Public Infrastructure Provision and Ethnic Favouritism: Evidence from South Africa

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Abstract

Does ethnic favouritism in administrative governments affect public infrastructure provision? While previous literature has studied the effects of ethnic favouritism on economic growth and development determinants, there has been limited empirical evidence on ethnic favouritism in public infrastructure provision, particularly in South Africa. We study the effects of ethnic favouritism on provision of water and electricity infrastructure. Using municipal-level data for 52 district municipalities from 1996 to 2016, we find that coethnic municipalities are associated with higher growth in infrastructure relative to non-coethnic municipalities. The results remain robust to time and municipal fixed effects, as well as dynamic specifications. Additionally, we construct a counterfactual scenario to confirm our results.

Keywords: Ethnic Favouritism, South Africa, Public Infrastructure
JEL: J15, H54, O55

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1 Introduction

Ethnicity and ethnic divisions are central in explaining economic growth and development (Alesina, Baqir, & Easterly, 1999; Alesina & La Ferrara, 2005; Easterly & Levine, 1997; Michalopoulos & Papaioannou, 2013). Related to ethnic diversity is favouritism and prejudice, which have been found to be present in Africa (Ahlerup & Isaksson, 2015; Amodio & Chiovelli, 2017; Burgess, Jedwab, Miguel, Morjaria, & Padro i Miquel, 2015; Franck & Rainer, 2012; Kasara, 2007; Kramon & Posner, 2016). Ethnic favouritism occurs when members of the same ethnicity as political leaders benefit from patronage and other public or political decisions (Burgess et al., 2015). This biased conduct usually results in negative developmental and welfare effects (Amodio & Chiovelli, 2017; Franck & Rainer, 2012) which are important concerns for a developing democracy such as South Africa.

South Africa is an ethnically diverse country with a history of extreme favouritism and discrimination based on race due to the apartheid regime (1948 to 1994).[1] The detrimental effects of apartheid on society, the economy and infrastructure are still evident and calls for the governing party, which has been led by presidents from different ethnicities, to ensure the fair distribution of resources to all South African citizens.

In line with Burgess et al. (2015) and others (Ahlerup & Isaksson, 2015; De Luca, Hodler, Raschky, & Valsecchi, 2018; Hodler & Raschky, 2014; Kramon & Posner, 2016) we argue that ethnic favouritism can occur through coethnicity to the president, who has the ability to direct funding for infrastructure provision through the Cabinet. Accordingly, our study builds on the recent body of work focussing on ethnic favouritism in public goods provision specifically in South Africa, which has received limited attention in the literature.

A number of studies focus on the incidence of ethnic favouritism in Africa. Burgess et al. (2015) find ethnic favouritism in central government road building investment in Kenya between the Kikuyu and Kalenjin ethnic groups.

Franck and Rainer (2012) associate ethnic favouritism to and highlight the detrimental effects thereof on primary education outcomes and infant

[1] The apartheid regime was implemented by the National Party government and enforced the separate development of racial groups, favouring the white minority(South African History Online, 2016).

mortality in Sub-Saharan Africa, excluding South Africa. Similarly, Kramon and Posner (2016) find that in Kenya, coethnicity to the president during school-age years can be linked to higher levels of education. Favouritism does not occur as a result of future employment expectations or spill over effects, but because of concious spending targeted toward ministers' and the president's ethnic groups (Kramon & Posner, 2016).

Affiliation with political leaders may not necessarily involve positive rewards for coethnic members. Kasara (2007) studies tax rates on crop types in Africa, excluding South Africa, and find that farmers coethnic to political leaders face higher taxes relative to non-coethnic farmers. She argues that this may be indicative of the power a political leader has over those of the same ethnicity or that favouritism occurs through unmeasured forms. Even in this setting there exists an association between coethnicity to the president and economic outcomes.

Studying Sub-Saharan African countries, including South Africa, Ahlerup and Isaksson (2015) use 2005 and 2006 Afrobarometer survey data to show that populations coethnic to the president and those residing in the president's region of origin are less likely to be treated unfairly by the government. Based on perceptions that governments in Sub-Saharan Africa treat non-coethnic citizens unfairly, research on public and political decisions pertaining to the distribution of resources is essential.

To the best of our knowledge, the only study focussing on South Africa is a recent working paper by Amodio and Chiovelli (2017) in which they find evidence of ethnic favouritism in the local labour market and agricultural sector, using local municipal election results for 2000 and 2001 Census data from Statistics South Africa (Stats SA). Their findings indicate that citizens of the Zulu ethnic group have a higher likelihood of being employed in the agricultural sector and in municipalities where the Inkatha Freedom Party (IFP) has the majority vote. Different to Amodio and Chiovelli (2017), we use longitudinal annual data to study whether there is an association between ethnicity and water and electricity infrastructure provision, a research topic not yet explored.

Our study contributes to existing literature in several ways. We collect national data from various resources, including the recently published and unexplored Municipal Barometer Databank (South African Local Government Association, 2017b) and construct a disaggregated municipal-level

panel data set. Our data set covers 52 district municipalities over the 1996 to 2016 period. As electricity and water infrastructure provision are within the power and functions of municipalities (South African Local Government Association, 2017a), this level of disaggregation is justifiable.

Different classifications of coethnicity according to specified thresholds allow us to run baseline and counterfactual analyses to ensure robustness of our results. In our baseline analysis, we classify a municipality as coethnic if more than 50 per cent of the population in the municipality is coethnic to the president (similar to Burgess et al. (2015)). In the counterfactual scenario, we classify coethnicity according to the smallest population share of the municipality. We account for time and municipal fixed effects throughout and include a dynamic specification to account for persistence in infrastructure.

Baseline findings suggest coethnic municipalities are associated with higher water infrastructure provision, relative to non-coethnic municipalities. The counterfactual analysis validates these results. In addition, we distinguish between rural and urban households. We expect rural households, irrespective of ethnicity, to start from a lower initial base of water infrastructure and therefore be associated with higher provision of water infrastructure across all municipalities. Our results, however, indicate that there is a difference in provision to rural households in coethnic municipalities relative to those in non-coethnic municipalities.

Moreover, as a first step to study the dynamics behind ethnic favouritism, we conduct a regime analysis considering the prevalence during the different presidential terms.

Results with respect to electricity infrastructure also suggest an association based on coethnicity of the municipality and support findings by Hodler and Raschky (2014) and De Luca et al. (2018). They find that in a panel of countries, including South Africa, birth regions of current political leaders experience more intense nighttime light density relative to regions not associated with current political leaders.

Findings from our study raises uncertainty about whether the South African governing party, the African National Congress (ANC), is upholding its constitution (ANC, 2012), in which it is stated that

> The ANC shall, in its composition and functioning, be democratic, non-racial and non-sexist and combat any form of racial, tribalistic or ethnic exclusivism or chauvinism.

2 Background

We demonstrate the potential rationale behind ethnic favouritism using three ethnic politics models discussed by Franck and Rainer (2012), based on work by Cox and Mccubbins (1986); Dixit and Londregan (1996); Lindbeck and Weibull (1987). In the first model, the president receives utility from the well-being of his ethnic group and therefore has altruistic inclinations towards citizens of the same ethnicity.

