine, territorial communities still are dependent on reverse funding, this fact implies importance of research on whether decentralisation provides the incentives for ATCs to develop.

Chapter 3

DECENTRALIZATION POLICY IN UKRAINE

According to the reform, ATCs enjoy a broad administrative and financial authority, including a more significant tax base and more expenditure sources. Furthermore, a territorial amalgamation was combined with fiscal decentralization (Harus 2019). According to a poll in 2020, most of the population - 59% believe in the need for local government reform and decentralization, and among those the need for local government reform and decentralization, and among those who are aware of the reform, 81% believe that Ukraine needs decentralization[5].

3.1. Provisional parts of the reform

The reform consists of the three provisional parts and is a complex multi-dimensional policy. The first dimension is territorial reform, in broad literature known as "municipal mergers", presupposes the voluntary amalgamation of local communities. On June 12, 2020, the Government approved a new administrative-territorial structure of the basic level. By 2021, the number of Ukrainian local governments were reduced from 11,250 to 1,469 through the process of amalgamation[6]. Currently the reform is on its final stage as compulsory amalgamation has been implemented. The main issue with the amalgamated communities in Ukraine is its ability to perform and manage resources, which needs constant monitoring. Hence, the empirical evidence on the lessons to be

[5] https://decentralization.gov.ua/uploads/library/file/633/2020Report_UKR_ukr.pdf
[6] https://decentralization.gov.ua/gromadas

learnt from the voluntary amalgamation is necessary to complete the reform successfully.

The second dimension is financial, namely independent formation of the local budgets by six types of the tax collection within the community. The second dimension of the reform is conditional on the first one so that amalgamations are corestone of the successful policy implementation. Two main factors play in favor of the amalgamated communities - expanded financial resources due to the bigger transfers from the state budget and bigger amount of taxes collected by the local authority. Moreover, local authorities get the freedom to exercise the tax revenues in the desired way. Such factors make local authorities prone to stimulate development of business activity in the ATC to collect more taxes and expand regional development. The effect of amalgamation was immediate as in 2016 compared to 2017 it allowed to increase the own revenues of ATC budgets per 1 inhabitant of the respective territory, on average by almost UAH 800 (around 20%)[7]. However, no rigorous empirical research was conducted to investigate the cause-effect relation between the amount of tax collected and development of the region.

The third dimension of the reform, which stimulated regional development, is the administrative component. According to the law provision of the economic instrument for local development as credits, tax collection and its redistribution, realisation of the communal property, independent urban planning and similar, was maintained. Measurement of regional development is impossible without such administrative tools as strong subjectiveness in local authority in the decision-making process is a novel of the decentralisation process.

According to the same data, in 2015 only 19% of respondents anticipated that their lives would improve due to the reform (one should keep in mind that the

[7] https://despro.org.ua/despro/Local%20Budgets%20of%20ACs.pdf

first newly ATCs only appeared on 1 January 2016). In 2020, the number of Ukrainians who said that their lives improved due to the reform increased significantly to 61%.

3.2. Implementation process and its consequences

Nevertheless, even though the reform has been fully rolled out, there are many challenges in its implementation. The government decided to establish the so-called Regional Development Agencies (RDAs) in all Oblast. Allegedly, these agencies are supposed to facilitate local development. However, in sharp contrast to the underlying idea of decentralization, these agencies strengthen the power of the central government (which is the opposite of the idea of giving more power and autonomy to local governments). The overall influence of RDAs on local development is difficult to assess since they were established only in half of the Oblasts[8]. Therefore, there is a salient demand for knowledge whether these agencies should be transformed, rolled back, or supported in a way that can be harmonized with decentralization.

Furthermore, according to the assessment of the "State strategy for regional development until 2027"[9], the government omits local economic inequalities and social cohesion. Some researchers registered growing discrimination against internally displaced persons (IDPs) at labor markets (Vakhitova, Iavorskyi 2020). Considering political engagement, researchers have shown that despite many positive changes, an amalgamation of small village councils caused new obstacles for local female candidates who could not scale their campaign to the level of

[8] According to the "Report on the results and activities of Regional Development Agencies in the first half of 2021" all Oblasts decided to establish RDAs and in 21 Oblasts RDAs are registered. https://www.minregion.gov.ua/wp-content/uploads/2021/09/zvit-pro-rezultaty-diyalnosti-agenczij-regionalnogo-rozvytku-u-pershomu-pivrichchi-2021-roku.pdf

[9] Strategic assessment of the state strategy for regional development until 2027 and its analytical part by KSE, within support of the U-LEAD with Europe Program (after the request of the Ministry of Communities and Territories of Ukraine).

larger amalgamated units[10]. Another significant issue is the pace of amalgamation. The process of amalgamation started as voluntary. However, with time, those communities which did not engage voluntarily were forcefully amalgamated by the state. Little is known why some communities were not eager to amalgamate in the first place and whether the speed of amalgamation has become an independent factor of socio-economic divergence.

