# “Testing equalization in municipal capital transfers: Case of North Macedonia”


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# TESTING EQUALIZATION IN MUNICIPAL CAPITAL TRANSFERS: CASE OF NORTH MACEDONIA

## Abstract

This paper analyzes the determinants of municipal capital transfer allocation in North Macedonia using data for all 80 municipalities over 2018–2022. Capital transfers are a key investment instrument in fiscally decentralized systems, yet their fragmented and project-based delivery may weaken equalization. To test whether transfers follow developmental or fiscal-capacity criteria, the study combines baseline OLS estimates with a two-part (hurdle) model that separates access from transfer intensity, quantile regressions to capture distributional heterogeneity, and inequality measures. The results show no statistically significant association between municipal development level or fiscal capacity and the probability of receiving any capital transfer, indicating that entry into the system is not needs-based. Conditional on receipt, the development coefficient is negative but not robustly significant, indicating no systematic targeting of less-developed units among recipients. Inequality diagnostics reinforce this conclusion: the Gini coefficient for per-capita capital transfers (0.75) vastly exceeds that for municipal revenues (0.18), and Lorenz curves reveal a sharply more unequal transfer distribution. Overall, the evidence implies that unobserved institutional or political factors dominate the access margin and that capital transfers currently introduce an additional layer of territorial divergence rather than mitigating existing disparities.

**Keywords** capital transfers, intergovernmental fiscal relations, fiscal decentralization, municipal finance, territorial inequality, North Macedonia

**JEL Classification** H72, H77, R51, R58

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## INTRODUCTION

Intergovernmental capital transfers are a central instrument through which higher levels of government influence local infrastructure investment and territorial equity. Because these transfers often constitute a major share of municipal investment funding, their allocation has direct implications for whether poorer or fiscally weaker jurisdictions can close infrastructure gaps and participate in development on comparable terms.

Empirical evidence from decentralized and transition contexts indicates that capital grants are frequently distributed through discretionary or project-based mechanisms, which can weaken their orientation toward equalization. In such settings, it remains unclear whether capital transfers systematically reach municipalities with greater development needs or lower fiscal capacity. To put it in a more general form, the question is whether fragmented, project-based municipal capital transfers can implement equalization criteria in practice. North Macedonia is a relevant case for testing these concerns because municipalities display substantial territorial disparities in development level and fiscal capacity. However, there is little systematic evidence on whether capital transfers in this environment function as an equalization instrument.

# 1. LITERATURE REVIEW

The role of intergovernmental transfers in fiscally decentralized systems has long been a central concern of public finance and fiscal federalism. Classic theory emphasizes that decentralization can improve allocative efficiency by matching public service provision to local preferences, but also creates coordination and equity challenges that justify continued central-government involvement (Musgrave, 1959; Oates, 1972). Intergovernmental transfers, including capital grants, are therefore not merely technical budgetary instruments but core mechanisms through which higher levels of government address vertical fiscal imbalances and horizontal disparities across subnational units.

The decentralization theorem (Oates, 1972, 1999) provides the foundational framework for analyzing intergovernmental fiscal relations. While local governments are assumed to have superior information regarding local needs, decentralization can exacerbate territorial inequalities when fiscal capacity varies substantially across jurisdictions. Equalization transfers are therefore normatively justified to ensure comparable access to public services and infrastructure regardless of local tax base or development level (Boadway, 2004).

Within this framework, capital transfers play a distinct role. Unlike general-purpose transfers, which are typically designed to support recurrent expenditures and fiscal capacity equalization, capital grants are intended to address infrastructure gaps and long-term development constraints. In principle, capital transfers should therefore be positively associated with indicators of infrastructure deficiency and negatively associated with fiscal capacity, compensating municipalities that are structurally disadvantaged in their ability to finance investment (Ahmad & Searle, 2006; Levtchenkova & Petchey, 2007; Petchey & MacDonald, 2007). However, the literature emphasizes that the equalizing potential of capital transfers depends critically on their institutional design. Musgrave (1959) already noted that poorly designed grants can undermine efficiency and equity by distorting local incentives. More recent contributions in "second-generation" fiscal federalism highlight that political incentives and institutional features – often interacting with administrative capacity and information constraints – shape how intergovernmental transfers operate in practice (Weingast, 2009).