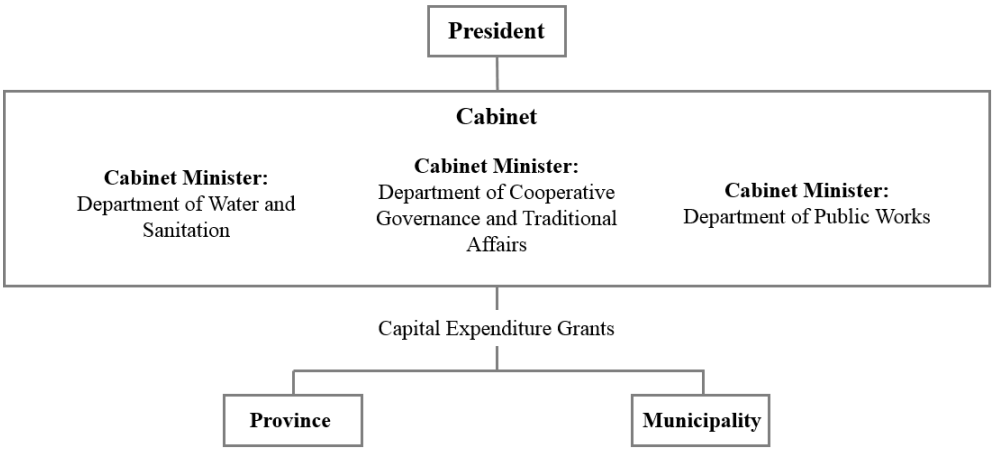
The second model assumes that the president is ultimately a politician that strategically distributes resources to retain majority votes. In addition, citizens derive utility if the president is from their ethnic group and will support the president irrespective of the distribution of resources.

The third model is based on the second, however, in this case coethnic citizens only support the president based on the distribution of resources to their advantage. The model is therefore considered the mutual exchange of support (Franck & Rainer, 2012). Based on the history of apartheid in South Africa, democratic presidents may be inclined to benefit coethnic citizens as a way of correcting the injustice of the previous regime for altruistic reasons or in order to retain majority votes.

The president has the ability to direct funding allocated to provide public infrastructure. Municipal capital expenditure is mainly funded through conditional grants, managed by national departments headed by the respective Cabinet ministers that the president appoints (Minister of Finance, 2018; Oosthuizen & Thornhill, 2017). For example, if a municipality requires funding to improve infrastructure related to basic services provision, the municipality submits a business plan to the National Department of Cooperative Governance and Traditional Affairs, the national transferring department for the Municipal Infrastructure Grant, which will then (depending on the conditions) transfer funding to the municipality (Minister of Finance, 2018). Figure 1 depicts the link between the president, the Cabinet and public infrastructure provision.

Since the end of Apartheid in 1994, South Africa's governing party has been the ANC, led by presidents from different ethnic groups. Nelson Mandela, South Africa's first democratic president and Thabo Mbeki are from the Xhosa ethnicity. Jacob Zuma is a Zulu (see Table A.1). Figure 2 illustrates South Africa's ethnolinguistic composition and their districts of

Figure 1: President and Cabinet



Source: Minister of Finance (2018); Oosthuizen and Thornhill (2017)

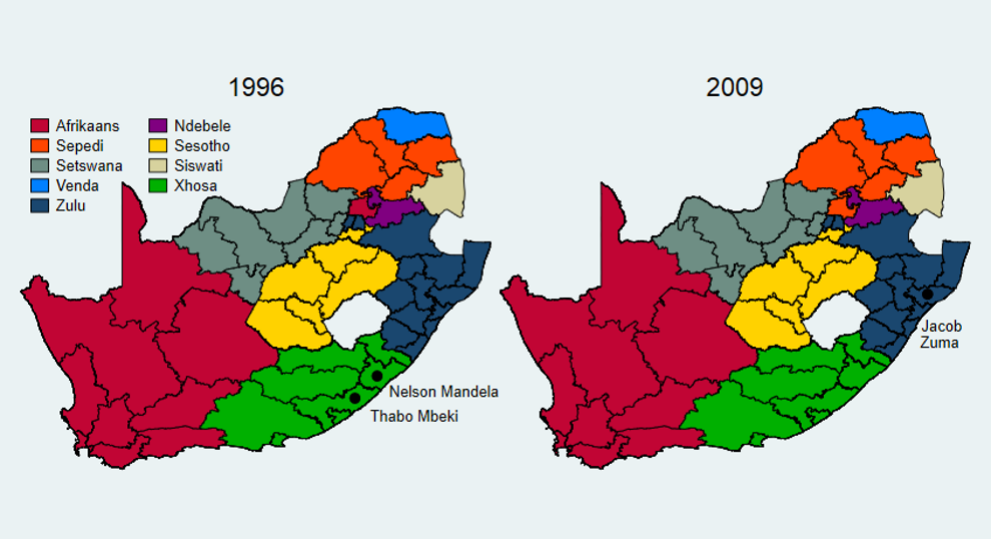
birth.

The two major black ethnic groupings in South Africa are the Nguni, comprising Ndebele, Swazi, Xhosa and Zulu; and the Sotho, which include the Northern Sotho (referred to as Pedi), Southern Sotho, Tswana, Tsonga and Venda. The white population encompass Afrikaners, from Dutch, German and French European descent and British settlers. The coloured population stem from varied descent and speak Afrikaans and English (O'Malley, 2000). As South Africa reports population demographics according to race, we use home language to derive ethnic affiliation. South Africa has eleven official languages of which all indigenous languages are associated to ethnic groups.

In Figure 2, we show the ethnicity of municipalities in 1996, the start of our ethnolinguistic data and also South Africa's democracy under the Xhosa regime, relative to 2009, the start of the Zulu regime. Nine of the eleven official languages represent the majority of the population within municipalities. The Eastern Cape, birthplace of Nelson Mandela and Thabo Mbeki, comprise majority Xhosa population. KwaZulu-Natal, the birthplace of Jacob Zuma, and some parts of Mpumalanga and Gauteng are majority Zulu.

With the exception of the City of Tshwane, where the majority language spoken changed from Afrikaans in 1996 to Sesotho in 2009, migration has

Figure 2: South Africa Ethnolinguistic Map



Source: South African Local Government Association (2017b)

not taken place to such an extent that the ethnolinguistic classification of municipalities changed. This motivates the notion that the president is able to distinguish coethnic municipalities from non-coethnic municipalities.

3 Data and Method

3.1 Data

Water infrastructure, the main dependent variable, is measured by the percentage of households that have access to water at or above RDP level, $rdpwater_{it}$. The Reconstruction and Development Programme (RDP) level is the prescribed minimum standard of water supply to households. Water at or above the RDP level is classified as water supply, say, a tap, that provides potable water within 200 metres of the household (Department of Water and Sanitation, 2015). The RDP was set in place in 1994 and prioritises access to water and sanitation (Department of Water Affairs and Forestry, 2004).

