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Article

Employment impact of national, provincial and local government capital in South Africa: An aggregate and sectoral perspective

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DEVELOPMENT ECONOMICS | RESEARCH ARTICLE

Employment impact of national, provincial and local government capital in South Africa: An aggregate and sectoral perspective

Charles Shaaba Saba^{1*}, Nicholas Ngepah¹ and Abieyuwa Ohonba¹

Abstract: This study examines the impact of general/national, provincial and local government capital on employment in South Africa. The study spans from 1993 to 2017 for a panel of 269 South African municipalities. The study employs the Granger causality test and the System Generalised Method of Moments (SGMM) estimation techniques. Findings show bidirectional causality between the variables of interest in the eight economic sectors. The results from the SGMM show that general/national government capital contributes more to total employment and the categories of employment (that is, different skills levels) in the economic sectors compared to provincial and local government capital. This suggests provincial and local government capital has not adequately contributed to citizens' different skills development and employment levels. Therefore, this article recommends synergised and well invested national, provincial and local government capital at all levels of skills development to equip citizens, create jobs, and grow the South African economy.

Subjects: Macroeconomics; Labour Economics; Development Economics

Keywords: Government capital; employment; system-GMM; South Africa

1. Introduction

The South African government's inability to provide adequate jobs and reduce the persistently high unemployment rate has become a problem that deserves a solution. According to International

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PUBLIC INTEREST STATEMENT

The South African economy is today plagued with unemployment crisis that has deepened the problem of poverty and inequality. Therefore, in order to rescue the escalating joblessness in the country, there is need to assess the impact of general/national, provincial and local government capital on job creation for the purpose of policy recommendations. The results reveal that the national government contribute more to total employment and different categories of employment (that is, skilled, semi-skilled and low-skilled) when compared to provincial and local government. This suggest that there is need to shift attention from the national government to provincial and local government to contribute to citizens' different skills development and employment levels in order to complement the effort of the national government.

Labour Organization (ILO, 2020), “Almost half of the countries in the sub-Saharan Africa region have estimated unemployment rates below 5 per cent (though in some of them, notably South Africa, the unemployment rate exceeds 20 per cent)”. However, at the end of 2020, Statistics South Africa estimated South Africa’s unemployment rate to be 32.5% (Statistics South Africa, 2020).

These statistics raise a red flag that calls for urgent steps backed by realistic measures to solve this challenge. If the problem is ignored, the South African society will not escape the associated problems attributed to unemployment. The literature has well established that a lack of jobs/employment can affect the productivity of individuals, families, and the nation as a whole (De Witte, 2012; Ngepah et al., 2021a). Consequently, every available public scarce resource at the disposal of the different levels of government must be effectively utilised to solve this long-standing problem. It is on this basis that we sought to explore whether national, provincial and local government capital has helped create jobs/employment in the economic sectors of South Africa. This study is timely and important because the findings will guide policymakers in creating more employment categories (different skills levels) in South Africa’s economic sectors, especially since the economy is faced with high unemployment rates.

Empirical literature has assessed the interaction of capital investments on various economic indicators. Studies by Chaudhuri and Sheen (2007), Sawtelle (2007), and Aljebrin and Ibrahim (2012), among others, confirmed the relationships between employment, real gross domestic product (GDP), investment and government capital/expenditure. But, to the best of our knowledge, no study has attempted to empirically assess the impact of government capital on employment spanning 1993 to 2017 with a panel of 269 South African municipalities. We employ Dumitrescu and Hurlin’s (2012) most recently proposed panel causality test and the System Generalised Method of Moments (SGMM) technique that accounts for endogeneity issues in a model. Employment impact is analysed for different skill levels (skilled, semi-skilled and low-skilled) and within eight specific economic sectors of South Africa. The eight economic sectors cover the agriculture, forestry and fisheries; manufacturing; mining and quarrying; electricity, gas and water; construction; wholesale and retail trade; catering; finance, insurance and real estate; and community, social and personal services sectors. The government capital comprises general/national, provincial and local government capital.

The findings from this study offer strong evidence of bidirectional causal relationships among our variables of interest in the eight economic sectors. SGMM results suggest that the general government capital outperforms other levels of government in providing total employment and increasing categories of employment (that is, different skills levels) in South Africa’s economic sectors. The remainder of the paper is structured as follows: Section 2 reviews the relevant literature; Section 3 explains the methodological approach; Section 4 presents and discusses the empirical results; and Section 5 concludes the study.

2. Literature review

The Constitution of South Africa set out a three-tiered fiscal system, namely the national/central, provincial and local governments. For example, local governments range from several significant metropolitan areas (metros) to a large number of smaller rural towns. The Constitution currently assigns significant fiscal powers to the provinces, which have the power to set spending and regulatory policies for a range of public services, including education, the environment, health, housing, local government, transportation, and economic development. The Constitution requires that “Local government and each province is entitled to an equitable share of revenue raised nationally to enable it to provide basic services and perform functions allocated to it.”¹ South Africa’s local government (municipal) is divided into local municipalities. Each municipality has a council where decisions are made, and municipal officials and staff implement the work of the municipality. The Council must pass a budget for its municipality each year, decide on development plans and service delivery for its municipal area. The national government of South Africa comprises parliament, cabinet and various other departments. These components perform

functions outlined in the Constitution and legislation enacted by parliament. The national government ensures service fairness and corrects inter-community resource misallocations. Hence, each aspect of the three-tiered fiscal system has access to its own resources/capital enacted in the Constitution, but how much of these resources/capital has been used to create jobs remained unanswered in the empirical literature for 1993 to 2017. It is on this basis that we embarked on this empirical study for the purpose of academic awareness and policy direction.