Petchey and MacDonald (2007) argue that while project-specific grants may improve allocative efficiency when projects generate spillovers or require technical oversight, they are ill-suited to achieving equalization objectives in settings characterized by uneven administrative capacity. In such environments, wealthier or more capable jurisdictions are better positioned to prepare proposals, meet co-financing requirements, and navigate complex approval procedures, leading to a systematic bias in access to capital funding. This design perspective implies that capital grant allocation may operate at two distinct margins. First, municipalities must gain access to funding by successfully applying, being deemed eligible, or being selected. Second, conditional on access, they receive a certain level of funding. Different criteria may govern these two stages, and equalization may fail even if developmental considerations are formally included at the allocation stage (Petchey & MacDonald, 2007). A substantial empirical literature shows that discretionary intergovernmental transfers are often influenced by political incentives rather than objective need. Grossman (1994) develops a political model of grants in which central governments allocate transfers strategically to maximize electoral returns. Empirical evidence supports this view: Brollo and Nannicini (2012) show that in Brazil, federal transfers increase in politically competitive or aligned municipalities, particularly in close elections.

Beyond political alignment, administrative capacity plays a critical role in determining access to capital funding. Beam and Conlan (2002) and Hall (2008) demonstrate that local governments with greater bureaucratic resources and experience are more successful in competitive grant environments. These findings are consistent with the argument that application-based capital grants tend to reward municipalities that can mobilize technical expertise, prepare documentation, and secure co-financing, regardless of development need. Rodden (2006) and Treisman (2007) further argue that such patterns are not anomalies but structural features of decentralized systems with weakly institutionalized transfer rules. Where al-


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location criteria are opaque or negotiable, transfers tend to reinforce existing power asymmetries and fiscal inequalities rather than mitigate them. From this perspective, deviations from equalization are systematic outcomes of institutional design rather than implementation failures.

Empirical studies testing whether capital transfers follow equalization logic produce mixed results. In some contexts, particularly where explicit formulas govern transfers, poorer regions receive higher per-capita funding (Becker et al., 2010). However, even in these cases, implementation quality and absorptive capacity can limit the equalizing impact of investment grants. Research on EU structural funds, for example, finds that while allocation rules are formally redistributive, actual spending is often skewed toward regions with more substantial administrative capacity and project pipelines (Crescenzi, 2009). These findings echo concerns raised by Petchey and MacDonald (2007) regarding the tension between project-based allocation and equalization objectives.

The experience of Southeast European countries provides a particularly relevant context for analyzing capital transfers. Decentralization reforms in the early 2000s expanded municipal responsibilities but often failed to provide commensurate revenue autonomy or stable investment financing (Bartlett et al., 2018). As a result, municipalities remain heavily dependent on intergovernmental transfers, especially for capital expenditures. World Bank assessments highlight that in many countries of the region, capital transfers are fragmented across ministries, programs, and funding streams, with heterogeneous eligibility criteria and limited coordination (World Bank, 2024). This fragmentation increases transaction costs for municipalities and amplifies the role of administrative capacity in determining access to funding. The result is often sporadic investment patterns and weak territorial equalization.

Empirical research on intergovernmental finance in North Macedonia remains limited but points to persistent horizontal disparities. Early analyses of the post-2004 decentralization framework already noted that municipalities faced narrow own-revenue bases and strong dependence on central transfers, raising doubts about the system's equalization capacity (Nikolov, 2004). More recent studies confirm these concerns. Gruevski and Gaber (2023) show that municipal fiscal capacity varies widely and is shaped by both economic structure and administrative capability, with significant gaps between rural municipalities, urban centers, and the City of Skopje. Evidence on VAT-sharing reforms suggests that while formula-based transfers have some equalizing intent, they only partially offset structural disparities (Elezi et al., 2023). Trenovski et al. (2022) further demonstrate that development level, capital expenditure, and transparency significantly affect municipal revenue performance, reinforcing cumulative advantages over time. World Bank (2024) reviews underline that capital investment financing remains uneven and fragmented, limiting municipalities' ability to address infrastructure gaps in a systematic manner.

Against this background, a key gap in the literature concerns whether municipal capital transfers in North Macedonia operate as an equalization instrument once both access and allocation intensity are considered. Existing studies focus primarily on revenues or general transfers, while systematic municipality-wide evidence on capital grant allocation remains scarce. By explicitly distinguishing between the probability of receiving any capital transfer and the size of transfers conditional on receipt, and by combining regression-based analysis with inequality diagnostics, this study directly engages with design-based critiques in the literature. In doing so, it aims to contribute to a more nuanced understanding of how capital transfer systems function in practice and whether they align with their normative equalization objectives.

## 2. METHODOLOGY

The empirical analysis relies on a cross-sectional municipal dataset covering all 80 municipalities in North Macedonia. Fiscal variables are aggregated over 2018–2022 and expressed both in totals and per-capita terms. Data on capital transfers and municipal revenues are from the Ministry of Finance of North Macedonia, while population figures come from the State Statistical Office of North Macedonia. Municipal Development Index

(MDI), which provides a multidimensional ranking of municipal development (GoLocal, 2025).[1]

Table 1 lists all variables used in empirical estimations, their definitions, and measurement units. The dependent variable is capital transfers per capita (CapTrans_pc), which captures the intensity of intergovernmental capital support adjusted for municipality size. The main explanatory variable is the level of municipal development (MDI), used to test whether less developed municipalities receive greater capital support in line with horizontal equity. Fiscal capacity is proxied by municipal revenues per capita (Rev_pc), because municipalities with stronger own-revenue bases are expected to require less equalizing capital funding.