There is an indication that two groups of settlements were keen to amalgamate in the very wave of amalgamation (2016 and 2017). Firstly, settlements, which generated substantial revenues from Personal Income tax. Such territories were likely to expect benefits of amalgamation since they would keep higher shares of the income tax for themselves. Secondly, settlements under previous historical experiences with local self-governance in the Austro-Hungarian Empire and Poland[11]. Theoretically, such places have a long shadow of history of local-self-governance, mutual trust, and trust into local government. Despite some anecdotal evidence and early studies which supported the abovementioned hypotheses, the evidence is still inconclusive. To this date, there is no systematic, rigorous academic research on the process of decentralization. Therefore, there is no good understanding of the driving forces of the amalgamations in 2018 and 2019, as well as the social, economic, and political consequences of this dynamic. Thus, there is a demand for research on the causes and consequences of voluntary amalgamation.

In addition to this, the Government of Ukraine has issued a command aiming to implement the International Open Data Charter[12]. According to this document, Ukraine must implement legislation, infrastructure, and educational programs to improve open data reusability at the national and regional levels. At the same

[10]https://voxukraine.org/perevagy-ta-vyklyky-zastosuvannya-gendernoyi-kvoty-pid-chas-mistsevyh-vyboriv-2020-roku-v-ukrayini/
[11] See https://voxukraine.org/en/understanding-ukraine-s-decentralisation-reform/
[12] Rada.gov.ua (2020). On the International Open Data Charter. Retrieved April 14, 2020, from https://zakon.rada.gov.ua/laws/show/900-2018-p

time, as of 2020, the implementation of open data practices for many national agencies and regional administrations was still lacking[13]. This is a crucial problem for local development (Linders, Wilson 2011). Therefore, there is a need for collecting more data and making such data publicly available for replication and policy making.

Another concern for the evaluation of decentralization lies in measurement and statistical analysis. The decentralization reform is happening simultaneously with other significant reforms and interventions such as the land market reform, the digitalization reform, changes in the electoral system, various interventions by foreign donors to support infrastructure and business in Eastern Ukraine, etc. To this end, the observed impact of decentralization on local economic activities and local political participation is confounded by many other variables. Therefore, the impact of decentralization on the socio-economic development net of other social forces is not known precisely. The abovementioned lack of relevant data exacerbates this issue. Most of the relevant data are available for large administrative units (oblast) instead of ATCs. Furthermore, crucial historical data are often absent, thus hampering comparative analysis (i.e., economic development before and after decentralization). In addition to this, sociological polls are rarely executed at the level of communities. In contrast, many European countries which experienced decentralization reforms often collect data at the level of communities (Völker 2007).

To sum up, the decentralization reform faces two significant challenges. The first challenge is about performance. The progress of the reform is uneven in different areas. The reasons and consequences for the pace of voluntary amalgamation are not known. The second challenge is about analysis. The data are often lacking, and the statistical analysis is at risk of being confounded. At the same time, there

[13] Tapas.org.ua (2019). Evaluation of open data accessibility. Retrieved April 14, 2020, from http://tapas.org.ua/informatsiia/zahalna-otsinka-stanu-opryliudnennia-ta-onovlennia-vidkrytykh-danykh/

is a significant demand for high-quality and data-driven policy advice. Previous research has shown that political stakeholders show interest in getting evidence-based analyses but often claim that policy-oriented studies are abstract and do not include recommendations[14].

[14] Ilko Kucheriv Democratic Initiatives Foundation (n.d. [b]). Nezalezhni Analitychni Tsentry Ukrayiny u Protsesi Vyroblennya

Chapter 4

DATA DESCRIPTION

4.1. Description of indicators of development

This research employs the panel data on the tax on personal income collected for the 827 budgets of the Amalgamated Territorial Communities for 2019-2021. Also, we employ 15 indicators, which are indicators of regional development for 2019-2021 are presented in Table 1. The data is officially obtained from the Ministry for Regional Development, Building, and Housing of Ukraine.

To illustrate development the Index approach has been employed. Index of regional development for this research includes population, area, firstaid, declarat, doctors, salar (see Table 1). The index is developed through a normalization approach, in particular, a method of min-max scaling, which has the following representation:

$$\text{Xscaled} = \frac{\text{X}-\min(\text{X})}{\max(\text{X})-\min(\text{X})} \quad (1)$$

After scaling 6 indicators and summing for the Index of regional development, the normally distributed variable ended up. Such indicators have been chosen from the presented dataset as it reflects the level of infrastructure development (number of first aid facilities, doctors, and number of patients it covers) within the territorial community. The choice of population and area variables can be explained by basic characteristics that explain development. Including the share of the cost of labor for state functions (local self-government) from the revenue part of the general fund budget accounts for the extensiveness of the local self-

government, probably, a number of departments. The last is an appropriate measure for development in terms of local self-government infrastructure. The variables of choice are the most relevant for describing development despite the limitation of the data available.

Table 1. Indicators of the regional development

Variable	**Explanation**
TPI 2019-2021	Tax on personal income
Population 2020-2021	Population
Area	Area
Firstaid 2021	First aid facilities (NSHU data)
Declarat 2021	Number of declarations (NSZU data)
Doctors 2021	Number of doctors (NSZU data)
Totaltax 2020-2021	Total revenues to the local budget
Partlocaltax 2020-2021	The share of local taxes in the revenue part of the general fund
reverseFunding 2021	Reverse Subsidy
basicFunding 2021	Basic Subsidy
PIT per capita	Tax on personal income per capita
excisePercapita 2020-2021	Excise per capita
LandTaxPC 2021	Land Tax per capita
SingleTaxPC 2020-2021	Single Tax per capita
Salar 2020-2021	The share of the cost of labor for state functions (local self-government) from the revenue part of the general fund budget

For better understanding of data, the summary statistic table for processed data (free from outliers) is presented below (see Table 2).