There is well-established literature on employment and its determinants. Existing literature suggests that labour markets consist of the demand for labour and supply of labour, just like markets for goods. On the one hand, a wide range of factors affects employment from both the demand and supply sides. Employment is considered to be dependent on economic growth, capital stocks, technology, wages, price of other inputs, labour productivity, imports, exports, previous period's employment and output, and labour market policies, among others, from the demand side (International Monetary Fund (IMF), 2014; Ramady, 2013 among others). On the other hand, wages, the number of workers in an economy, individuals' preferences, skills or education affect employment from the supply side of the labour market (Blundell & MaCurdy, 1999).

The theoretical literature assumes that employment is directly affected by the cost of labour. According to the law of demand, there is a negative relationship between the demand for labour and wages. Therefore, a higher wage leads to a decrease in the quantity of labour demanded, while a lower wage leads to an increase in the quantity of labour demanded. The law of supply states that a positive link exists between the supply of labour and wages. A higher price of labour leads to a higher quantity of labour supplied, while a lower price results in a lower quantity supplied (Chang & Schorfheide, 2003). Additionally, a change in the relative price of labour (the price of labour relative to that of other inputs) can lead to a more concentrated use of the cheapest inputs. In other words, relatively cheap capital is likely to prompt firms to be more capital-intensive, while in the case of relatively cheap labour, firms are likely to be more labour-intensive. Similarly, a change in the comparative prices of different skills categories might cause changes in the type of skills demanded by firms. For instance, if the wages of unskilled workers increase moderately more than that of skilled workers, firms might choose to use fewer unskilled workers and more skilled workers (International Labour Office (ILO), 2010).

Furthermore, technology within an economy significantly impacts the demand for high-skill and low-skill workers in the labour market. Technology thus leads to the increased demand for high-skilled workers able to operate machinery. It also constitutes a complement to high-skill workers. Despite such positive effects on the demand for skilled workers, technology also leads to the replacement of unskilled human labour by machinery in some key sectors of an economy, thereby reducing employment (IMF, 2014). Thus, it is a substitute for low-skilled workers. The mainstream economic theory states that economic growth has a positive impact on employment (Aljebrin & Ibrahim, 2012; Şahin et al., 2014; Sawtelle, 2007). Moreover, variables such as output, productivity, exports, price of other inputs, and education levels have positive effects on employment, while imports and the number of workers in an economy are negatively associated with employment (IMF, 2014; Ramady, 2013).

Focusing on firm-level datasets, Bresson et al.'s (1992) study, for example, estimated employment equations for three different types of labour in 586 French manufacturing firms. They found that the wage elasticities were greatest for the least skilled workers. Abowd et al. (1999) also examined French data on workers' entry and exit from firms and attempted to use information on the size of costs associated with workers' movements. They found very high fixed costs were associated with workers' dismissals, and most adjustments were through varying the hiring rate. Bond and Van Reenen (2007) surveyed micro-econometric research on investment and employment that used panel data from individual firms or plants. They focused on previous studies' model specification and econometric estimation issues, and reviewed some of their main empirical findings. Their study alluded that structural micro-econometric models of investment and

employment are useful for testing hypotheses about the environment in which firms make decisions about their factor inputs.

Aiyagari et al. (1992) investigated the output, employment, and interest rate effects of government consumption using the neoclassical stochastic growth model. Their study theoretically illustrated that a persistent change in government consumption has a greater impact on output and employment than a temporary change, and there could be an analogue to the Keynesian multiplier in the neoclassical growth model. For firm-level datasets, Heintz (2000) examined the productive investment impact of distributive outcomes, unresolved distributive conflicts, and its implications for the level of unemployment in South Africa. The study established a link between investment and employment within the context of Keynesian and classical unemployment. Using time-series and cross-sectional data, the results supported the argument that both distributive outcomes and distributive conflicts are important influencers on the rate of investment and, consequently, employment. Fouladi's (2010) study focused on Iran by investigating government expenditure's impact on GDP, employment and private investment using the computable general equilibrium (CGE) model approach. The study's results confirmed that government expenditure impacts the economy in different ways when types of costs are taken into account. The findings revealed that an increase in government consumption expenditure causes a reduction in production, employment and investment. Using a different approach, Kelishomi and Nisticò (2022) investigated the impact of economic sanctions on employment in Iran. Their estimates indicated that the sanctions toward Iran led to an overall decline in the manufacturing employment growth rate of 16.4 percentage points. The findings further revealed a significant asymmetrical effect across industries with different ex-ante import shares, basically stimulated by labour-intensive industries and industries that heavily depend on imported inputs.