In addition to these core equalization variables, we include a small set of controls commonly used in the intergovernmental transfer literature to isolate development and capacity effects from basic structural differences across municipalities. Population size is introduced in logarithmic form (log_pop) to control for scale effects: larger municipalities may have different investment needs and may face different administrative or political bargaining conditions. A rural dummy (rural) captures systematic spatial differences in infrastructure needs and service costs; rural municipalities may require higher per-capita capital support due to dispersion, lower density, or backlog in local public goods. Finally, a Skopje metropolitan dummy (Skopje) is included to account for capital-city and metropolitan centrality effects.

Before turning to the econometric tests, Table 2 summarizes the main variables and sets the empirical context. It shows substantial cross-municipal variation in development (MDI) and fiscal capacity (revenues per capita), implying that a genuinely equalizing transfer system should produce systematic differences in capital-transfer allocations. At the same time, capital transfers per capita are highly dispersed and right-skewed, with many zero-recipient municipalities and a small upper tail of huge per-capita grants. These distributional features motivate using a two-part (hurdle) model to distinguish access from conditional intensity, followed by quantile and inequality analyses to assess whether targeting differs across the condi-

**Table 1.** Variable definitions

| Variable | Definition | Unit (period coverage) |
|---|---|---|
| CapTrans_total | Total capital transfers received | MKD, 2018–2022 |
| CapTrans_pc | Capital transfers per capita (dependent variable) | MKD per resident, 2018–2022 |
| Rev_total | Total municipal revenues | MKD, 2018–2022 |
| Rev_pc | Municipal revenues per capita (fiscal capacity proxy) | MKD per resident, 2018–2022 |
| MDI | Municipal Development Index (higher = more developed) | Index, year 2024 |
| log_pop | Population (log) | ln(Population), 2021 estimate |
| rural | Rural municipality dummy | 1 = rural municipality, 0 = otherwise |
| Skopje | Skopje metropolitan municipality dummy | 1 = Skopje metropolitan municipalities, 0 = otherwise |
| has_transfer | Transfer access indicator | 1 if CapTrans_total > 0 over 2018–2022, else 0 |

**Table 2.** Descriptive statistics

| Variable | Mean | SD | Min | P25 | Median | P75 | Max |
|---|---|---|---|---|---|---|---|
| Capital transfers per capita (CapTrans_pc) | 1,348.8 | 2,419.5 | 0 | 0 | 246.8 | 1,893.9 | 13,353.0 |
| Capital transfers (CapTrans_total) | 15.32 | 25.85 | 0 | 0 | 2.63 | 23.11 | 136.99 |
| Municipal revenues per capita (Rev_pc) | 98,287.0 | 35,223.3 | 42,462.7 | 76,393.2 | 94,923.3 | 109,353.3 | 257,215.1 |
| Municipal revenues (Rev_total) | 1,970.0 | 1,990.0 | 180.0 | 650.0 | 1,140.0 | 2,390.0 | 8,560.0 |
| Population | 22,959 | 23,667 | 2,086 | 5,424 | 13,501 | 36,292 | 98,104 |

*Note:* Values refer to all 80 municipalities. Fiscal variables are aggregated over the 2018–2022 period. CapTrans_pc and Rev_pc are in MKD per inhabitant; CapTrans_total and Rev_total are in million MKD. Per-capita values are computed using population estimates for 2021.

1 Municipal Development Index (MDI) is a composite measure created to give a single, comparable picture of how developed each municipality in North Macedonia is. It has been first time introduced in 2017. This study uses MDI version 2024.


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tional distribution. A histogram of capital transfers per capita is provided in Appendix A, Figure A1, for visual reference.

The empirical testing approach is intentionally aligned with the empirical structure of municipal capital transfer data in North Macedonia. Two descriptive features of the dependent variable (capital transfers per capita) determine model choice. First, the distribution includes a large proportion of zero observations: almost half of municipalities received no capital transfers over 2018–2022 (35 out of 80, i.e., 44%). Second, among municipalities that did receive transfers, amounts are highly right-skewed, with a small number of high beneficiaries. These properties imply that mean-based linear models alone may be insufficient and may conceal heterogeneous allocation patterns. To address this, four complementary methods are applied: baseline OLS, a two-part (hurdle) model, quantile regressions, and inequality measures.