Data on access to water is available from 1994 to 2017 and is obtained from the Department of Water and Sanitation, National Water Services Knowledge System. The Department of Water and Sanitation updates and

models data sourced from Stats SA's Census data (Department of Water and Sanitation, 2018).

As a second dependent variable of interest, we use average nighttime light density as a proxy for electricity infrastructure ($nlight_{it}$). We follow Michalopoulos and Papaioannou (2013) and Hodler and Raschky (2014) and take the natural logarithm of $nlight_{it}$ plus 0.01 in order to account for possible observations that have no reported nighttime light. Nighttime light density data is used in an attempt to capture all man-made light including household and commercial lights, street lights and light emitted by schools, healthcare facilities, recreational and other public infrastructures.

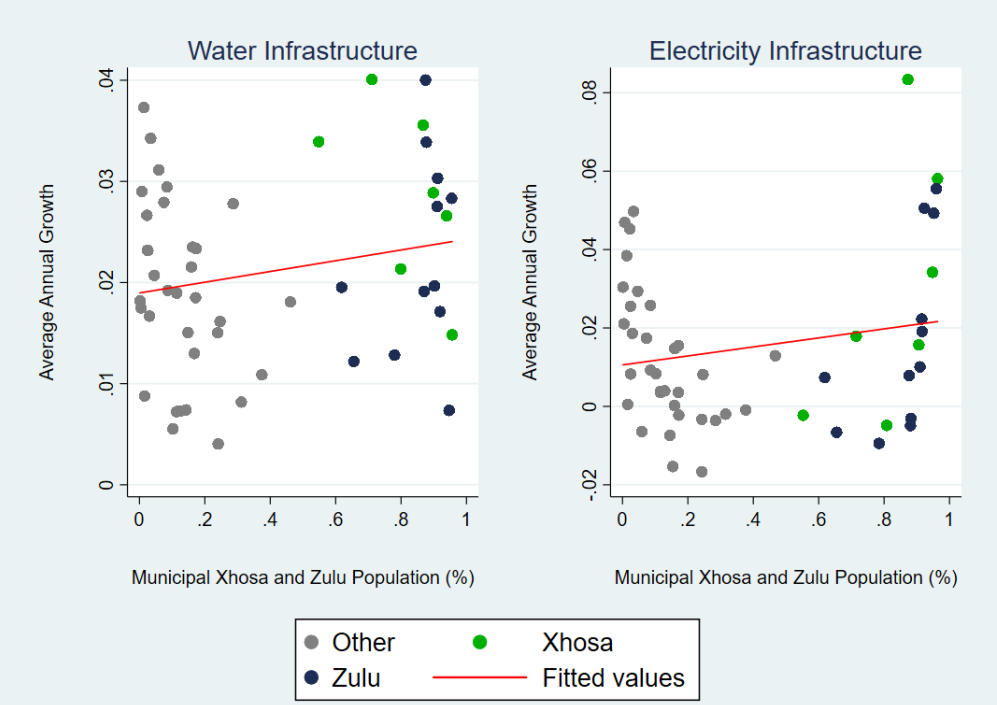
Nighttime light density data is captured by the United States Air Force Defense Meteorological Satellite Program (DMSP) satellites that circle the earth 14 times per day. Nighttime light density data are then processed by the National Oceanic and Atmospheric Administration (NOAA) National Geophysical Data Centre (NGDC) to remove strong sources of natural light such as forest fires, auroral activity, late sunsets and the bright half of the lunar cycle to produce observations of man-made outdoor and some indoor use of light. Values range from zero (no light) to 63 (rich and dense light) (Henderson, Storeygard, & Weil, 2012). Data is available from 1992 to 2013 and obtained from AidData according to GADM 2.8 demarcation (Goodman, BenYishay, & Runfola, 2016).

The main control variable is a binary indicator capturing whether the municipality is coethnic to the president in time $t-1$. The variable $coethnic(50\%)_{it-1}$, is based on Burgess et al. (2015) and Hodler and Raschky (2014). $coethnic(50\%)_{it-1}$ is equal to 1 if more than 50 per cent of the municipality's population is coethnic to the president in time $t-1$, 0 otherwise. Like Hodler and Raschky (2014), we use lagged values of the coethnicity measure as there are likely delays between the president or government's decision to allocate funds and the actual provision of infrastructure. To illustrate, over the 1996 to 2009 period the $coethnic(50\%)_{it-1}$ variable is equal to 1 for municipalities where more than 50 per cent of the population is classified as Xhosa. Over the 2010 to 2016 period, $coethnic(50\%)_{it-1}$ is equal to 1 for municipalities where more than 50 per cent of the population is classified as Zulu.

Figure 3 illustrates average annual growth in water and electricity infrastructure by municipality and the share of population within the municipality

that are Xhosa and Zulu, therefore coethnic to the presidents in our sample. We colour code municipalities by whether 50 per cent or more of the population within the municipality is Xhosa or Zulu, therefore classified as coethnic during the period that the president of the same ethnic group was in power, or Other, therefore non-coethnic. There is a positive relationship between public infrastructure provision and the share of population that are Xhosa and Zulu.

Figure 3: Growth in Public Infrastructure and Municipal Share of Coethnic Population



Source: South African Local Government Association (2017b)

Furthermore, we create a counterfactual, $coethnic(cf)_{it-1}$, a binary variable equal to 1 if the ethnic group representing the smallest share of the municipality's population (the minority) is coethnic to the president in time $t-1$, 0 otherwise. For example, if the population representing the minority of the municipality's population is classified as Xhosa, that municipality will be classified as coethnic to the president according to the counterfactual specification.

Home language data is obtained from the Municipal Barometer Databank which allows the extraction of annual municipal data from 1996 to 2016 (South African Local Government Association, 2017b). The Municipal Barometer, initiated by the South African Local Government Association (SALGA) in 2011, provides municipal-level statistics with the aim to assist municipalities with planning and oversight. Municipal Barometer updates and models data sourced from Stats SA's census data, National Treasury and Quantec.

Another control variable of interest is political competition, $polcomp_{it}$. We argue that in municipalities where the ruling government face high levels of political competition, that is opposition parties threatening to win majority votes in the next election, government may be inclined to increase public infrastructure provision in an attempt to secure votes and retain power.

We construct $polcomp_{it}$ by calculating the inverse of the winning margin between the top two political parties on a municipal level. A large variable therefore corresponds to high levels of political competition and vice-versa. The first democratic election 1994 results are obtained from Election Resources.org (Manuel Álvarez-Rivera, 2016) and 1999 to 2014 results from the Electoral Commission of South Africa (IEC) (Electoral Commission of South Africa, 2017).