For the United States (US), Beard et al. (2014) measured the employment effects of changes in capital investment in the US information sector by econometrically estimating an "employment multiplier" from historical data. The study used an input-output approach. They found that information sector jobs have substantially higher median earnings than the private sector average, and the economic significance of changes in information sector employment is greater than might first appear. On the contrary, a recent study by Hunt and Nunn (2022) re-examined whether US workers had become increasingly concentrated in low and high-wage jobs relative to middle-wage jobs, a phenomenon known as employment polarisation. The study applied both worker-based and occupation-based approaches. The authors reported a decline in both occupation and individual level employment since 1973 in the share of workers earning middle wages, and inconsistency in employment polarisation when it comes to large increases in the share of high-paid and low-paid workers. Therefore, the study did not support the view that employment was polarising during the 1990s (due to automation or other factors). Moreover, Aslim (2022) explored the effect of public health insurance on employment transitions among adults without dependent children in the US. That study used labour market outcomes and household demographic data obtained from the monthly Current Population Survey (CPS). The sample period spanned January 2010 through July 2016. The findings revealed that the probability of part-time employment increases relative to full-time employment. The study uncovered that employment transitions are primarily attributed to personal (voluntary) reasons instead of economic (involuntary) reasons, suggesting that increases in part-time employment are created through the labour supply channel.

Several empirical studies have also analysed the determinants of employment in both developed and developing countries. Malik and Sarwar (2013) investigated the factors that determine the labour demand function for Pakistan over the period 1970 to 2011. They used the Johansen co-integration approach and found FDI and GDP positively impacted employment. However, they also determined the exchange rate negatively affects the country's employment level. Similarly, Aljebrin and Ibrahim (2012) analysed the determinants of employment in Saudi Arabia from 1990 to 2008. Using the co-integrated approach, they found that variables such as economic growth, real investment, real government expenditure and real value of exports are positively and

significantly related to employment. In contrast, the real value of imports has a negative and significant impact on employment.

Autor and Dorn (2013) examined the polarisation of employment and wages using a partial general equilibrium model. Their estimated results showed a need for meaningful disaggregation of labour input. The implication of such a finding is that the simple skilled versus non-skilled distinction may be too broad. Similarly, Bergström and Panas (1992) found that estimates of total factor productivity are sensitive to the choice of the disaggregation of inputs. Swane and Vistrand (2006) analysed the relationship between GDP and employment growth in Sweden using the employment-population ratio to measure the extent of employment generation. The estimated results revealed a positive and significant relationship between GDP and employment growth. Bhalotra (1998) also reported on the significant positive effects of output change, capital stock and previous employment periods on employment, while manhours and the previous period of wages had significant negative effects on employment.

To the best of our knowledge, this study differs from the previous empirical studies in the literature because it investigated the dynamic impact of general/national, province and local government capital on total employment (and different categories of employment such as skilled, semi-skilled and low-skilled) in the South African economy. It focused on eight specific economic sectors (which include agriculture, forestry and fisheries; manufacturing; mining and quarrying; electricity, gas and water; construction; wholesale and retail trade; catering; finance, insurance and real estate; and community, social and personal services sectors) by using quantitative data spanning from 1993 to 2017 for a panel of 269 municipalities.

3. Methodology and data

3.1. Empirical model specification

One of the bases that forms the determinants of employment in the literature is a simple labour demand framework for countries, regions and organisations. In this context, employment is based on the labour demand equation derived from a production function following Narayanan's (2003) specification. A basic production function consists of labour and capital inputs; the function is described as follows by Eita and Du Toit (2009):

$$Y = AF(K, L) \quad (1)$$

Where production (Y) is a function of capital (K), labour (L) and productivity (A). Changes in capital will result in a change in employment and production. Capital has a positive impact on the previous year's employment Bhalotra, 1998. To construct the impact of capital on employment, Narayanan (2003) used the following equations:

- A basic model of employment

$$i(K, E/PH, \beta^e, A) \quad (2)$$

- The employment is assumed to be static; hence, a stable employment state equation

$$EM = g(K, A, v(\beta^e)R) \quad (3)$$

- These equations are derived from:

- A production function:

$$EM = g(K, A, v(\beta^e)R)$$

- and price-setting behaviour

$$EM = g(K, A, v(\beta^e)R)$$

where $EM = g(K, A, v(\beta^e)R)$ is the number of workers, $l(.)$ is a function that includes lags of the arguments, K is capital stock, E is nominal annual earnings per worker, P is the price of the value added, H is the actual number of hours worked per worker, $EM = g(K, A, v(\beta^e)R)$ is an index of expected cyclical demand, A is an index of technical progress, $EM = g(K, A, v(\beta^e)R)$ is the product demand elasticity, $EM = g(K, A, v(\beta^e)R)$, the real hourly earnings, and $EM = g(K, A, v(\beta^e)R)$ is the marginal product of an additional worker. For a positive capital outcome, high product demand elasticity is required to curb the substitution effect between capital and labour. The increased demand can result in a rise in employment as prices increase. Labour-augmenting technical progress reduces wages, thereby raising employment and increasing labour efficiency, ultimately reducing employment. Neutral or capital-augmenting technical progress enhances employment. The following equation arises from the previous equations:

$$EM = g(K, A, v(\beta^e)R) \quad (6)$$

In this equation, the subscripts g , i and t stand for metropolitan municipalities, the sector and year, respectively. The model can be adjusted to include and exclude one or more dummy variables for the municipality, sector and year. The dummy variables are expected to capture the effects of technical progress, as indicated in the initial equations. $EM = g(K, A, v(\beta^e)R)$ represents employment in terms of total persons engaged; K is productive capital stock deflated by specific price index; $EM = g(K, A, v(\beta^e)R)$ is output stock measured as the change in the logarithm of the gross value of output; $EM = g(K, A, v(\beta^e)R)$ is the wage per person engaged in the production per year deflated by the specific price index; $EM = g(K, A, v(\beta^e)R)$ is the dummy variable for reforms; $EM = g(K, A, v(\beta^e)R)$ dummy variable for the degree of openness; and $EM = g(K, A, v(\beta^e)R)$ interaction of dummies for reforms and degree openness with other explanatory variables.