The analysis begins with a baseline OLS model, a conventional benchmark in the fiscal federalism literature. The baseline models use per-capita MKD values in levels for capital transfers and budget revenues, while only population size is log-transformed. This preserves zero observations, keeps coefficients interpretable in fiscal units, and avoids imposing nonlinear transformations when skewness is already addressed through hurdle and quantile techniques.

OLS estimates the average conditional association between per capita transfers and municipal fundamentals:

$$\begin{aligned} CapTran\_pc_i &= \alpha + \beta_1 MDI_i \\ &+ \beta_2 \operatorname{Re}v\_pc_i + \beta_3 \ln\left(Pop_i\right) \\ &+ \beta_4 Rural_i + \beta_5 Skopje_i + \varepsilon_i. \end{aligned} \tag{1}$$

Robust (HC1) standard errors are employed because cross-section fiscal data typically exhibit heteroscedasticity (Wooldridge, 2010). While OLS is not expected to fully capture allocation dynamics in the presence of structural zeros, it provides a reference point for assessing the importance of model extensions.

Given the concentration of zeros, the empirical process is modeled in two stages (Mullahy, 1998). Namely, capital transfers are typically allocated through staged procedures: municipalities first obtain access (eligibility, approval, or project selection), and only then receive a specific amount. These stages may be governed by different criteria. Therefore, treating allocation as a single process risks conflating entry with intensity. A two-stage hurdle framework allows these margins to differ.

**(i) Stage 1 – Logit (access)**

$$\begin{aligned} &\Pr\left(has_{transferi} = 1\right) = \Lambda\left(\gamma_0 + \gamma_1 MDI_i\right. \\ &+ \gamma_2 \operatorname{Re}v_{pci} + \gamma_3 \ln\left(Pop_i\right) + \gamma_4 Rural_i \\ &\left. + \gamma_5 Skopje_i\right) \end{aligned} \tag{2}$$

The second stage evaluates whether the developmental or equalization criteria matter once access is obtained. Interpreting results separately at both margins enables a sharper test of equalization logic.

**(ii) Stage 2 – Conditional OLS (intensity)**

$$\begin{aligned} &CapTrans_{pci}(has_{transferi} = 1) = \delta_0 + \delta_1 MDI_i \\ &+ \delta_2 \operatorname{Re}v_{pci} + \delta_3 \ln\left(Pop_i\right) \\ &+ \delta_4 Rural_i + \delta_5 Skopje_i + u_i. \end{aligned} \tag{3}$$

For a more precise understanding of the chances for a certain municipality to be granted a capital transfer, we apply quantile regressions (Koenker & Bassett, 1978). The median quantile captures the "typical" municipality, while the upper-quartile quantile focuses on high-transfer beneficiaries. This permits testing whether development-based targeting differs across the distribution, particularly in the upper tail.

$$\begin{aligned} &Q_\tau\left(CapTrans\_pc_i \middle| X_i\right) = X_i' \beta_\tau, \\ &\tau \in \{0.50, 0.75\}. \end{aligned} \tag{4}$$

Finally, because capital transfers are normatively justified as tools for equalization and convergence, their territorial dispersion is assessed using Gini coefficients. If transfers are equalizing, their distribution should be less unequal than fiscal capacity would imply. A higher Gini for transfers indicates divergence. The Gini coefficient is calculated as follows (Cowell, 2011):

$$G = \frac{2\sum_{i=1}^{n} i\, y_i}{n\sum_{i=1}^{n} y_i} - \frac{n+1}{n}. \quad (5)$$

Overall, the combined strategy matches the institutional allocation logic and the statistical distribution of transfers, enabling an assessment of whether capital transfers respond to development needs and the fiscal capacity of the municipalities.

# 3. RESULTS

We begin with a standard linear benchmark to assess whether development, fiscal capacity, demographic size, and spatial classification are systematically associated with per-capita capital transfers at the mean. Table 3 suggests that observable municipal characteristics explain little of the variation in per capita transfers.

The MDI coefficient is negative, which is directionally consistent with equalization, but it is only weakly significant and not robust across specifications; therefore, the unconditional results do not provide firm evidence that development level systematically affects per-capita capital transfers. Fiscal capacity and demographic size are not statistically significant in these specifications. Overall, the baseline OLS explains a limited share of the cross-municipal variation in per-capita capital transfers.

**Table 3.** Baseline OLS

| Variable | Coefficient | Std. Err. | p-value |
|---|---|---|---|
| Constant | 111.66 | 44.56 | 0.01 |
| MDI | –1.34 | 0.79 | 0.09 |
| Rev_pc | 0.07 | 0.12 | 0.56 |
| log_pop | –5.69 | 3.19 | 0.07 |
| rural | 0.81 | 6.05 | 0.89 |
| skopje | 6.17 | 5.94 | 0.30 |

*Note:* Observations: 80; $R^2$ = 0.15. The dependent variable is CapTrans_pc, in hundreds of MKD per capita. Rev_pc is in thousands of MKD per capita. Robust SE (HC1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The hurdle model distinguishes between (i) whether municipalities receive any capital transfer and (ii) how large transfers are among recipients. The first stage estimates a logit model for the probability that a municipality receives any capital transfer over 2018–2022. The goal is to examine whether development-based targeting differs across the conditional distribution, particularly in the upper tail.