Table 2. Summary statistics

Variable	Mean	Std. Dev.	Min	Max
TPI 2021, K UAH	44 165.049	61 296.387	4 549.3	476 881.3
Population 2021, persons	15 724	18144	2348	150768
Area, km2	367.188	301.037	7.7	2 144.1
First aid 2021, facilities	7	7	1	50
Declarat 2021, persons	13 695	16 790	576	143 572
Doctors 2021, persons	10	12.3	0.5	92.5
Part local tax 2021, %	34.9	9.8	10.6	83.8
Excise PC 2021, K UAH	286.7	430.3	3.4	3 354.4
Land Tax PC 2021, K UAH	693	666	14	6 737
Single Tax PC, K 2021 UAH	747	342.3	89.6	3 075
Salar 2021, %	26.9	10	7.4	71
Development Index	0.181	0.126	0.013	0.82

4.2. Data cleaning

Before presenting the econometric results, the normality of the dataset needs to be checked. For the research the Shapiro-Wilk normality test is employed. The

data is not normally distributed. If p> 0.05, normality can be assumed, none of the variables could satisfy the hypothesis on normality.

Table 3. Output of the Shapiro-Wilk normality test

data: Dataset_final2$TPI2021; W = 0.022726, p-value < 2.2e-16
data: Dataset_final2$declarat2021; W = 0.069884, p-value < 2.2e-16
data: Dataset_final2$Population2021; W = 0.050846, p-value < 2.2e-16
data: Dataset_final2$area; W = 0.55477, p-value < 2.2e-16
data: Dataset_final2$firstaid2021; W = 0.089268, p-value < 2.2e-16
data: Dataset_final2$doctors2021; W = 0.075701, p-value < 2.2e-16
data: Dataset_final2$totaltax2021; W = 0.072651, p-value < 2.2e-16
data: Dataset_final2$partlocaltax2021; W = 0.81014, p-value < 2.2e-16
data: Dataset_final2$excisePercapita2021; W = 0.25448, p-value < 2.2e-16
data: Dataset_final2$LandTaxPC2021; W = 0.1172, p-value < 2.2e-16
data: Dataset_final2$SingleTaxPC2021; W = 0.61692, p-value < 2.2e-16
data: Dataset_final2$Salar2021; W = 0.72882, p-value < 2.2e-16

The cause for the non-normal distribution of the data is outliers that are explained by the presence of the big cities in the data. Territorial communities that at the same time are cities of oblast significance may generate big budgets and create the effect of outliers. Furthermore, the dataset contains NAs and 0 which do not allow the operation of the data. After cleaning the dataset, getting rid of outliers, NAs, and 0 - it ends up with 417 observations (each observation represents a territorial community). After the clearing process and taking its logarithmic representation the data distribution has the following representation:

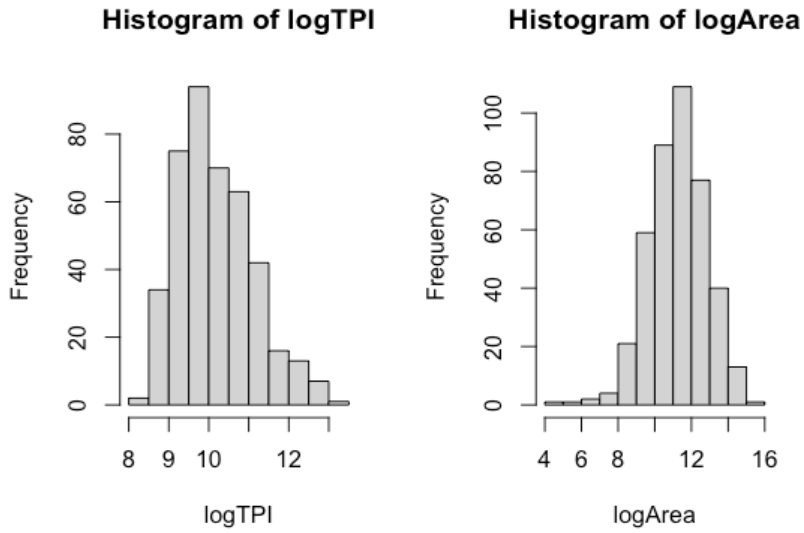

Figure 1. Graphical representation of the variables Tax on personal income and Area distributions