Additional control variables include the employment rate ($employment_{it}$), population density ($popdens_{it}$), growth in urban settlements relative to rural settlements ($urbanrural_{it}$) and the gross value added share of government expenditure ($gvagovt_{it}$). The chosen control variables were influenced by Burgess et al. (2015) to control for demographic and economic factors. Demographic factors are captured by $popdens_{it}$ and $urbanrural_{it}$, whilst $employment_{it}$ and $gvagovt_{it}$ represent economic activity within municipalities. Furthermore, our control variables account for economic and demographic factors considered in the Division of Revenue Act according to which municipalities receive transfers from national government based on the equitable share formula. In addition to these factors, the formula corrects for the disproportionate revenue earned by municipalities (Minister of Finance, 2018).

Population density is the total population divided by the area km^2 of the municipality. Population density captures the pressure that an increase in the population within an area places on public infrastructure, especially

in terms of water infrastructure.

The growth in the number of urban settlements (cities, towns, suburbs, townships and other informal settlements adjacent to urban settlements), relative to rural settlements (tribal and farming areas) in each municipality partially represents a certain level of development and the subsequent urbanisation that takes place within municipalities.

The employment rate is the employed population divided by the working age population. Employment aims to account for household income and wealth that affects access to and use of infrastructure, as well as the level of economic activity in a municipality.

The gross value added share of government expenditure measures the role of government in a municipality's economic activity. These indicators are obtained from the Municipal Barometer Databank (South African Local Government Association, 2017b) and the Department of Water and Sanitation (2018).

3.2 Method

We conduct the study on a district municipal level. As per the Legislative Framework Governing Municipal Performance Measurement (South African Local Government Association, 2017a), potable water supply systems are classified as a district municipal function. Similarly, bulk supply of electricity, including the supply, transmission, distribution and where relevant, the generation thereof is within the district municipality's power and function. Aggregation on a district municipal level furthermore addresses the challenge of the high number of changes in the demarcation of local municipalities and towns since 1994.

The dataset spans from 1996 to 2016 and covers 52 municipalities (44 district and 8 metropolitan municipalities). Summary statistics are provided in Table 1. Summary statistics indicate heterogeneity across the variables in the sample. The mean level of access to water is relatively high at approximately 75 per cent of households across municipalities having access to water at or above the RDP level over the study period , whilst average nighttime light density is relatively low with high variation.

Based on the dimension of the data, we use a fixed effects model. By including municipal (α_i) and year fixed effects (δ_t) we control for time-invariant factors specific to municipalities and aggregate trends that are

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
$rdpwater_{it}$	75.084	20.616	20.61	100	1144
$nlight_{it}$	5.676	10.087	0.057	57.037	1144
$coethnic(50\%)_{it}$	0.167	0.373	0	1	1301
$coethnic(cf)_{it}$	0.023	0.15	0	1	1301
$polcomp_{it}$	0.484	0.252	0.037	0.997	1171
$employment_{it}$	0.342	0.117	0.102	0.608	1092
$popdens_{it}$	195.167	447.501	0.852	3064.108	1092
$urbanrural_{it}$	2.984	7.009	0.002	60.727	1080
$gvagovt_{it}$	18.892	8.656	6.04	41.99	1092

omitted from the model specification.

The fixed effects specification is

$$infrastructure_{it} = \beta_1 coethnic_{it-1} + \beta_2 X_{it} + \alpha_i + \delta_t + u_{it} \quad (1)$$

where $infrastructure_{it}$ is $rdpwater_{it}$ or $nlight_{it}$;
and $coethnic_{it-1}$ is $coethnic(50\%)_{it-1}$ in the baseline and $coethnic(cf)_{it-1}$ in the counterfactual analysis. X_{it} represents control variables as discussed and u_{it} is an error term.

The coefficient estimate of interest is β_1. In the baseline analysis, a positive and statistically significant coefficient estimate suggests that coethnic municipalities are associated with higher public infrastructure provision relative to non-coethnic municipalities.

4 Results

4.1 Baseline Analysis

In Table 2 Panel A, water infrastructure based on water access at or above RDP level, $rdpwater_{it}$, is the dependent variable. Columns 1 to 6 report fixed effects estimates. Results suggest an association between coethnicity of a municipality and water infrastructure provision. Results remain robust as control variables are included. The coefficient estimate of 0.083 (β_1) in column 6 indicates that coethnic municipalities are associated with approximately 9 per cent higher water infrastructure provision relative to non-coethnic municipalities.

Although positive, our findings suggest that political competition ($polcomp_{it}$) is not significant in explaining water infrastructure provision.

As expected, employment coefficient estimates are positive and significant. Employed households earning an income are more likely to afford housing that provides piped water well above the RDP's minimum requirement level. Additionally, higher employment within a municipality entails higher government collection of rates, which may be allocated towards infrastructure improvements.

Population density ($popdens_{it}$) is significant and negatively associated with water infrastructure provision. Population growth in an area necessitates maintenance and upgrades to public infrastructure, which are often not adequate to sustain increased pressures. Other control variables are not statistically significant in explaining water infrastructure provision.

In column 7 we include a lagged dependent variable, $rdpwater_{it-1}$, to account for persistence in infrastructure. Although the coefficient estimate is relatively smaller, it remains positive and significant, supporting our results reported in column 6 that municipalities coethnic to the president are associated with higher water infrastructure provision relative to non-coethnic municipalities. In this specification, government's contribution to economic activity is statistically significant and positive. The preferred specifications are columns 6 and 7, where all control variables are included.

Table 2 Panel B reports estimates with respect to electricity infrastructure ($nlight_{it}$). The coefficient estimate of 0.064 (β_1) in column 13 indicates that coethnic municipalities are associated with approximately 7 per cent higher electricity infrastructure provision relative to non-coethnic municipalities. This is in line with results reported in Panel A and support findings by Hodler and Raschky (2014) and De Luca et al. (2018). Results remain robust as control variables are included to take into account other factors that may affect electricity infrastructure and the provision thereof.

In contrast to water infrastructure, political competition is positive and significantly associated with electricity infrastructure provision. This is in line with our expectations. In municipalities where the ruling party face higher levels of competition, government may increase infrastructure provision in an attempt to retain the majority vote. The different measures of the dependent variables may explain why political competition is significantly associated with electricity though not water infrastructure. Water infrastructure is household specific, whilst the proxy for electricity infrastructure includes the infrastructure itself and use thereof by households, business and

government.