**Table 4.** Logit – Probability of receiving capital transfers

| Variable | Coefficient | Std. Err. | p-value |
|---|---|---|---|
| Constant | 1.67 | 4.64 | 0.72 |
| MDI | –0.04 | 0.07 | 0.58 |
| Rev_pc | –0.01 | 0.01 | 0.38 |
| log_pop | 0.04 | 0.34 | 0.91 |
| rural | 0.74 | 0.66 | 0.26 |
| Skopje | 0.28 | 0.81 | 0.73 |

*Note:* Observations: 80; Pseudo $R^2$ = 0.04. Logit access stage (CapTrans_pc > 0). Rev_pc in thousands of MKD per capita. Robust SE. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The access model shows that none of the municipal fundamentals significantly predict transfer receipt. Development, fiscal capacity, population size, and spatial status do not explain entry into the capital transfer system. The second stage focuses only on the subset of municipalities with actual capital transfers ($n$ = 45). This model evaluates whether, once admitted to the system, allocation levels respond to the development or fiscal capacity of municipalities.

**Table 5.** Conditional OLS – Per capita transfers among recipients

| Variable | Coefficient | Std. Err. | p-value |
|---|---|---|---|
| Constant | 194.76 | 70.79 | 0.01 |
| MDI | –2.04 | 1.04 | 0.05 |
| Rev_pc | 0.29 | 0.19 | 0.11 |
| log_pop | –12.53 | 5.15 | 0.01 |
| rural | –6.49 | 8.45 | 0.44 |
| Skopje | 15.25 | 9.96 | 0.13 |

*Note:* Observations: 45; $R^2$ = 0.39. Estimated for recipient municipalities only. DV CapTrans_pc in hundreds of MKD per capita; Rev_pc in thousands of MKD per capita. Robust SE (HC1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The relationship between transfers and the level of development for the transfer-recipient group is weakly significant and negative. The magnitude implies that a one-point increase in MDI (more developed) is associated with roughly 204 MKD lower transfers per capita. Fiscal capacity enters positively, although insignificantly. In sum, the hurdle model shows no need-based targeting at entry, and only weak targeting in amounts among recipients.


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Given the heavy upper tail of transfer amounts, average effects may obscure distribution-specific relationships. Quantile regressions are therefore estimated at the median (τ = 0.50) and upper quartile (τ = 0.75).

**Table 6.** Quantile regressions (τ = 0.50 and τ = 0.75)

| Variable | τ = 0.50 Coef (p) | τ = 0.75 Coef (p) |
|---|---|---|
| MDI | –1.0 (0.37) | –1.3 (0.48) |
| Rev_pc | 0.139 (0.39) | 0.600 (0.001) |
| log_pop | –14.7 (0.02) | –15.6 (0.02) |
| rural | –9.6 (0.39) | 13.9 (0.34) |
| skopje | 9.5 (0.48) | 37.3 (0.04) |

*Note:* Observations: 45; Pseudo $R^2$ (τ = 0.50) = 0.172; Pseudo $R^2$ (τ = 0.75) = 0.310. Quantile regressions estimated on recipient municipalities only. DV CapTrans_pc in hundreds of MKD per capita; Rev_pc in thousands of MKD per capita. *p*-values in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 6 does not reveal a stable development-level targeting pattern across the conditional distribution. While MDI coefficients are negative throughout, they remain statistically insignificant at both τ = 0.50 and τ = 0.75, reinforcing the conclusion that conditional targeting of municipalities based on their (lower) level of development is not systematic. By contrast, fiscal capacity becomes more positively associated with transfers toward the upper tail.

The final question is whether capital transfers reduce territorial disparities. This is assessed by comparing inequality in transfers to inequality in municipal fiscal capacity. The Gini coefficient for per-capita capital transfers is exceptionally high (0.75) and far exceeds that for per-capita municipal revenues (0.18). This result is substantiated by Lorenz curves for per-capita capital transfers and per-capita municipal revenues, whereby sharp divergence between the two curves confirms that capital transfers generate substantially greater territorial inequality than underlying fiscal capacity.

Robustness checks using panel models and alternative specifications with year fixed effects corroborate these conclusions. We re-estimate the baseline models using a municipality–year panel covering 2018–2022. This expands the sample to 405 municipality-year observations and allows us to control for year-specific shocks (e.g., program cycles, elections, or macroeconomic events such as COVID-19 disruptions) by including year fixed effects. Standard errors are clustered at the municipal level to account for serial correlation within municipalities over time. Because the Municipal Development Index (MDI) is time-invariant, it is included in the pooled panel specifications. At the same time, in models with municipality fixed effects, it is absorbed together with other time-invariant controls.