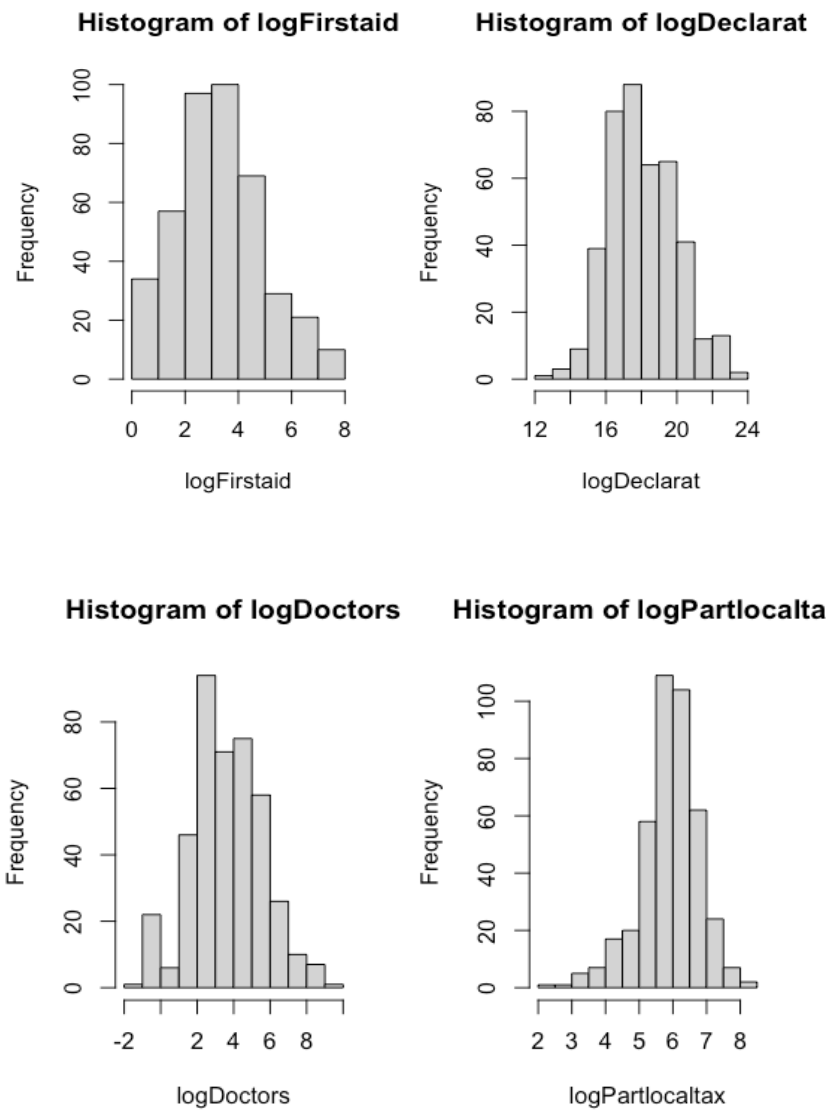

Figure 2. Graphical representation of the variables' distributions

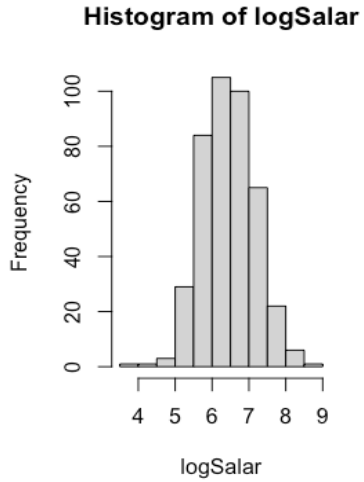

Figure 3. Graphical representation of the share of the cost of labor for state functions (local self-government) from the revenue part of the general fund budget distribution

A cursory visual inspection suggests that each variable presented is normally distributed, some of them have slight kurtosis to the right or to the left (see Figures 1-3). The last will not have major influence on the accuracy of the regressions output. Taking the natural logarithm helps to normalize data and establish the normality assumption in linear regression.

4.3. Correlation check

To ensure the validity of the models the statistical hypothesis about the presence of endogeneity needs to be denied so that correlation between the variables may be checked. Checking the corrplot, variables that may potentially cause multicollinearity with tax on personal income variable are Population and Totaltax so that there is no need to include it into the model (see Figure 4).