Corresponding to results in Panel A, employment is found to have a

Table 2: Coethnic (50%) Results

				Panel A			
				Dependent Variable: $rdpwater_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$coethnic(50\%)_{it-1}$	0.062	0.062*	0.091**	0.091**	0.085**	0.083**	0.031*
	(0.038)	(0.034)	(0.038)	(0.039)	(0.039)	(0.038)	(0.017)
$polcomp_{it}$		0.006	0.016	0.028	0.021	0.014	0.004
		(0.102)	(0.088)	(0.083)	(0.075)	(0.075)	(0.029)
$employment_{it}$			0.948***	0.807***	0.786***	0.797***	0.062
			(0.137)	(0.118)	(0.122)	(0.126)	(0.043)
$popdens_{it}$				-0.557***	-0.612***	-0.596***	-0.097***
				(0.097)	(0.095)	(0.098)	(0.035)
$urbanrural_{it}$					0.022	0.024	0.005
					(0.016)	(0.016)	(0.005)
$gvagovt_{it}$						0.120	0.115**
						(0.112)	(0.051)
$rdpwater_{it-1}$							0.823***
							(0.026)
R-squared	0.580	0.583	0.668	0.691	0.705	0.706	0.908
F-stat	22.10***	20.47***	68.11***	100.13***	118.82***	136.91***	1129.24***
Observations	988	978	978	978	926	926	878
				Panel B			
				Dependent Variable: $nlight_{it}$			
	(8)	(9)	(10)	(11)	(12)	(13)	(14)
$coethnic(50\%)_{it-1}$	0.018	0.035	0.061*	0.061*	0.063**	0.064**	0.034*
	(0.043)	(0.039)	(0.031)	(0.031)	(0.030)	(0.030)	(0.019)
$polcomp_{it}$		0.278***	0.267***	0.266***	0.285***	0.287***	0.146***
		(0.060)	(0.046)	(0.046)	(0.044)	(0.044)	(0.035)
$employment_{it}$			0.993***	0.962***	0.987***	0.980***	0.387***
			(0.153)	(0.159)	(0.168)	(0.168)	(0.100)
$popdens_{it}$				-0.133	-0.092	-0.113	-0.012
				(0.210)	(0.218)	(0.214)	(0.113)
$urbanrural_{it}$					-0.003	-0.005	-0.011
					(0.014)	(0.014)	(0.007)
$gvagovt_{it}$						-0.085	0.000
						(0.096)	(0.061)
$nlight_{it-1}$							0.510***
							(0.045)
R-squared	0.145	0.198	0.326	0.328	0.339	0.340	0.504
F-stat	45.04***	41.43***	46.08***	46.05***	49.81***	63.22***	119.60***
Observations	884	874	874	874	770	770	770
Number of dmuni	52	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: $coethnic(50\%)_{it-1}$ is a binary variable equal to 1 if 50 per cent or more of the municipality's population is coethnic to the president in time $t-1$, 0 otherwise.
Columns 1 to 6 and 8 to 13 report fixed effects estimates and columns 7 and 14 report the dynamic specification estimates by including the lagged dependent variable. We acknowledge that these estimates may suffer from the Nickell bias, and we additionally run the Bruno (2005) consistent estimator. Bias corrected LSDV results are available on request.

positive and statistically significant association with electricity infrastructure provision. Employment is a proxy for economic activity as it captures the jobs created by business and government in a municipality, which affects household income and wealth that in turn determine the personal use of electricity.

In Panel B, population density remains negative, although not statistically significant.

In column 14 we include a lagged dependent variable, $nlight_{it-1}$, to account for persistence in electricity infrastructure. Although the coefficient estimate is smaller, it is positive and significant, supporting our findings. In this specification, political competition and employment remain significant. The preferred specifications are columns 13 and 14, where all control variables are included.

As a robustness check, we extrapolate ethnic and control data to 1992 and 1994, the first data points for electricity and water infrastructure respectively. Estimates from this exercise support findings as discussed and results are available on request.

Based on the relationship between coethnicity and public infrastructure, it is likely that citizens in Xhosa and/or Zulu municipalities experienced improved access to water and electricity relative to other municipalities, during the period that the coethnic president was in power. We study the incidence of ethnic favouritism during the respective regimes in Section 5.2.

Considering results with respect to political competition, findings may also indicate that the connection between a coethnic president and members of the same ethnicity is based on the premise of the second or third ethnic politics model (Franck & Rainer, 2012) as discussed in Section 2. Presidents strategically distribute resources in an effort to win and maintain the majority vote.

4.2 Counterfactual Analysis

Table 3 Panel A and Panel B report counterfactual results using the model specification as in Equation 1 for water and electricity infrastructure respectively. β_1 coefficient estimates based on $coethnic(cf)_{it-1}$ are not statistically significant. Municipalities where the minority of the population are either Xhosa or Zulu, are not associated with higher infrastructure provision during the period that the coethnic president is in power. Therefore, the

counterfactual findings support the baseline results that suggest an association between coethnicity and water and electricity infrastructure provision, where a substantial majority (more than 50 per cent) of the population is coethnic to the president.

Presidents may neglect non-coethnic municipalities as the well-being of their coethnic members are perceived to be unaffected. Based on the first ethnic politics model, presidents will therefore not derive utility by providing public infrastructure to municipalities where only the minority is coethnic.

To check these results, we construct an additional coethnic specification, $coethnic(m)_{it-1}$, equal to 1 if the majority of the municipality's population is coethnic to the president, 0 otherwise. This specification is not subject to a percentage threshold and allows us to capture coethnic municipalities that are ethnically fractionalised, where the ethnic majority is not equal to or more than 50 per cent of the municipality's population. Results are discussed in Appendix A.2.1.

Table 3: Counterfactual Results

			Panel A			
			Dependent Variable: $rdpwater_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)
$coethnic(cf)_{it-1}$	-0.038	-0.037	-0.019	-0.013	-0.023	-0.023
	(0.029)	(0.029)	(0.015)	(0.016)	(0.018)	(0.017)
$polcomp_{it}$		-0.025	-0.029	-0.017	-0.023	-0.030
		(0.119)	(0.108)	(0.100)	(0.089)	(0.089)
$employment_{it}$			0.880***	0.740***	0.713***	0.729***
			(0.136)	(0.127)	(0.139)	(0.142)
$popdens_{it}$				-0.557***	-0.619***	-0.597***
				(0.102)	(0.103)	(0.105)
$urbanrural_{it}$					0.025	0.027
					(0.018)	(0.018)
$gvagovt_{it}$						0.154
						(0.129)
R-squared	0.571	0.575	0.650	0.673	0.689	0.691
F-stat	18.05***	16.13***	76.02***	102.86***	106.93***	112.98***
Observations	988	978	978	978	926	926
			Panel B			
			Dependent Variable: $nlight_{it}$			
	(7)	(8)	(9)	(10)	(11)	(12)
$coethnic(cf)_{it-1}$	-0.013	-0.009	0.014	0.015	0.011	0.011
	(0.077)	(0.069)	(0.054)	(0.054)	(0.054)	(0.054)
$polcomp_{it}$		0.266***	0.247***	0.246***	0.261***	0.263***
		(0.064)	(0.052)	(0.052)	(0.053)	(0.053)
$employment_{it}$			0.957***	0.926***	0.943***	0.936***
			(0.149)	(0.157)	(0.164)	(0.164)
$popdens_{it}$				-0.136	-0.100	-0.117
				(0.212)	(0.219)	(0.216)
$urbanrural_{it}$					-0.001	-0.002
					(0.013)	(0.014)
$gvagovt_{it}$						-0.070
						(0.100)
R-squared	0.144	0.194	0.315	0.316	0.326	0.327
F-stat	44.36***	41.10***	45.86***	45.69***	47.58***	61.18***
Observations	884	874	874	874	770	770
Number of dmuni	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: $coethnic(cf)_{it-1}$ is a binary variable equal to 1 if the ethnic group representing the smallest share of the municipality's population (the minority) is coethnic to the president in time $t-1$, 0 otherwise.