We further re-estimate the pooled model and the recipients-only model using a log-compressed de-

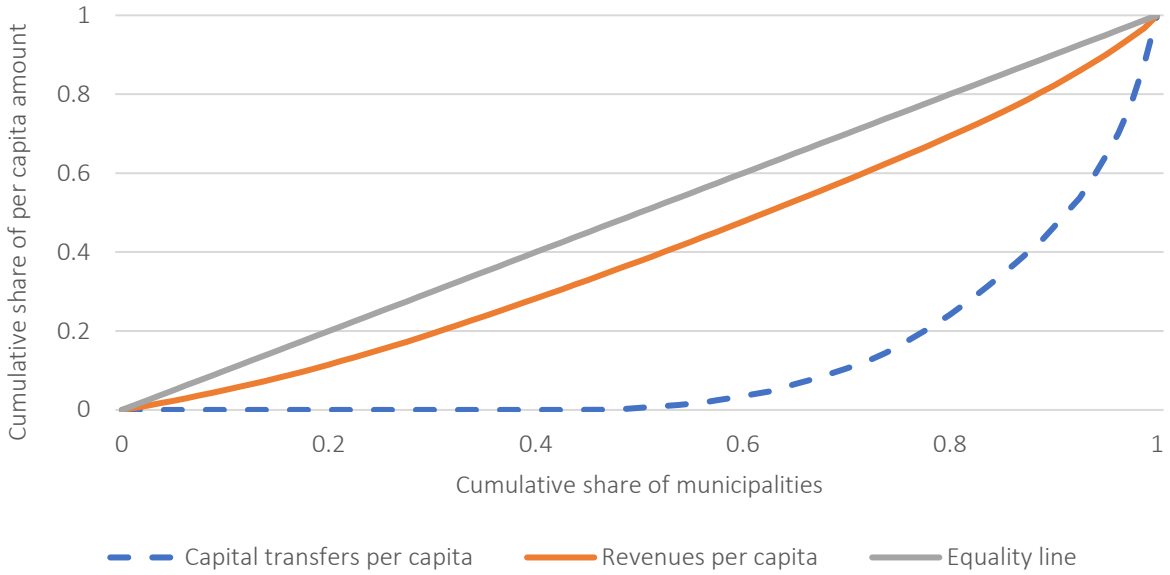


**Figure 1.** Lorenz curves for per capita capital transfers and per capita municipal revenues over 2018–2022

pendent variable, ln(1+CapTrans_pc). This keeps municipalities with zero transfers in the sample while reducing the influence of the upper tail, allowing us to see whether the results depend on extreme values. We also estimate a Tobit model as a simple alternative treatment of zeros, where zero transfers are interpreted as left-censoring rather than a separate selection process. Finally, we check informally that excluding a small number of very high-transfer municipalities does not change the direction of results. Together, these checks address the key validity risks in our dataset: skewness, zeros, and outliers. Full robustness results are reported in Appendix B (Tables B1-B4).

To summarize, across all specifications, three patterns emerge. First, access to transfers is not needs-based: development, fiscal capacity, and size do not explain whether municipalities receive any capital support. Second, conditional amounts show at most weak development-based targeting once municipalities enter the system; the MDI effect is negative but not robust across specifications. Third, quantile estimates indicate that large allocations are more closely associated with fiscal capacity than with development need, while overall inequality in transfers remains extreme. Taken together, the evidence suggests that capital transfers in North Macedonia do not consistently implement an equalization logic at the system level, and that unobserved institutional or political factors likely dominate the access stage.

## 4. DISCUSSION

The results indicate a weak correspondence between observable "need" proxies and the allocation of municipal capital transfers in North Macedonia, especially at the access point, where 35 out of 80 municipalities (44%) received no capital transfers over 2018–2022. Neither the Municipal Development Index nor per-capita revenues predict whether a municipality receives any capital transfer. This pattern is consistent with the interpretation that access may be shaped by factors not captured by the included socioeconomic indicators, such as administrative discretion, project-selection procedures, call timing, or political and bargaining dynamics. Similar patterns have been documented in discretionary or application-based grant systems, where entry depends more on administrative capacity and political economy than on objective need (Bird & Smart, 2002; Rodden, 2006; Treisman, 2007). The North Macedonian institutional setting – multiple ministries, numerous programs, and heterogeneous eligibility and co-financing requirements – contributes to an environment in which linking capital transfer access to measured development need is difficult.