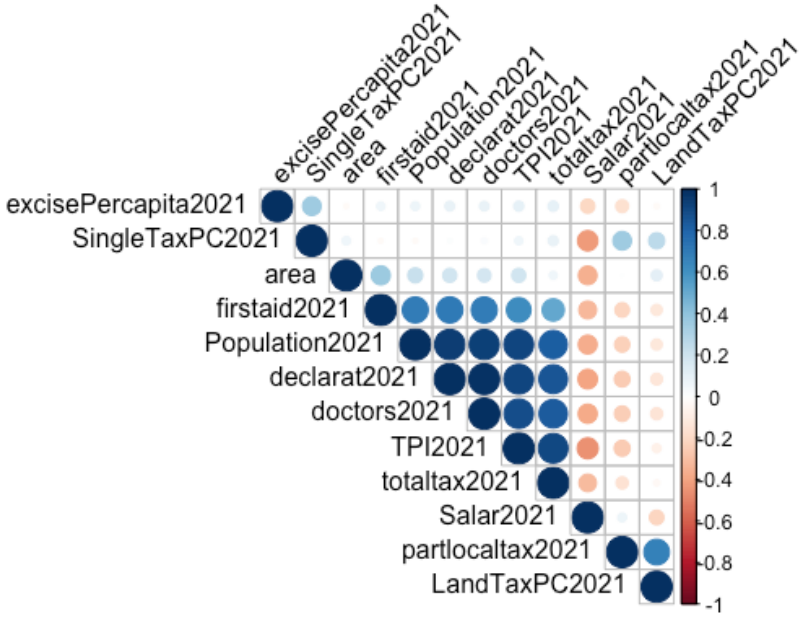

Figure 4. Correlation matrix for the variables

Alternatively, to include the population variable in the model the tax on personal income per capita is worth considering. The interesting finding from the correlation matrix is that different types of taxes such as a tax on personal income, land tax, single tax, and excise tax are weakly correlated. That leads us to the assumption that the amount collected of the particular tax will not insight on the proportional growth of the amount of another tax type.

Chapter 5

METHODOLOGY

Besides simple OLS models (see equation 2), the additional model employed for the research is the system GMM method proposed by Arellano and Bond (1995) and used in Canare and Francisco (2019) for Decentralization and Income Inequality relation estimation in the panel of countries (see equation 3 for GMM model). On the one hand, to estimate the cause-relation-affect the panel data should be used as such analysis usually provides more robust econometric results because it has both time-series and cross-section components. On the other hand, due to the panel data and specificity of the variables, the statistical hypothesis is the presence of endogeneity in the potential model due to the correlation in error terms.

Besides the statistical correlation between independent and dependent variables, there may be other reasons that give rise to the correlation between those variables (Subhan 2018). The problem of endogeneity arises when the explanatory variable is correlated with the error term. Endogeneity bias can lead to inconsistent estimates and incorrect inferences, which may provide misleading conclusions and inappropriate theoretical interpretations. Ketokivi and McIntosh (2017) brought up the cases when such bias can even lead to coefficients having the wrong sign.

In the case of the research on the effect of the development index on financial decentralisation as its reverse effect, the potential bias may be caused by omitted variables. The model lacks variables as other possible variables in infrastructure, economics, and demography, which are instrumental for regional development. The challenge for research is data accessibility.

Another potential source of bias in the model is a problem of simultaneity. The problem of simultaneity occurs when two variables simultaneously affect/cause each other and have reciprocal feedback loops (Zaefarian et al. 2017). The problem of simultaneity is solved for this research by omitting variables that might contain the simultaneity effect.

The solution is the system GMM method that addresses the presence of the lagged endogenous variable and permits a certain degree of endogeneity in the other explanatory variables. Arellano and Bond's (1991) GMM estimator differences equation eliminates the territory-specific (ATC) effect and then uses all possible lagged levels as instruments.

The GMM model removes endogeneity by "internally transforming the data" – transformation refers to a statistical process where a variable's past value is subtracted from its present value (Roodman 2009). In this way, the number of observations is reduced and this process (internal transformation) enhances the efficiency of the GMM model (Wooldridge 2012). For our research, the differences in the equation and the lagged endogenous variable will be implemented for the dependent variable (see equation 4).

$$y = a + \beta 0 * y, t - 1 + \beta 1 * Xit + \mu it \tag{2}$$

$$\Delta y = a + \Delta yi(t - 1) + \Delta x'it\gamma + \Delta vit \tag{3}$$

$$\begin{aligned} TPI, t - TPI, t - 1 &= a + \beta 0 * (TPI, t - 1 - TPI, t - 2) \\ &+ \beta * (Xit - Xi, t - 1) + (\varepsilon i - \varepsilon i) + (\vartheta it - \vartheta i, t - 1) \end{aligned} \tag{4}$$

The dependent variable is y (an amount of the tax on personal income per taxpayer collected for the 417 budgets of the Amalgamated Territorial Communities for 2021). Tax on personal income is a fair measurement for the tax collection capacity of the community as it does not depend (has a weak correlation) on land available, infrastructure (that generates excise, for example), population (as we employ TPI per capita). Moreover, according to Bahl (1999) tax on personal income collected meets the tests for a good sub-national government tax. TPI can be relatively easy to administer, especially if it focuses on payroll employment and is linked to the central government income tax base. TPI is an effective instrumental variable for financial decentralisation.

Independent variables – Xs - 6 variables, which form the Index of regional development - in terms of demography (population, area) and infrastructure (number of first aid facilities, doctors, and the number of signed declarations with family doctors in the community; the share of the cost of labor for state functions (local self-government) from the revenue part of the general fund budget - development in terms of local self-government infrastructure).

To check the reverse effect of financial decentralisation on regional development, the OLS for Development Index as a dependent variable and different types of taxes (tax on personal income per capita, land tax per capita, single tax per capita, excise per capita), as independent variables, is also employed. The Development Index is a product of a normalization approach, in particular a method of min-max scaling. The variables as population, area, first aid facilities (NSZU data), number of declarations (NSZU data), number of doctors (NSZU data), and the share of the cost of labor for state functions (local self-government) from the revenue part of the general fund budget (see detailed description in Chapter 4).

