

Municipal Merger and Debt Issuance in South African Municipalities¹

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1 Introduction

Municipal mergers have been implemented to improve the efficiency and fiscal condition of local governments. However, it is often considered to cause the fiscal common pool problem, a concept very close to the free-rider problem. In this problem, if n municipalities with debt are merged, the debt burden is shared, and it will be $1/n$ of the original repayment cost. Using this concept and the data of different countries, researchers such as Fritz and Feld (2019), Hinnerich (2009), Hirota and Yunoue (2017), Jordahl and Liang (2010), and Nakazawa (2016) studied municipal mergers using difference-in-difference analysis (DID). These studies have observed that municipalities increase debt issuance before the mergers and indicated the existence of the common pool problem.

This study extends the idea of this literature to South African municipal mergers and contributes for the literature in three aspects. First, the South African situation is ideal for DID. One concern in the aforementioned literature is the endogeneity of treatment since the decision regarding merger is usually spontaneous. However, municipal mergers in South Africa are exogenously determined by an independent board, called the Municipal Demarcation Board (MDB), to integrate of South Africans through mergers in a post-Apartheid society. Second, since the execution of mergers was implemented at the same time across the municipalities, the treatment period is considered to be the same. While previous research used annual data, where each municipality merges at different times, this may cause a bias. For example, if municipality A was merged on January 1, 2017 and municipality B was merged on December 31, 2017, the same year dummy explains the treatment effect. In addition, we can obtain quarterly, half-yearly, and annual data. These data will capture the effect of treatment precisely. Third, this study first observes a reduction in borrowings before municipal mergers for the first time. This surprising result may be due to the monitoring by provincial governments. Therefore, this study first suggests that the common pool problem can be eliminated through proper monitoring.

¹ This research is based on the project by the Japan International Cooperation Agency. We are very thankful to Hirofumi Kawakita for the support. We also thank Clement Mulamba, Katsuyoshi Nakazawa, Nobuo Akai for their comments, the National Treasury of South Africa for provision of data and research environment, JSPS KAKENHI Grant Number JP18J12301, and the CBI Program of Osaka University for financial support. Appendix of this paper is available at <https://bit.ly/2lG01yb>. The authors are responsible for all remaining errors.

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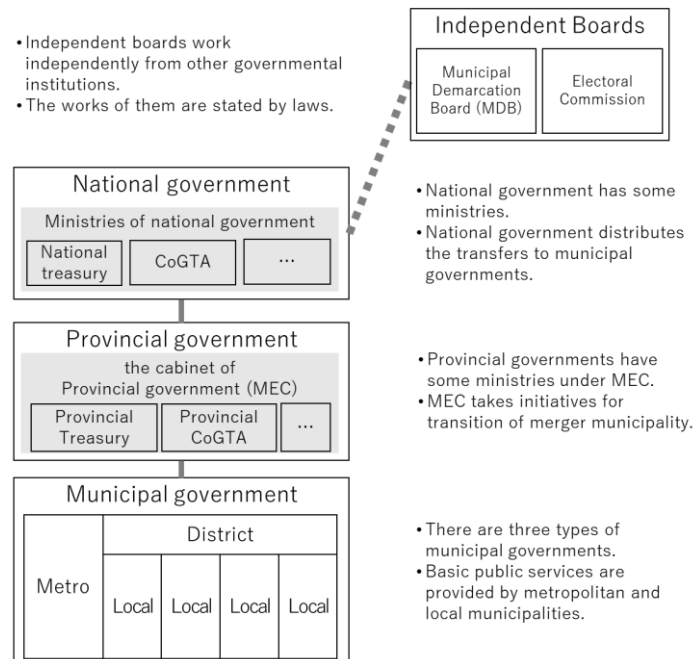
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The rest of this paper is organized as follows. Section 2 details the South African mergers in 2016 and their institutional background. Section 3 outlines the data and the hypothesis. Section 4 reports the regression results. Section 5 presents concluding remarks.

2 Institutional background

2.1 Overview of Local Government in South Africa

Figure 1: South African governmental system



South Africa has a three-tier governance system, as shown in Figure 1. Municipalities are primarily responsible for local public services⁵, and must be an autonomous and financially self-sufficient sphere of government. Thus, the national government does not necessarily guarantee finance for municipalities.

The main revenue sources of finance for municipalities are service charges for providing water and electricity and property tax. Municipalities are allowed to borrow to supplement their capital budgets. This borrowing, namely debt issuance, accounts for 3 percent of the total revenue.