Among recipient municipalities, transfer intensity exhibits a modest pro-poor orientation. Conditional regressions indicate that less developed municipalities receive higher per-capita transfers, although the relationship is economically small and statistically fragile. Quantile estimates do not show systematic developmental targeting in the upper tail; instead, fiscal capacity becomes strongly associated with large per-capita transfers. This pattern is consistent with design-based concerns that project-specific capital grants may privilege jurisdictions with greater administrative capacity to prepare proposals and meet co-financing and procedural requirements (Petchey & MacDonald, 2007). Finally, inequality analysis reveals that capital transfers are distributed far more unevenly than municipal fiscal capacity. The Gini coefficient for per-capita transfers is close to 0.75, while the Gini for per-capita revenues is about 0.18. The combined Lorenz curves show a wide gap between the two distributions. From a policy perspective, this pattern indicates that capital transfers are not currently acting as a territorial equalizer; instead, they introduce an additional layer of dispersion, amplifying differences across municipalities in public investment capacity.

In the North Macedonian context, a plausible explanation is that capital transfers are largely project-based and negotiated, with limited reliance on transparent allocation formulas. When project pipelines are uneven, municipalities with higher administrative capacity and better access to information may be more likely to secure funding, regardless of development status. Once access is obtained, some programs may still incorporate developmental considerations, which could explain the weak pro-poor pattern among recipient municipalities.

The results also have implications for the design of intergovernmental capital funding. A system more clearly oriented toward convergence would likely benefit from


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(i) a clearer and more stable equalization formula that guarantees minimum access for low-development municipalities;

(ii) staged co-financing rules that do not penalize low-capacity jurisdictions; and

(iii) technical-assistance mechanisms to reduce administrative disparities in project preparation.

Without such reforms, capital transfers may remain sporadic and concentrated, limiting their ability to support balanced regional development.

Two limitations should be acknowledged. First, the dataset is cross-sectional and aggregated over several years, which prevents identification of year-to-year dynamics, program-specific rules, or political cycles. Second, the analysis does not include direct measures of political alignment, administrative capacity, the availability of co-financing, or project quality. These factors are plausible drivers of access and should be incorporated in future research. Nevertheless, the paper establishes a first systematic quantitative baseline and provides evidence that capital transfers do not operate as a consistent equalization instrument in North Macedonia.

## CONCLUSION

This paper examined whether capital transfers from central to municipal governments in North Macedonia follow developmental and equalization criteria in order to test whether municipalities with greater development needs and weaker fiscal capacity are prioritized in capital-grant allocation. The results provide three main conclusions. First, development level and fiscal capacity do not predict access to capital transfers. Nearly half of municipalities receive no capital funding over the period studied, and this extensive-margin exclusion is unrelated to observable need. Second, among recipient municipalities, allocations are more strongly associated with fiscal capacity than development need. Third, capital transfers are highly unequal territorially, indicating that capital funding currently amplifies rather than mitigates spatial disparities.

Taken together, the evidence indicates that capital transfers do not function as a systematic equalization instrument in North Macedonia. Strengthening transparent, rules-based access and allocation criteria is therefore critical if capital grants are to support balanced local development. More broadly, the findings imply that the current architecture reinforces cumulative advantages among better-positioned jurisdictions. In practical terms, improving equalization performance requires not only clearer allocation rules but also design features that reduce barriers to participation for low-capacity municipalities, particularly where project preparation and co-financing constraints affect access. Finally, continuous monitoring of capital grants' flows and application of inequality diagnostics would ensure clear evidence whether changes in the grant allocation system shift the territorial distribution of capital funding toward greater spatial convergence.

## AUTHOR CONTRIBUTIONS

Conceptualization: Jakša Puljiz.
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# APPENDIX A