Chapter 6

RESULTS

In the following section, we use a step-by-step procedure to demonstrate how GMM offers robust estimates compared to OLS. We first start with OLS analysis and identify endogeneity issues by utilizing Durbin-Wu-Hausman test as suggested in Subhan (2008). The procedure then demonstrates that OLS fails to capture endogeneity. The GMM model finally incorporates lagged-values of the dependent variable (tax on personal income per capita). Thereby, the endogeneity concerns are addressed and the valid estimates are produced by using a rigorous GMM process.

6.1. Basic OLS analysis

The econometric results suggest several implications on the relationship between decentralization and development. First, the simple OLS regression output suggests that some development indicators are associated with a higher amount of tax on personal income collected. Tax on personal income per capita only for 2021 has been employed because of the completed dataset for this year. Besides extracting outliers from the dataset, logarithms for the variables were used to improve the fit of the model by transforming the distribution of the features to a more normally shaped bell curve.

The positive relation between dependent variable - Tax on personal income per capita - is observed with independent variables as Area, Number of declarations, Number of doctors, The share of local taxes in the revenue part of the general fund, LandTaxPC 2021, Single Tax per capita. Negative relation is present with variables – population and the share of the cost of labor for state functions (local

self-government) from the revenue part of the general fund budget (see Table 4). Are ends up significant. Given everything equal, higher expenses on local self-government and bigger population led to lower tax revenues on personal income that might seem counterintuitive and needs to be investigated.

Table 4. Coefficients for ordinary least squares linear model (effect of development on tax)

	log(TPI 2021 PC)	
Predictors	*Estimates*	*CI*
(Intercept)	6.78 ***	5.26 – 8.30
Population2021 [log]	-0.45 ***	-0.55 – -0.35
area [log]	0.07 **	0.02 – 0.13
firstaid2021 [log]	-0.03	-0.10 – 0.04
declarat2021 [log]	0.10	-0.07 – 0.27
doctors2021 [log]	0.12	-0.05 – 0.28
Salar2021 [log]	-0.99 ***	-1.11 – -0.86
Observations	417	
R^2 / R^2 adjusted	0.451 / 0.443	

** p<0.05 ** p<0.01 *** p<0.001*

Counterintuitively in the outcome and no effect of the other instrumental variables for regional development leads to the assumption on presence of endogeneity. The Durbin-Wu-Hausman test is commonly used to detect endogeneity of individual regressors.

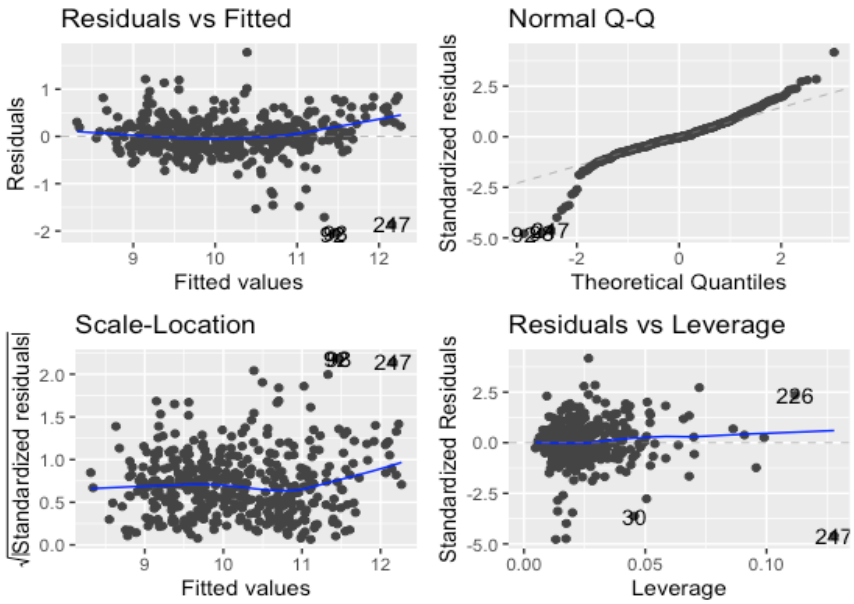

Figure 5. Plotting diagnostics for ordinary least squares linear model (effect of development on tax)

The null hypothesis for the Durbin-Wu-Hausman test is that there is no correlation between the tax on personal income (y) and population | tax on personal income (y) and salar. After running the OLS with employed instrumental variables population and salar in the lagged period we obtained results of the Hausman test. During the estimation of the Durbin-Wu-Hausman test, we failed to support the null hypothesis so the bias in the OLS regression is present. The explanatory variable is correlated with the residuals (error term). Such an outcome is easily explained by the omitted variable bias as the amount of tax on personal income is not fully explained by the variables available in the dataset.

6.2. One-step GMM model and comparison

This research uses a one-step panel data estimation to overcome the endogeneity (see question 4). GMM model that employs differences between data for 2021 and 2020, 2020 and 2019, of the dependent variable allows a certain degree of endogeneity and suggests slightly different output (see Table 5). For the model we employ lagged population, a stands for the difference between the tax on personal income 2020 and 2019, for the independent variable (y) difference between the tax on personal income 2021 and 2020 is employed.