Following the previous studies, we estimated two employment models, namely the total employment model (equation 7) and the sectorial employment model (equation 8). Moreover, in each model, the capital is divided into four components, which include (i) general/national government capital; (ii) provincial government capital; (iii) local government capital; and (iv) capital in all economic sectors. We also included dummy variables for the sectors under review for the South African economy and metropolitan municipalities. However, the dummy variables for reforms, degree of openness, and interaction of dummy variables on reforms and degree of openness with other explanatory variables were removed from the models. The empirical employment models from which our estimations take their bearing follow:

4. Empirical total employment model

$$\begin{aligned} \ln emp_toth_{git} = & \beta_0 + \beta_1 \ln emp_toth_{git-1} + \beta_2 \ln wage_toth_{git} + \beta_3 \ln gfcf_oth_{git} + \beta_4 \ln gfcf_gg_{git} + \\ & \beta_5 \ln gfcf_pg_{git} + \beta_6 \ln gfcf_lg_{git} + \beta_7 \ln lva_oth_{git} + \beta_8 metro_{git} + \beta_9 sector1_{git} + \\ & \beta_{10} sector2_{git} + \beta_{11} sector3_{git} + \beta_{12} sector4_{git} + \beta_{13} sector5_{git} + \beta_{14} sector6_{git} + \\ & \beta_{15} sector7_{git} + \beta_{16} sector8_{git} \end{aligned} \quad (7)$$

5. Empirical sectorial employment model

$$\begin{aligned} \ln emp_toth_{git} = & \alpha_0 + \alpha_1 \ln emp_toth_{git-1} + \alpha_2 \ln wage_toth_{git} + \alpha_3 \ln gfcf_oth_{git} \\ & + \alpha_4 \ln gfcf_gg_{git} + \alpha_5 \ln gfcf_pg_{git} + \alpha_6 \ln gfcf_lg_{git} + \alpha_7 \ln lva_oth_{git} \\ & + \alpha_8 metro_{git} + \varepsilon_{2it} \end{aligned} \quad (8)$$

Where: $\beta_1 \dots \beta_{16}$, $\alpha_1 \dots \alpha_8$ are the coefficient parameters for total and sectorial employment models; $\beta_1 \dots \beta_{16}$, $\alpha_1 \dots \alpha_8$ are the error terms; $i = 1, 2 \dots N$; and $t = 1, 2 \dots T$. The variables are in natural logarithm form (\ln). The description and the data sources for the variables can be found in Table 1. As stated, the annual panel data used in this study were from the period 1993 to 2017 (presented in Table 1 below) for the South African economy. The data comprised 269 South African municipalities. To save space, they are not reported in this study but can be made available upon request.

Table 1. Variables, description and data sources

Variables	Meaning	Data source	Theoretical expectation
gfcf_gg	General government gross fixed capital formation in R millions constant 2010 prices (1993-2017) serve as a proxy for national/general government capital	Quantec database	Positive
gfcf_pg	Provincial government gross fixed capital formation in R millions constant 2010 prices (1993-2017) serve as a proxy for provincial government capital	Quantec database	Positive
gfcf_lg	Local government gross fixed capital formation in R millions constant 2010 prices (1993-2017) serve as a proxy for local government capital	Quantec database	Positive
gfcf_oth	Gross fixed capital formation for the sectors in R millions constant 2010 (1993-2017)	Quantec database	Positive
gva_oth	Gross value added at basic prices of the sectors (1993-2017) serve as a proxy for output	Quantec database	Positive
wage_tototh	Wages by employment for the sectors (1993 – 2017)	Quantec database	Negative
emp_tototh	Total employment for the sectors (1993-2017)	Quantec database	Positive
emp_skoth	Total skilled employment for the sectors (1993-2017)	Quantec database	Positive
emp_sskoth	Total semi-skilled employment for the sectors (1993-2017)	Quantec database	Positive
emp_lsoth	Total low-skilled employment for the sectors (1993-2017)	Quantec database	Positive
Metro	Metropolitan municipality dummies	Authors	
Sector 1 (reference group)	Dummy taking 1 if agriculture, forestry and fisheries sector and 0 otherwise	Authors	

(Continued)