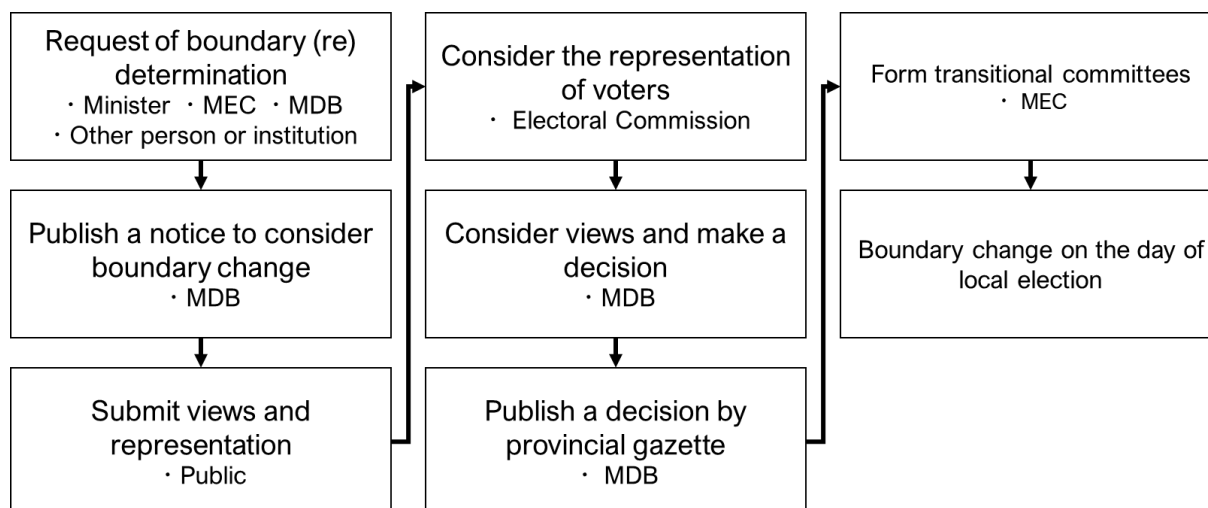
2.2 Municipal mergers in South Africa

After the abolition of Apartheid, divided communities planned to integrate, with municipal mergers determined by the MDB. Municipal demarcation change occur while local elections are implemented, which is every five years. Thus, including districts, the number of municipalities reduced from 1,262

⁵ Since district governments have few works, this study focuses on metropolitan and local areas..

in FY1995/96 to 257 after FY2016/17⁶.

Figure 2: Process of municipal demarcation change



Source: Municipal Demarcation Board (2017)

The municipal demarcation change includes several procedures; it begins with a request⁷ (Figure 2). After the MDB receives the requests for demarcation change, it considers them and declares the consideration. The MDB must also set a period to gather views and sends notice to provincial government executives, called Members of the Executive Council (MEC), municipalities, districts, and traditional leaders. The MDB must then consider submitted views and decide the demarcation. The MDB publishes its determination in the relevant provincial gazette. Although 16 criteria for decision-making are listed in the Municipal Demarcation Act, according to the MDB, there is no crucial criterion. Thus, no one other than the MDB can tell which municipalities will be merged in the final decision⁸. Before the final decision, the MDB must also ask the opinion of the electoral commission because the boundary change may affect the results of elections.

The determination takes effect from the date when the gazette is published. The final decision on the demarcation in 2016 was published in August 2015. After that, the MEC makes provisions for transitional measures to facilitate the establishment of municipalities. Through the transitional committees, the MEC monitored municipalities to stop new contracts being made before their mergers. This may strongly affect the behavior of municipalities because those to be merged may not be able to issue debts even if they sought free-riding behaviors.

⁶ The financial year of South African municipalities starts from July. Here, the number of municipalities includes districts, although we omit them in the analysis.

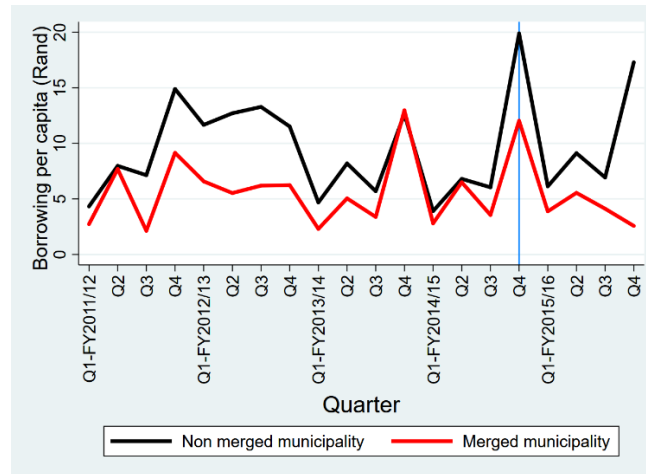
⁷ The MDB itself can also submit the request.