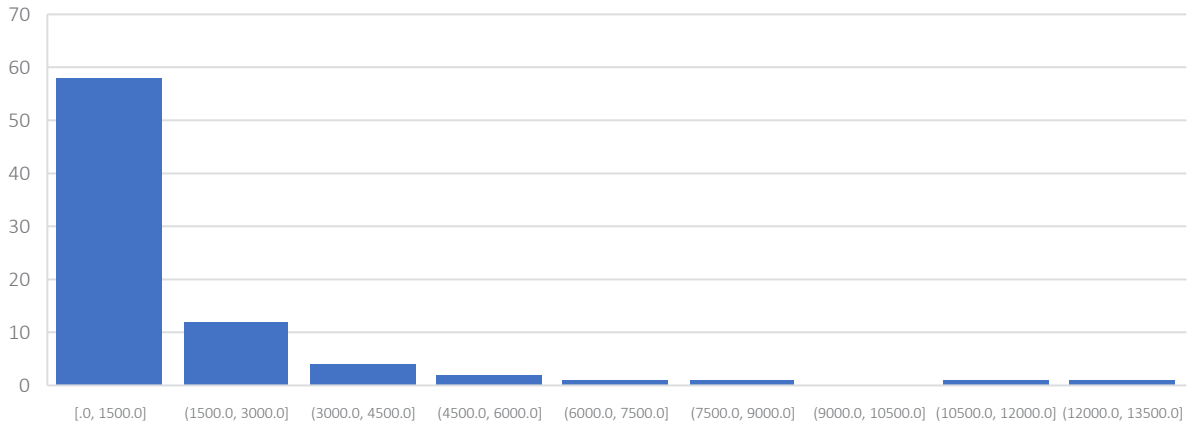


**Figure A1.** Per-capita capital transfers across municipalities (2018–2022, MKD per resident)

# APPENDIX B

**Table B1.** Panel pooled OLS with year fixed effects (DV: CapTrans_pc)

| Variable | Coef | SE (clustered) | p-value |
|---|---|---|---|
| MDI | −6.449 | 5.580 | 0.248 |
| Rev_pc | 0.017 | 0.012 | 0.145 |
| log_pop | −32.937 | 53.657 | 0.539 |
| Rural | 131.190 | 126.803 | 0.301 |
| Skopje | 128.230 | 111.896 | 0.252 |

*Note:* Observations: 405; $R^2$ = 0·095; Adjusted $R^2$ = 0·075. Year fixed effects included; SE clustered by municipality. CapTrans_pc and Rev_pc are in MKD per capita (levels). Table B1 replicates the baseline OLS in a municipality–year panel with year fixed effects.

**Table B2.** Panel pooled Logit with year fixed effects (DV: has_transfer; Odds Ratios)

| Variable | Odds Ratio | SE (clustered) | p-value |
|---|---|---|---|
| MDI | 0.957 | 0.027 | 0.103 |
| Rev_pc | 1.000 | 0.000 | 0.940 |
| log_pop | 1.429 | 0.276 | 0.196 |
| rural | 1.519 | 0.529 | 0.429 |
| Skopje | 0.930 | 0.630 | 0.909 |

*Note:* Observations: 405; Pseudo $R^2$ (McFadden) = 0·066. Year fixed effects included; SE clustered by municipality. Reported coefficients are odds ratios. Table B2 estimates the corresponding access equation in odds ratios.

**Table B3.** Robustness of pooled (all-municipality) results

| Variable | Baseline OLS (levels) | OLS log DV ln(1+CapTrans_pc) | Tobit (censored at 0) |
|---|---|---|---|
| MDI | −20.95 (0.55) | −0.056 (0.36) | −38.74 (0.53) |
| Rev_pc | 0.002 (0.60) | −0.000009 (0.56) | 0.00297 (0.85) |
| Controls | Included | Included | included |
| Model fit | $R^2$ = 0.12 | $R^2$ = 0.065 | — |

*Note:* All municipalities (N = 80). DV in columns (1) and (3) is CapTrans_pc in hundreds of MKD per capita; column (2) uses ln(1+CapTrans_pc). Rev_pc in thousands of MKD per capita. *p*-values in parentheses. Table B3 tests sensitivity to functional form and alternative handling of zeros (log-compressed DV and Tobit). Column (1) repeats baseline OLS in levels, column (2) uses ln(1+CapTrans_pc), and column (3) reports a Tobit specification.


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**Table B4.** Robustness of access and intensity results (two-part framework)

| Panel A | | Panel B | | |
|---|---|---|---|---|
| Access (Logit) | | Intensity among recipients (Conditional OLS) | | |
| **Variable** | **Baseline Logit** | **Variable** | **Conditional OLS (levels)** | **Conditional OLS log DV ln(1+CapTrans_pc)** |
| MDI | −0.014 (0.62) | MDI | −132.4 (0.06) | −0.036 (0.13) |
| Rev_pc | 0.00001 (0.55) | Rev_pc | 0.008 (0.12) | 0.000006 (0.34) |
| log_pop | −0.149 (0.54) | log_pop | 64.3 (0.23) | −0.769 (0.007) |
| rural | 0.331 (0.55) | rural | 14.2 (0.89) | −0.635 (0.086) |
| Skopje | −0.091 (0.90) | Skopje | −23.0 (0.85) | 0.157 (0.816) |
| Model fit | Pseudo $R^2$ = 0.04 | Model fit | $R^2$ = 0.33 | $R^2$ = 0.387 |
| DV = has_transfer; N = 80 | | Recipients only (CapTrans_pc > 0); N = 45 | | |

*Note: p*-values in parentheses. Table B4 re-checks robustness separately for access and intensity in the two-part framework. Panel A reports the access logit, while Panel B reports conditional OLS among recipients in levels and in log form. Development (MDI) and fiscal capacity (Rev_pc) remain weak predictors of access and conditional intensity, supporting the main results.