Table 1. (Continued)			
Variables	Meaning	Data source	Theoretical expectation
Sector 2	Dummy taking 1 if mining and quarrying sector and 0 otherwise	Authors	
Sector 3	Dummy taking 1 if manufacturing sector and 0 otherwise	Authors	
Sector 4	Dummy taking 1 if electricity, gas and water sector and 0 otherwise	Authors	
Sector 5	Dummy taking 1 if construction sector and 0 otherwise	Authors	
Sector 6	Dummy taking 1 if wholesale and retail trade, catering sector and 0 otherwise	Authors	
Sector 7	Dummy taking 1 if finance, insurance, real estate sector and 0 otherwise	Authors	
Sector 8	Dummy taking 1 if community, social and personal services sector and 0 otherwise	Authors	
Note: The study uses an annual panel data sourced from Quantec database. Skills classification according to profession in South Africa consist of: skilled (manager, professional, technician); semi-skilled (clerk, sales & services, skilled agriculture, craft & related trade, plant & machine operator; and low-skilled (elementary and domestic worker) (Statistics South Africa, 2014; Ngepah et al., 2021b). Data for the variables are sources from the South African Standardised Industry Indicator Database, which is collected, managed and owned by Quantec (2020). Source: Author's Computations			

The sample contained a fairly representative panel of eight sectors (presented in Table 1 below). The time period and the number of sectors used in this study were carefully chosen based on data availability. All the data were collected from the Quantec database (2020), and the main independent variable of interest was employment. Quantec database provides the distinct gross fixed capital formation for the national, provincial and local governments without any overlap. The gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 South Africa National Account, net acquisitions of valuables are also considered capital formation.

5.1. Estimation strategy

To achieve the objective of this study, we employed two processes, namely the panel Granger-causality and GMM estimation techniques. This study applied the heterogeneous panel causality test proposed by Dumitrescu and Hurlin (2012)² to investigate direction causality among our variables of interest. We used this causality test because it considers the heterogeneous nature of the panel data.

The study further estimated the system generalised method of moments³ (SGMM). Using Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond's (1998) estimation process for GMMs, we established that dynamic relationships exist between government capital at national, provincial and local levels, employment, and other independent variables in South Africa. These dynamic models were utilised to determine the impact of the independent variables on employment while controlling for potential bias due to the endogeneity of the regressors.

6. Empirical results and discussion

Table 2 presents the descriptive statistic results for the study's entire sample. We observed that for the full sample, the mean (or standard deviation) values for total employment (emp_tototh), total skilled employment (emp_skoth), total semi-skilled employment (emp_sskoth), total low-skilled employment (emp_lsoth) were 7.095, 4.72, 6.094 and 5.631 (or 2.173, 2.224, 2.021 and 2.168), respectively. The maximum and minimum values for the ten variables were between 13.224 and -3.124, respectively. The skewness had both negative and positive values, which shows a negatively and positively skewed distribution. A similar interpretation holds for the rest of the variables. Figures 1, 2 and 3 present the scatter plots for the mean value relationship between different employment categories and different government capital. A visual inspection of the figures shows that a linear relationship exists between different employment categories and different government capital. It is worth noting that the national government capital contributes more to total, skilled, semi-skilled and low-skilled employments when compared to provincial and local government capital. This is because, as capital keeps increasing towards the right-hand side, the scatter plot for employment keeps increasing towards the right-hand side for all the categories of employment.

Before compiling the econometric results, we first applied the heterogeneous causality test proposed by Dumitrescu and Hurlin (2012) to examine the causal relationship among the variables of interest. The results in Table 3 provide strong evidence of the bidirectional causality between our variables of interest in the overall economic sectors and each of the eight specified sectors. The results in Table 3 reveal that the null hypothesis of no Granger causality is rejected for the eight specific and overall economic sectors (i.e., aggregate). These sectors are: agriculture, forestry and fisheries; manufacturing; mining and quarrying; electricity, gas and water; construction; wholesale and retail trade; catering; finance, insurance and real estate; and community, social and personal services sectors. The individual Wald statistics at 10%, 5% and 1% levels of significance are statistically significant. This implies that a rise (fall) in the injection of government capital at national, provincial and local levels causes a corresponding rise (fall) in total employment in the economic sectors. Equally, a rise (fall) in the level of total employment in the economic sectors causes a rise (fall) in government (general, provincial and local governments) capital. This suggests that appropriate econometric models are those that need to control for endogeneity.

Table 2. Descriptive statistics results

Variables	Observation	Mean	Standard deviation	Min	Max	Skewness	Kurtosis
lemp_tototh	54937	7.095	2.173	0.000	13.224	-0.471	3.200
lemp_skoth	52680	4.72	2.224	0.000	12.075	0.055	2.817
lemp_sskoith	54835	6.094	2.021	0.000	12.381	-0.239	3.236
lemp_Isoth	53887	5.631	2.168	0.000	12.032	-0.286	2.703
lwage_tototh	55025	4.186	1.943	-3.576	11.181	0.161	3.409
lgfcf_oth	55075	3.25	2.012	-5.116	10.114	0.058	3.314
lgfcf_gg	55400	4.63	1.457	0.954	9.678	0.519	3.119
lgfcf_pg	55400	4.434	1.470	0.803	9.504	0.485	3.067
lgfcf_lg	55400	2.812	1.493	-2.216	7.895	0.510	3.212
lgva_oth	55075	5.189	1.874	-3.124	11.784	0.048	3.579

Source: Author's Computations

Figure 1. (A): Scatter Plot between Total Employment and National Government Capital; (B): Scatter Plot between Skilled Employment and National Government Capital; (C): Scatter Plot between Semi-Skilled Employment and National Government Capital; (D): Scatter Plot between Low-Skilled Employment and National Government Capital