Table 5. Coefficients for GMM model

	log(y)	
Predictors	*Estimates*	*CI*
(Intercept)	3.22 *	0.32 – 6.12
a [log]	-0.02	-0.09 – 0.05
Population2020 [log]	-0.33 *	-0.59 – -0.07
area [log]	0.20 **	0.08 – 0.32
firstaid2021 [log]	-0.03	-0.16 – 0.11
declarat2021 [log]	-0.19	-0.54 – 0.16
doctors2021 [log]	0.31	-0.04 – 0.67
x9 [log]	-0.33 ***	-0.41 – -0.25
Observations	241	
R^2 / R^2 adjusted	0.296 / 0.275	

** p<0.05 ** p<0.01 *** p<0.001*

The result of the GMM model differs from the OLS output. The result of the GMM model differs from the OLS output. The GMM model still demonstrates the counterintuitive relation of independent variables and some dependent

variables which stand for development. For instance, population and salar are significant but preserve negative magnitude. The significance of the population decreased. The negative sign of the population variable may be explained by a gradual decrease in the population while the increase in the amount of taxes throughout the years. The negative sigh of the salar variable may be explained by a decrease in expenses on local self-government with an increase in the amount of tax on personal income per capita, which implies the more the community ears on tax revenues – the less share it spends on local government.

The most interesting finding from the GMM model is that changes in the amount collected from different groups of local taxes are not interrelated and have no significant effect on each other. That effect implies development to be detached from the amount of taxes collected within the territorial community.

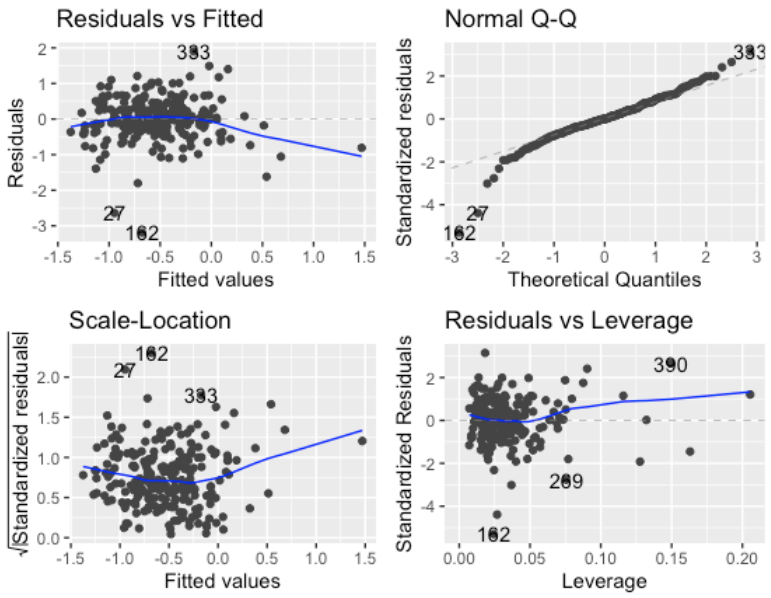

Figure 6. Plotting diagnostics for GMM model

To check the reverse effect of the amount of taxes collected on the development index the OLS is employed. From the output below (see Table 6) the strong negative effect of tax on personal income and single tax is observed. Also, there is a negative effect, albeit weak, of the excise tax per capita on development. Durbin-Wu-Hausman test did not reveal any endogeneity in the OLS model. The counterintuitive magnitude of the significant variables leads to the consideration of the ability of territorial communities to self-funding. Adding the share of local taxes in the revenue part of the general fund demonstrated a strong positive effect of the least on development. Taking that the mean of partlocaltax2021 ~ 35%, such relation hints that the development of the territorial community is still highly dependent on reverse funding (from the state).

Table 6. Coefficients for ordinary least squares linear model (effect of tax on development)

	log(Development)	
Predictors	*Estimates*	*CI*
(Intercept)	0.62	-0.14 – 1.39
TPI2021PC [log]	-0.40 ***	-0.51 – -0.30
excisePercapita2021 [log]	-0.05 *	-0.09 – -0.01
LandTaxPC2021 [log]	0.01	-0.08 – 0.09
SingleTaxPC2021 [log]	-0.30 ***	-0.44 – -0.16
Observations	417	
R^2 / R^2 adjusted	0.273 / 0.266	