5 Robustness Checks

5.1 Rural and Urban Household Water Infrastructure Analysis

In Table 4, the dependent variables are access to water infrastructure by rural households, $rdpwater\ (rural)_{it}$ (Panel A) and urban households, $rdpwater\ (urban)_{it}$ (Panel B).

Overall, we expect rural households to have lower income, therefore bound to start from a lower initial base of water infrastructure. This potentially explains increased provision in water infrastructure to rural households relative to urban households across all municipalities. Our results in Panel A, however, indicate that there is a difference in water infrastructure provision to rural households in coethnic, municipalities and those in non-coethnic municipalities. Findings suggest that rural households in Xhosa and/or Zulu municipalities are associated with higher water infrastructure provision relative to rural households in non-coethnic municipalities. Again, our results may point to the second or third ethnic politics model (Franck & Rainer, 2012). As rural areas are often strongholds for politicians, the distribution of resources to these households may assist in securing votes for upcoming elections.

Growth in urban settlements relative to rural settlements, $urbanrural_{it}$, is statistically significant and positively associated to water infrastructure provided to rural households. When regions develop and subsequent urbanisation takes place, rural households benefit from increased water infrastructure.

Gross value added share of government, $gvagovt_{it}$, is also positively associated with water infrastructure provision and shows the importance of economic activity generated by the government in the local economy for rural household infrastructure. Other control variable coefficients are in line with Table 2 Panel A results.

Panel B reports results with respect to urban households. In this case, results are not statistically significant and we do not find an association between coethnicity and provision of water infrastructure. We expect households that are located in close proximity to economically active urban areas to have improved access to infrastructure from the outset relative to rural households in tribal and farming areas.

Table 4: Coethnic (50%) Rural and Urban Water Infrastructure Results

			Panel A			
			Dependent Variable: $rdpwater(rural)_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)
$coethnic(50\%)_{it-1}$	0.062	0.062*	0.096**	0.094**	0.091**	0.087**
	(0.039)	(0.035)	(0.039)	(0.041)	(0.041)	(0.041)
$polcomp_{it}$		0.012	0.034	0.039	0.059	0.048
		(0.108)	(0.097)	(0.092)	(0.081)	(0.081)
$employment_{it}$			1.019***	0.834***	0.856***	0.876***
			(0.148)	(0.138)	(0.137)	(0.142)
$popdens_{it}$				-0.666***	-0.671***	-0.641***
				(0.140)	(0.127)	(0.132)
$urbanrural_{it}$					0.027*	0.031**
					(0.014)	(0.015)
$gvagovt_{it}$						0.219*
						(0.120)
R-squared	0.545	0.555	0.639	0.668	0.675	0.679
F-stat	14.09***	14.34***	35.73***	45.88***	48.37***	51.51***
			Panel B			
			Dependent Variable: $rdpwater(urban)_{it}$			
	(7)	(8)	(9)	(10)	(11)	(12)
$coethnic(50\%)_{it-1}$	0.007	0.005	0.009	0.009	0.007	0.007
	(0.042)	(0.044)	(0.046)	(0.045)	(0.046)	(0.046)
$polcomp_{it}$		-0.031	-0.030	-0.020	-0.039	-0.038
		(0.087)	(0.086)	(0.081)	(0.082)	(0.082)
$employment_{it}$			0.153	0.045	-0.004	-0.005
			(0.233)	(0.232)	(0.244)	(0.244)
$popdens_{it}$				-0.428***	-0.468***	-0.468***
				(0.103)	(0.113)	(0.116)
$urbanrural_{it}$					-0.005	-0.005
					(0.013)	(0.014)
$gvagovt_{it}$						-0.002
						(0.095)
R-squared	0.529	0.526	0.529	0.553	0.557	0.557
F-stat	21.59***	18.67***	20.31***	23.47***	21.97***	21.14***
Observations	988	978	978	978	926	926
Number of dmuni	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: $coethnic(50\%)_{it-1}$ is a binary variable equal to 1 if 50 per cent or more of the municipality's population is coethnic to the president in time $t-1$, 0 otherwise.

Table 5 reports counterfactual results with respect to rural and urban household water infrastructure provision. Panel A and B results justify $coethnic(50\%)_{it-1}$ results reported in Table 4. The β_1 coefficient estimate is

negative and not statistically significant, suggesting that coethnicity of the minority population is not associated with water infrastructure provision, even to rural households.

Table 5: Counterfactual Rural and Urban Water Infrastructure Results

			Panel A			
			Dependent Variable: $rdpwater(rural)_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)
$coethnic(cf)_{it-1}$	-0.044*	-0.042*	-0.025	-0.018	-0.026	-0.025
	(0.024)	(0.023)	(0.018)	(0.019)	(0.022)	(0.021)
$polcomp_{it}$		-0.022	-0.018	-0.012	0.013	0.001
		(0.124)	(0.116)	(0.107)	(0.092)	(0.094)
$employment_{it}$			0.936***	0.751***	0.778***	0.805***
			(0.154)	(0.155)	(0.161)	(0.166)
$popdens_{it}$				-0.673***	-0.678***	-0.642***
				(0.147)	(0.134)	(0.137)
$urbanrural_{it}$					0.030*	0.035**
					(0.016)	(0.017)
$gvagovt_{it}$						0.254*
						(0.136)
R-squared	0.538	0.548	0.621	0.650	0.658	0.664
F-stat	14.13***	15.19***	38.42***	52.36***	52.30***	54.79***
			Panel B			
			Dependent Variable: $rdpwater(urban)_{it}$			
	(7)	(8)	(9)	(10)	(11)	(12)
$coethnic(cf)_{it-1}$	-0.059	-0.060	-0.057	-0.052	-0.054	-0.054
	(0.053)	(0.054)	(0.051)	(0.052)	(0.051)	(0.051)
$polcomp_{it}$		-0.036	-0.036	-0.027	-0.044	-0.044
		(0.079)	(0.078)	(0.072)	(0.074)	(0.073)
$employment_{it}$			0.141	0.035	-0.013	-0.013
			(0.236)	(0.234)	(0.247)	(0.247)
$popdens_{it}$				-0.424***	-0.465***	-0.465***
				(0.103)	(0.113)	(0.116)
$urbanrural_{it}$					-0.004	-0.004
					(0.013)	(0.013)
$gvagovt_{it}$						0.000
						(0.095)
R-squared	0.532	0.528	0.532	0.555	0.559	0.559
F-stat	20.69***	18.87***	19.79***	23.58***	22.86***	21.92***
Observations	988	978	978	978	926	926
Number of dmuni	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: $coethnic(cf)_{it-1}$ is a binary variable equal to 1 if the ethnic group representing the smallest share of the municipality's population (the minority) is coethnic to the president in time $t-1$, 0 otherwise.