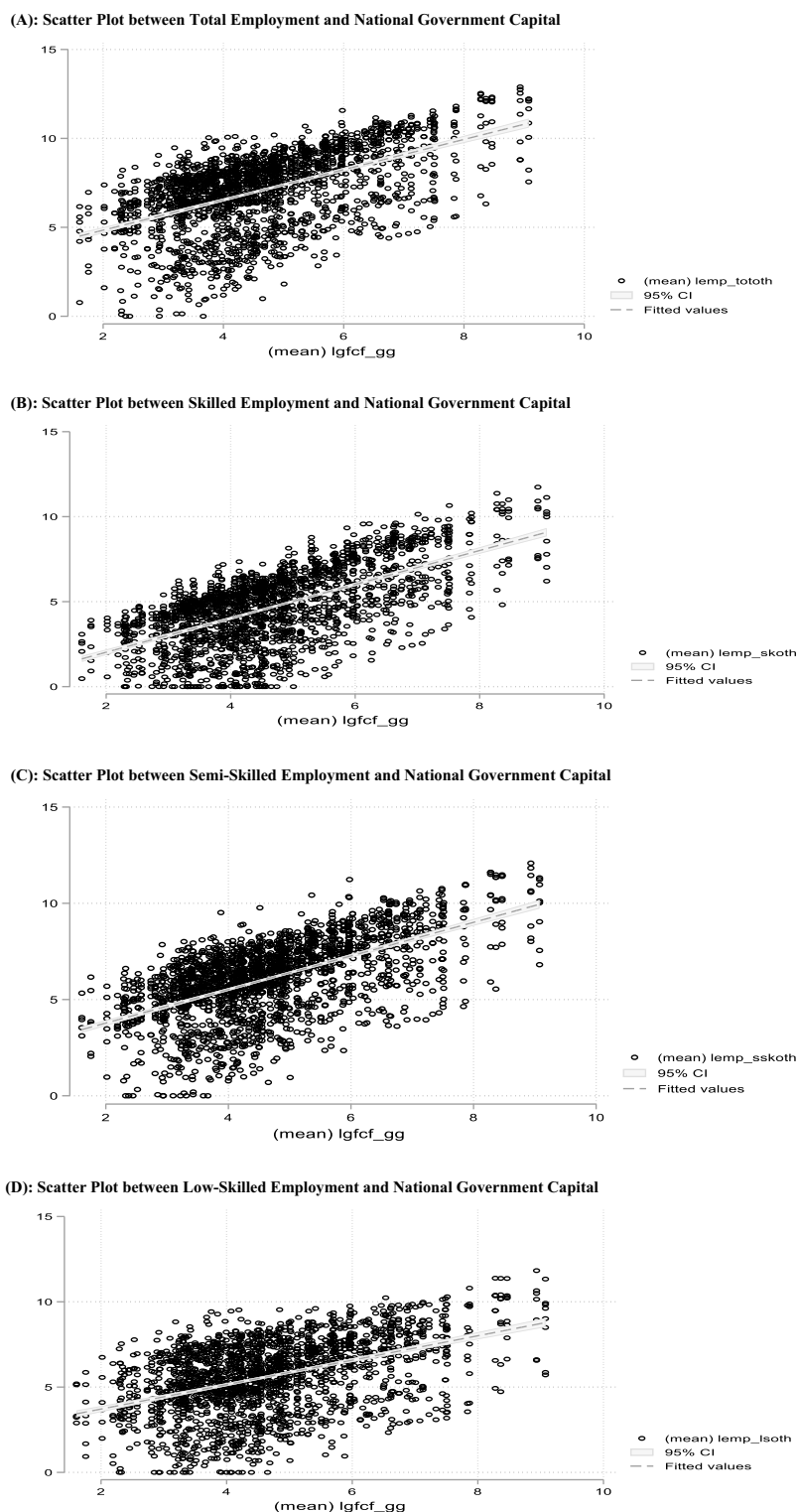
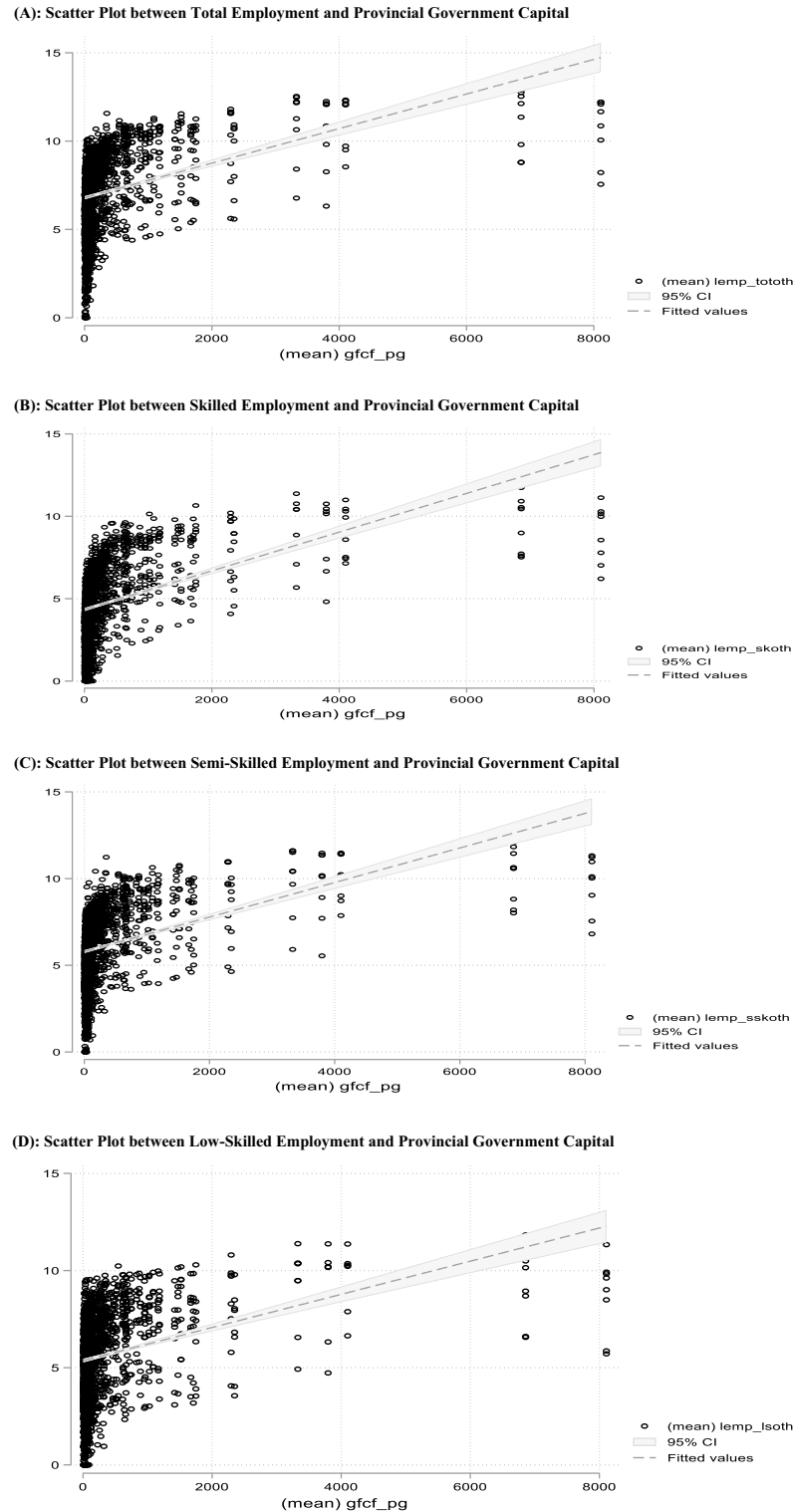