⁸ For the endogeneity, we investigate the propensity of merger using logit regression, although obvious propensity cannot be observed. See appendix.

3 Data and empirical analysis

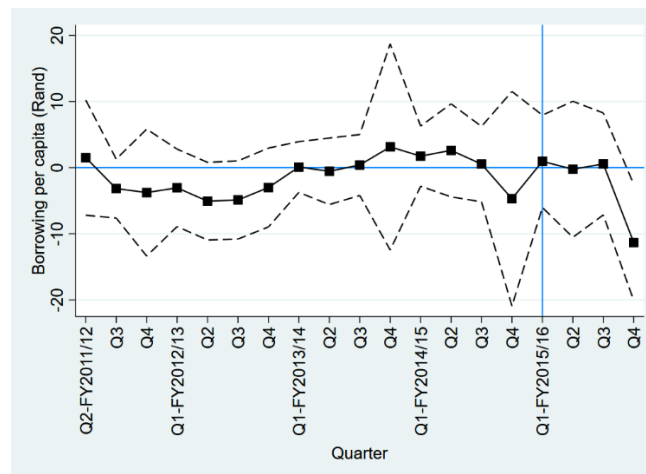
This study investigates whether the fiscal common pool problem exists regarding municipal mergers. As many studies reveal, after receiving the announcement of their mergers, municipalities may increase their debt and expenditure just before their mergers. We therefore formulate the following hypothesis: Municipalities increase their debt after receiving the announcement of a merger.

Figure 3: Trend of borrowing per capita



※ Year quarter is shown on the horizontal axis. The solid lines indicate the mean trends of borrowing per capita.

Figure 4: Event study



※ Year quarter is shown on the horizontal axis. The solid lines indicate changes in borrowing per capita as compared to the first quarter of FY2011/12 conditional on municipal fixed effects, year fixed effects, and control variables used in the DID analysis.

Dotted lines respectively show the 95% confidence intervals of the solid lines.

※ The result of the placebo test, $F(15, 231) = 1.45$, is based on the null hypothesis that the coefficients of all cross terms of the treatment dummy and the quarter dummies in the pre-treatment period (Q2 in FY2011/12 - Q4 in FY2014/15) are zero.

For the analysis, we mainly employ the quarterly panel data from FY2011/12 to FY2015/16. Yearly and half-yearly data were also used for a robustness check⁹. The data set contains the data of 232

⁹ The results of the robustness check are provided in the appendix.

municipalities, 47 of which were merged, and the rest were not.

The dependent variable is borrowing per capita by municipalities. In DID, the parallel trend assumption is important. The mean trends of the borrowing per capita are shown in Figure 3, which indicates that the parallel trend assumption probably holds. From this, we can confirm that the treatment group's borrowing reduced in the last quarter of FY2015/16. This also can be confirmed by the event study in Figure 4. In addition, the result of the placebo test is $F(15, 231) = 1.45$ under the null hypothesis that the coefficients of all cross terms of the treatment dummy and the quarter dummies in the pre-treatment period are zero. Thus, the parallel trend assumption holds here.

We specify the equation below as the baseline model.

$$\text{borrowing per capita}_{it} = \alpha_0 + \alpha_1 \text{Treatment}_i + \alpha_2 T_t + \alpha_3 \text{Treatment}_i \times T_t + X_{it}\beta + \varepsilon_{it}.$$

Treatment_i takes 1 if a municipality is merged. T_t consists of dummy variables that take 1 for each quarter in FY2015/16 since MDB published the final decision regarding demarcation in August 2015. However, because MEC started to form the transitional committee in January 2016, the effect of monitoring may be observed after that. The effect of the treatment will be reflected in α_3 . X_{it} consists of population, Gross Value Added (GVA), area, ANC seat, dummies about cities, debt stock, and audit dummy. ANC seat shows the occupancy rate of the African National Congress (ANC) in a municipal assembly. This will capture the political effect. The ANC is the ruling party in most municipalities. Dummies for cities captures metropolitan areas and secondary cities. In South Africa, eight large cities are designated as metropolitan areas. A secondary city is a designated category of relatively large cities; their roles are more comprehensive than the other municipalities. Debt stock shows the amount of debt stock of the municipality, which is lagged data. Audit dummy is a dummy variable taking 1 if the municipality's audit outcome was clean at that year, but 0 otherwise¹⁰. This captures the innate characteristics and the budget transparency of each municipality.