5.2 Presidential Term Analysis

In an attempt to study the basis of ethnic favouritism in South Africa, we conduct a presidential term analysis. We specify a fixed effects model that includes interacted binary variables that control for the three respective presidential terms and the ethnicity of municipalities. To account for the ethnicity of municipalities (*ethnic*), we construct two binary variables. *xhosa* is a binary variable equal to 1 if 50 per cent or more of the municipality's population is classified as Xhosa, 0 otherwise. *zulu* is equal to 1 if 50 per cent of the municipality's population is classified as Zulu, 0 otherwise. This specification allows us to evaluate Xhosa and Zulu municipalities relative to all other municipalities.

We then construct three *term* binary variables. *mandelaterm* is a binary variable equal to 1 over the 1996 to 1999 period, 0 otherwise. *mbekiterm* is a binary variable equal to 1 over the 2000 to 2008 period, 0 otherwise. *zumaterm* is a binary variable equal to 1 over the 2009 to 2016 period, 0 otherwise. To account for unobserved heterogeneity, we include time (δ_t) and municipal fixed effects (α_i) as in Equation 1.

The specification is

$$infrastructure_{it} = \beta_1 ethnic * term_{it} + \beta_2 X_{it} + \alpha_i + \delta_t + u_{it} \qquad (2)$$

where $infrastructure_{it}$ is either $rdpwater_{it}$ or $nlight_{it}$. X_{it} represents control variables as discussed and u_{it} is an error term.

The coefficient estimate of interest is β_1. A positive and significant coefficient therefore suggests an association between coethnicity and infrastructure provision during the president's term under consideration.

Table 6 reports presidential term results. The negative $xhosa{*}mandelaterm_{it}$ coefficient estimate in column 1 suggests that during the Mandela presidential term, Xhosa municipalities are not associated with higher water or electricity infrastructure provision relative to other municipalities. This is not surprising as the Mandela term of five years is short in comparison to subsequent presidential terms. Baseline results reported in Section 4.1 are therefore driven by coethnic municipalities being associated with higher infrastructure provision during the Mbeki and Zuma term.

The positive and significant $xhosa * mbekiterm_{it}$ estimate in columns 2 and 5 suggests that during the Mbeki term, Xhosa municipalities are

Table 6: Presidential Term Results

	Dependent Variable:					
	$rdpwater_{it}$			$nlight_{it}$		
	(1)	(2)	(3)	(4)	(5)	(6)
$xhosa * mandelaterm$	-0.119**			-0.040		
	(0.045)			(0.074)		
$xhosa * mbekiterm$		0.179***			0.145***	
		(0.047)			(0.032)	
$zulu * zumaterm$			0.073**			0.023
			(0.034)			(0.036)
$polcomp_{it}$	-0.013	-0.002	0.036	0.277***	0.274***	0.291***
	(0.086)	(0.082)	(0.073)	(0.050)	(0.047)	(0.051)
$employment_{it}$	0.651***	0.788***	0.700***	0.993***	1.062***	1.012***
	(0.149)	(0.126)	(0.119)	(0.158)	(0.161)	(0.162)
$popdens_{it}$	-0.517***	-0.607***	-0.543***	-0.066	-0.086	-0.082
	(0.123)	(0.112)	(0.096)	(0.216)	(0.210)	(0.205)
$urbanrural_{it}$	0.028	0.029*	0.026	0.001	0.001	-0.000
	(0.019)	(0.017)	(0.017)	(0.014)	(0.014)	(0.014)
$gvagovt_{it}$	0.078	0.010	0.073	-0.037	-0.083	-0.037
	(0.106)	(0.086)	(0.099)	(0.091)	(0.081)	(0.090)
Observations	969	969	969	813	813	813
R-squared	0.727	0.743	0.726	0.357	0.384	0.356
Number of dmuni	52	52	52	52	52	52
F-stat	125.99***	135.85***	129.23***	55.52***	50.82***	58.88***
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: xhosa (zulu) is a binary variable equal to 1 if 50 per cent or more of the municipality's population is classified as Xhosa (Zulu), 0 otherwise. The three term variables are binary variables equal to 1 for the years in which the respective presidents were in power, 0 otherwise.

associated with higher water and electricity infrastructure provision relative to other municipalities. $zulu * zumaterm_{it}$ coefficient estimate in column 3 indicates that Zulu municipalities are associated with approximately 8 per cent higher water infrastructure provision during the Zuma term. Yet, with respect to electricity infrastructure, results are positive but not statistically significant.

We test our results by evaluating infrastructure provision in Zulu municipalities over the Xhosa leadership term (1996 to 1999 and 2000 to 2008), and Xhosa municipalities over the Zulu leadership term (2009 to 2016). As expected, results are either negative or not statistically significant, indicating that Zulu municipalities are not associated with higher water or electricity infrastructure provision over the Xhosa leadership term. Similarly, Xhosa municipalities are not associated with higher infrastructure provision over

the Zulu leadership term. These results support presidential term findings and are available on request.

The introduction of Provincial and Municipal Infrastructure Grants in 2000 (Department of Planning Monitoring and Evaluation, 2014) possibly explains the positive association between coethnicity and public infrastructure during the Mbeki and Zuma term. Government delivers most social infrastructure through conditional grants, as discussed in Section 2. The implementation of such a funding mechanism may thus have provided room for strategic allocation of resources via Cabinet Ministers that head national transferring departments of grants to benefit coethnic citizens with the aim to secure votes. There is need for additional analysis in this regard. Future research could study conditional grants allocated to municipalities, with the aim to uncover patterns in transfers by national departments during the different presidential terms.

6 Concluding Remark

This study contributes to the debate on redistributive politics. We use district municipal level data over the 1996 to 2016 period to study ethnic favouritism in public infrastructure provision in South Africa. Empirical results suggest that there is an association between coethnicity to the president and relative higher water and electricity infrastructure provision. Building on this finding, more in-depth analysis of infrastructure grant allocation is necessary to confidently determine the presence and degree of ethnic favouritism. Henceforth policy makers can identify and address weaknesses in the infrastructure funding mechanism that have allowed biased distribution of resources up until now.

A possible recommendation for the current administrative government, headed by recently elected President Cyril Ramaphosa, is to establish ongoing monitoring and assessment systems that oversee the distribution of resources. To ensure that the governing party is upholding its constitution and distributing resources fairly, evaluation is necessary from the beginning where transferring departments approve and allocate funds up to the actual provision of the infrastructure.

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A Appendix

A.1 South African Presidents

In Table A.1 we provide information on the ethnicity and birth locations of South Africa's post-apartheid leaders. Kgalema Motlanthe was interim president for a negligible period of time and we do not account for his presidential term in our dataset. The 2017 elected leader of the ANC, Cyril Ramaphosa, was born in the City of Johannesburg and his parents are from Venda.