Table 4 present the empirical estimates obtained using the pooled ordinary least square (OLS) and SGMM as explained previously to assess the effect of various components of government

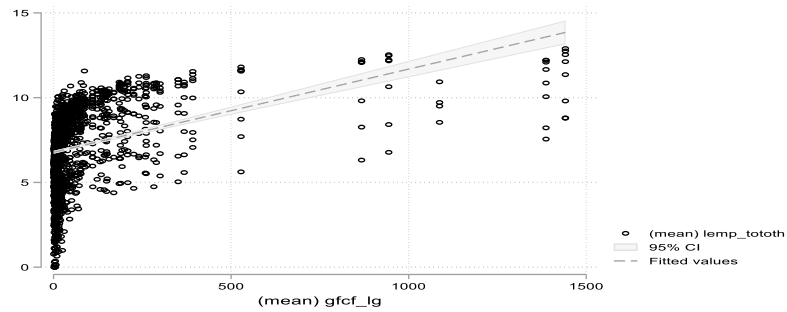
Figure 2. :(A): Scatter Plot between Total Employment and Provincial Government Capital; (B): Scatter Plot between Skilled Employment and Provincial Government Capital; (C): Scatter Plot between Semi-Skilled Employment and Provincial Government Capital; (D): Scatter Plot between Low-Skilled Employment and Provincial Government Capital



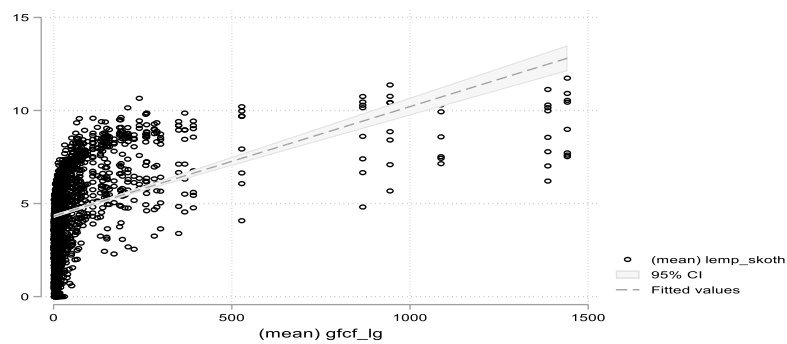
capital on total employment. We focused on our variables of interest. Only the SGMM estimates are discussed in detail going forward because they take the endogeneity problem into account.