The summary statistics and the data source of the variables are listed in Table 1 and Table 2, respectively¹¹.

¹⁰ Since the National Treasury considers the audit outcomes of "Unqualified – With findings," "Unqualified – No findings," and "Outstanding" to be clean outcomes, we create the Clean Audit dummy, which takes 1 if the outcome was one of these three and 0 otherwise.

¹¹ The only yearly data available are population, GVA, and Clean Audit. We use linear prediction to divide population and GVA data and construct quarterly and half-yearly data by substituting the current year's value for Clean Audit data.

Table 1: Sources of data and scale

Variables	Control Mean	Control Std Dev.	Treated Mean	Treated Std Dev.	Total mean	Total Std Dev.
Population	231341.1	563525.1	208930	518728.8	226800.9	554761.2
Gross Value Added	11830.11	41345.69	10642.34	34947.71	11589.49	40131.31
Area	5434.833	5586.28	4259.935	4687.661	5196.815	5436.366
ANC Seat	0.6438	0.1766	0.6676	0.1529	0.6486	0.1723
Metro	0.0324	0.1771	0.0425	0.2020	0.0344	0.1825
Secondary City	0.0810	0.2729	0.0851	0.2791	0.0818	0.2742
Borrowing	8194647	7.01e+07	4762069	5.01e+07	7499254	6.65e+07
Debt Stock	1.59e+08	9.77e+08	3.29e+08	1.64e+09	1.93e+08	1.14e+09
Clean Audit	0.4956	0.5000	0.4972	0.5000	0.4893	0.5001

Table 2: Summary statistics of quarterly data by groups

Variables	Data source	Scale
Population	Quantec easy database	Person
Gross Value Added	Quantec easy database	Million Rand
Area	Quantec easy database	Square Kilo-meter
ANC seat	Electoral commission of South Africa	Ratio to the whole number of
Metro	Municipal Election Result	local assembly seats
Secondary City	National Treasury, MFMA website	Dummy
Borrowing	National Treasury, MFMA website	Dummy
Debt Stock	National Treasury, MFMA section 71 data	Rand
	National Treasury, Annual Financial Statement	Dummy

4 Results

Table 3: Results for the OLS model

VARIABLES	(1) Borrowing per capita	(2)
Treatment×q-1 of FY2015/16	1.226 (2.518)	2.082 (2.727)
Treatment×q-2 of FY2015/16	-0.101 (4.129)	0.878 (4.183)
Treatment×q-3 of FY2015/16	0.614 (2.759)	1.684 (2.992)
Treatment×q-4 of FY2015/16	-11.35*** (4.156)	-10.19*** (3.833)
Treatment	-3.298* (1.817)	
ANCseat	-20.33** (8.184)	
Metro	8.630 (16.69)	
Secondarycity	17.18** (6.969)	
Pop	-1.65e-05 (1.14e-05)	0.000396** (0.000176)
GVA	0.000424*** (0.000151)	-0.00204 (0.00197)
Area	-0.000141 (0.000151)	
Debt	5.67e-10 (7.67e-10)	1.11e-09 (1.69e-09)
CleanAudit	2.060 (1.471)	-1.297 (1.567)
Constant	14.95** (5.934)	-60.30*** (20.72)
Observations	4,640	4,640
R-squared	0.170	0.062
Time dummy	Yes	Yes
Fixed effect	No	Yes
Number of code		232

Standard error clustered at the municipality level in parentheses

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

The results of analysis are shown in Table 3. The coefficient for the fourth quarter of FY2015/16 is negatively significant in the regression. This result can be seen in the fixed effects model. The

magnitude of the coefficients shows that borrowing per capita decreases by 10 Rand in the merged municipalities. This result is different from existing research, which has shown that debt increases. This may be because South African municipal mergers were well-controlled by the provincial government, which prevented the occurrence of the common pool problem. This result clarifies that the free-riding behaviors of municipalities to increase debts just before their mergers can be prevented through proper policy.

For the robustness check, using the yearly and half-yearly data, the coefficients of the cross terms are not significantly different from 0 (see appendix.). This result is reasonable because debt reduction is observed only in the last quarter of FY2015/16. Moreover, this result is also different from the existing research as an increase of borrowing is not observed.

5 Conclusion

Using South African data, we analyzed the common pool problem arising due to municipal mergers. Different from existing research, we demonstrate that South African municipalities reduced their borrowings before mergers. This result may be due to monitoring to stop borrowing. This implies that the common pool problem can be prevented by monitoring.

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