Table A.1: South African Presidents

President	Ruling Period	Ethnicity	Birth District
Nelson Mandela	10 May 1994 - 16 June 1999	Xhosa	OR Tambo (EC)
Thabo Mbeki	16 June 1999 - 24 September 2008	Xhosa	Amathole (EC)
Kgalema Motlanthe	24 September 2008 - 9 May 2009	Northern Sotho	City of Johannesburg (GP)
Jacob Zuma	9 May 2009 - 14 February 2018	Zulu	King Cetshwayo (KZN)

Source: South African History Online (2011a, 2011b, 2011c); The Presidency (2018); Stratfor—Worldview (2012); Yes! Media (2018)

A.2 Supplementary Robustness Checks

A.2.1 Alternative Coethnic Threshold Analysis

As a supplementary robustness check, we extend our analysis by classifying an additional coethnic binary variable to evaluate whether results persist when changing the threshold. $coethnic(m)_{it-1}$ is equal to 1 if the majority (no percentage threshold) of the municipality's population is coethnic to the president, 0 otherwise.

For example, in this specification the City of Johannesburg is classified as a Zulu municipality in 2016, therefore classified as coethnic to the president during that time period. However, because the Zulu population representing the majority is only equal to 22.2 per cent of the total municipal population, the City of Johannesburg is classified as non-coethnic in our baseline specification. Setting aside the strict 50 per cent threshold, this specification

Table A.2: Coethnic (Majority) Results

Dependent Variable: $rdpwater_{it}$						
	(1)	(2)	(3)	(4)	(5)	(6)
$coethnic(m)_{it-1}$	0.048	0.048	0.070**	0.080**	0.078**	0.075**
	(0.034)	(0.030)	(0.034)	(0.035)	(0.034)	(0.035)
$polcomp_{it}$		-0.001	0.006	0.024	0.020	0.014
		(0.106)	(0.092)	(0.084)	(0.075)	(0.075)
$employment_{it}$			0.930***	0.784***	0.767***	0.777***
			(0.134)	(0.118)	(0.123)	(0.127)
$popdens_{it}$				-0.601***	-0.657***	-0.641***
				(0.113)	(0.107)	(0.109)
$urbanrural_{it}$					0.024	0.026
					(0.016)	(0.016)
$gvagovt_{it}$						0.111
						(0.111)
R-squared	0.577	0.581	0.663	0.689	0.704	0.706
F-stat	21.80***	19.06***	75.51***	101.52***	115.05***	134.49***
Observations	988	978	978	978	926	926
Panel B						
Dependent Variable: $nlight_{it}$						
	(7)	(8)	(9)	(10)	(11)	(12)
$coethnic(m)_{it-1}$	-0.017	-0.001	0.018	0.020	0.022	0.023
	(0.017)	(0.017)	(0.015)	(0.015)	(0.016)	(0.035)
$polcomp_{it}$		0.266***	0.253***	0.254***	0.270***	0.272***
		(0.041)	(0.037)	(0.037)	(0.042)	(0.049)
$employment_{it}$			0.965***	0.933***	0.954***	0.947***
			(0.081)	(0.083)	(0.091)	(0.169)
$popdens_{it}$				-0.145	-0.108	-0.128
				(0.094)	(0.100)	(0.214)
$urbanrural_{it}$					-0.001	-0.002
					(0.009)	(0.014)
$gvagovt_{it}$						-0.078
						(0.099)
R-squared	0.145	0.194	0.316	0.318	0.328	0.329
F-stat	8.16***	10.76***	19.50***	18.67***	17.03***	59.60***
Observations	884	874	874	874	770	770
Number of dmuni	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: $coethnic(m)_{it-1}$ is a binary variable equal to 1 if the ethnic group representing the largest share of the municipality's population (the majority) is coethnic to the president in time $t-1$, 0 otherwise.

allows us to study the effect of coethnicity to the president in metropolitan municipalities that are ethnically fractionalised and hence equal to 0 in the $coethnic(50\%)_{it-1}$ specification.

Results in Table A.2 Panel A support findings with respect to water infrastructure provision according to the $coethnic(50\%)_{it-1}$ classification reported in Table 2 Panel A. Municipalities where the majority of the population, irrespective of the magnitude, are coethnic to the president, are associated with higher water infrastructure provision relative to non-coethnic municipalities. Column 6 coefficient estimate suggests that coethnic municipalities are associated with approximately 8 per cent higher water infrastructure provision relative to non-coethnic municipalities.

With respect to electricity infrastructure provision reported in Table A.2 Panel B. Results are not statistically significant and may suggest that there is only an association between coethnic municipalities and electricity infrastructure provision where a strict majority of the population are coethnic to the president.

Table A.3 presents water infrastructure results for rural (Panel A) and urban (Panel B) households. Both Panel A and Panel B support results reported in Table 4. Findings suggest that rural households in coethnic municipalities are associated with higher water infrastructure provision relative to rural households in non-coethnic municipalities.

Table A.3: Coethnic (Majority) Rural and Urban Water Infrastructure Results

	Panel A					
	Dependent Variable: $rdpwater(rural)_{it}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$coethnic(m)_{it-1}$	0.048	0.047	0.074**	0.084**	0.084**	0.079**
	(0.035)	(0.031)	(0.036)	(0.036)	(0.036)	(0.036)
$polcomp_{it}$		0.005	0.023	0.034	0.059	0.047
		(0.111)	(0.100)	(0.093)	(0.080)	(0.081)
$employment_{it}$			0.998***	0.809***	0.836***	0.855***
			(0.146)	(0.141)	(0.141)	(0.146)
$popdens_{it}$				-0.714***	-0.719***	-0.688***
				(0.156)	(0.140)	(0.143)
$urbanrural_{it}$					0.030**	0.033**
					(0.014)	(0.015)
$gvagovt_{it}$						0.209*
						(0.120)
R-squared	0.542	0.552	0.633	0.667	0.674	0.678
F-stat	14.42***	13.85***	36.91***	43.37***	46.24***	50.12***
	Panel B					
	Dependent Variable: $rdpwater(urban)_{it}$					
	(7)	(8)	(9)	(10)	(11)	(12)
$coethnic(m)_{it-1}$	0.003	-0.000	0.004	0.010	0.008	0.008
	(0.036)	(0.038)	(0.040)	(0.039)	(0.039)	(0.039)
$polcomp_{it}$		-0.034	-0.033	-0.020	-0.038	-0.037
		(0.086)	(0.085)	(0.079)	(0.081)	(0.081)
$employment_{it}$			0.149	0.044	-0.005	-0.005
			(0.233)	(0.231)	(0.244)	(0.244)
$popdens_{it}$				-0.433***	-0.473***	-0.473***
				(0.104)	(0.113)	(0.116)
$urbanrural_{it}$					-0.005	-0.005
					(0.013)	(0.013)
$gvagovt_{it}$						-0.004
						(0.096)
R-squared	0.529	0.525	0.529	0.553	0.558	0.558
F-stat	21.73***	18.80***	20.39***	23.37***	21.66***	20.86***
Observations	988	978	978	978	926	926
Number of dmuni	52	52	52	52	52	52
Time FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: $coethnic(m)_{it-1}$ is a binary variable equal to 1 if the ethnic group representing the largest share of the municipality's population (the majority) is coethnic to the president in time $t-1$, 0 otherwise.