** p<0.05 ** p<0.01 *** p<0.001*

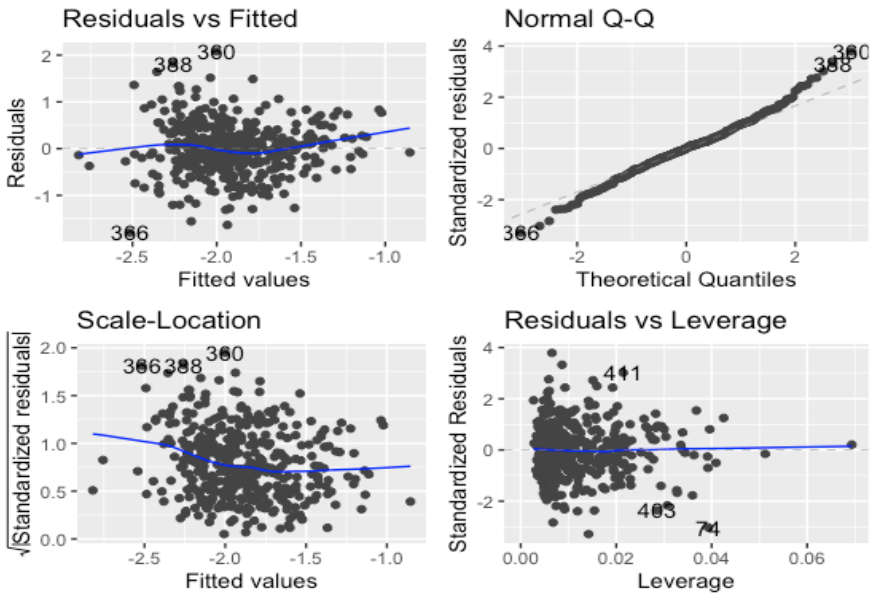

Figure 7. Plotting diagnostics for ordinary least squares linear model (effect of tax on development)

The high dependence of the territorial communities on reverse funding is explained by horizontal equalization of tax capacity of local self-government budgets that is carried out between local budgets of territorial communities and oblast' budgets. Rayon budgets are excluded from the system of horizontal equalization, that is, they are not provided with a basic (reverse) subsidy, as well as an educational subvention. The provision of state support to amalgamated territorial communities is provided within five years after their formation to improve the infrastructure and transport accessibility. Such an approach to the reform brings up the topic of the weak effectiveness of management of the tax revenue collected on the local level.

Chapter 7

CONCLUSIONS

The decentralisation policy is one of the most successful reforms in Ukraine since 2014. Since the start of the ATC formation, they enjoy a broad administrative and financial authority, including a more significant tax base and more expenditure sources. An amalgamation of the territorial communities was highly encouraged by the central government. During the first stage of the reform implementation, in 2016, the government envisaged the provision of financial assistance (infrastructural subvention) to those united territorial communities that commit to voluntary unification. Therefore, the Infrastructure Subvention played a role as a financial motivator and stimulator for the unification of communities. At the same time, the newly ATCs had the opportunity to use funds not only from subventions but also from the state regional development fund (RDF), subventions for the implementation of measures for the socio-economic development of territories to solve urgent problems. The presence of state assistance to support the development of the communities brings up the question of the ability of ATCs to self-funding. Furthermore, existing discussion within both academia and policymakers on the capacity of amalgamated territorial communities requires input on the effect of fiscal decentralisation on regional development.

The effect of regional development on financial decentralisation is found to be weak. Still, population and area have a significant effect on the amount of tax on personal income collected within the territorial community. The basic characteristics of the territorial community end up being dominant. Also, the higher the amount of taxes collected within the ATC the lower share of budget expenses goes to the maintenance of local government operations. At the same time, we found evidence the tax on personal income is the main source of revenue

for ATSs' budgets, except for reverse funding from the state. In addition, no relation between changes in revenues of different local tax types is observed.

The main finding is that communities and their infrastructure: healthcare, roads, schools, and kindergartens are still highly dependent on subvention from state funds. The role of subvention is important as a form of financial aid to local budgets from the state budget, which is intended for a specifically defined goal. Subventions mostly cover expenses on healthcare and education, moreover, ATS may obtain additional transfers to finance a particular project. Nevertheless, ATC that collect sufficient tax revenues may transfer additional funding to maintain social programs or develop infrastructure.

The results showed that higher tax revenues within amalgamated territorial communities have a strong positive effect on regional development, while the vice versa effect is weaker. That means to develop ATC either must stress its effort on the collection of the taxes or attract funding from the reverse transfers for different projects/programs. Tax on personal income, single tax, and excise tax affect development. The counterintuitive magnitude of the significant variables leads to the consideration of the ability of territorial communities to self-funding. Adding a share of local taxes in the revenue part of the general fund demonstrated the strong positive effect of the least on development. Taking that the mean of partlocaltax2021 ~ 35%, such relation hints that the development of the territorial community is still highly dependent on reverse funding from the state.

The weak effect of development on the amount of taxes collected and the high dependency of ATCs on reverse funding may be explained by the short period of the reform implementation. Active amalgamation started only in 2019 – in 2022 the process was planned to be finished. Unfortunately, financial decentralisation as a requiring transformation process was systematically

interrupted by two exogenous shocks: COVID restrictions in 2019 – 2020 and the start of aggression of the Russian Federation in 2022. It should be noted that in 2020, the Law of Ukraine "On the State Budget of Ukraine for 2020" (hereinafter - the State Budget for 2020) provided for the financing of the budget program "Subsidy from the state budget to local budgets to support the development of united territorial communities" (hereinafter - budget program) in the amount of UAH 2.1 billion. However, at an extraordinary plenary session on April 13, 2020, the Verkhovna Rada of Ukraine adopted amendments to the State Budget for 2020, which reduced expenditures on financing the specified budget program, allocating the funds to finance measures against COVID-19 spread, and its consequences. During the Ukraine Recovering Conference in Lugano, Prime Minister Denys Shmygal revealed that Ukraine needs $750 Billion for a three-stage recovery plan. Such losses are huge for the whole Ukrainian economy and comparing the budgets of small ATCs are enormous, probably the last will become dependent on the state budget further even more.

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