Figure 3. (A): Scatter Plot between Total Employment and Local Government Capital; (B): Scatter Plot between Skilled Employment and Local Government Capital; (C): Scatter Plot between Semi-Skilled Employment and Local Government Capital; (D): Scatter Plot between Low-Skilled Employment and Local Government Capital

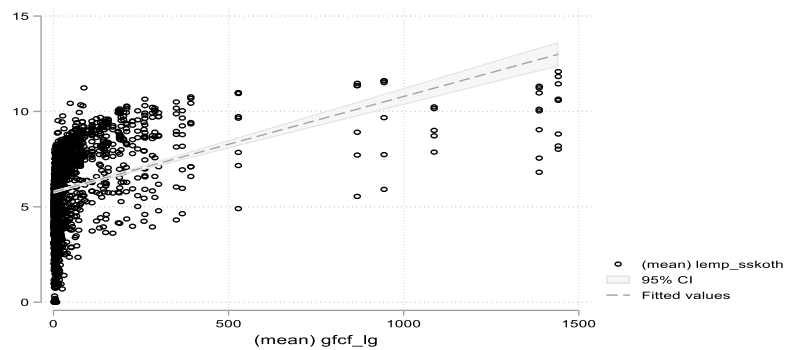
(A): Scatter Plot between Total Employment and Local Government Capital



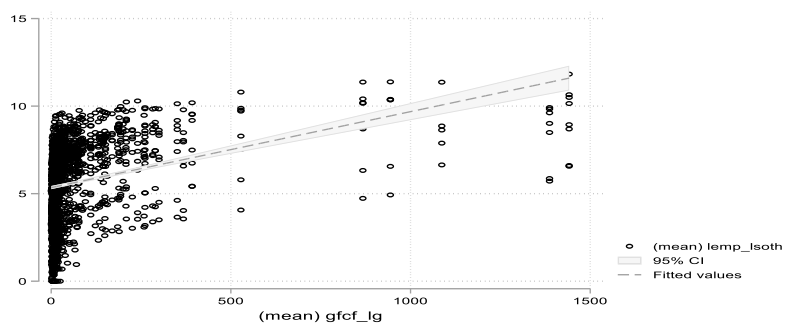
(B): Scatter Plot between Skilled Employment and Local Government Capital



(C): Scatter Plot between Semi-Skilled Employment and Local Government Capital



(D): Scatter Plot between Low-Skilled Employment and Local Government Capital



For our baseline results, we used the pool OLS. In column three of Table 4, general government capital ($lgfcf_gg$) has a positive and significant impact on total employment (emp_tototh) in South Africa. According to the total employment, for every 1% increase in the general government

Table 3. Dumitrescu and Hurlin (2012) panel causality test results

Model	Null hypothesis	W-statistic	Zbar-statistic	p-value	Nature of direction
Overall economic sectors					
1	gfcf_gg → emp_tototh	0.169	-26.004	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	5.838	131.405	0.000***	
2	gfcf_pg → emp_tototh	0.337	-21.344	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	6.013	136.278	0.000***	
3	gfcf_lg → emp_tototh	1.335	6.386	0.000***	gfcf_lg↔emp_tototh
	emp_tototh → gfcf_lg	1.589	13.438	0.000***	
Sector 1: Agriculture, forestry and fisheries sector					
1	gfcf_gg → emp_tototh	0.484	-6.102	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	4.450	32.838	0.000***	
2	gfcf_pg → emp_tototh	0.731	-3.678	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	4.898	37.232	0.000***	
3	gfcf_lg → emp_tototh	0.187	-9.013	0.000***	gfcf_lg↔emp_tototh
	emp_tototh → gfcf_lg	2.795	16.588	0.000***	
Sector 2: Manufacturing sector					
9	gfcf_gg → emp_tototh	2.836	16.994	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	8.094	68.611	0.000***	
10	gfcf_pg → emp_tototh	2.537	14.058	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	8.052	68.197	0.000***	
11	gfcf_lg → emp_tototh	1.352	2.418	0.016**	gfcf_lg↔emp_tototh
	emp_tototh → gfcf_lg	5.996	48.013	0.000***	
Sector 3: Mining and quarrying sector					
13	gfcf_gg → emp_tototh	3.921	27.640	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	2.932	17.934	0.000***	

(Continued)

Table 3. (Continued)

Model	Null hypothesis	W-statistic	Zbar-statistic	p-value	Nature of direction
14	gfcf_pg → emp_tototh	3.906	27.496	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	2.739	16.039	0.000***	
15	gfcf_lg → emp_tototh	2.883	17.454	0.000***	gfcf_lg ↔ emp_tototh
	emp_tototh → gfcf_lg	2.986	18.458	0000***	
Sector 4: Electricity, gas and water sector					
1	gfcf_gg → emp_tototh	0.169	-9.194	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	5.838	46.459	0.000***	
2	gfcf_pg → emp_tototh	0.337	-7.546	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	6.013	48.182	0.000***	
3	gfcf_lg → emp_tototh	1.335	2.258	0.024**	gfcf_lg ↔ emp_tototh
	emp_tototh → gfcf_lg	1.589	4.751	0.000***	
Sector 5: Construction sector					
1	gfcf_gg → emp_tototh	1.352	2.418	0.016***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	0.872	-2.290	0.022**	
2	gfcf_pg → emp_tototh	1.425	3.141	0.002***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	0.729	-3.692	0.000***	
3	gfcf_lg → emp_tototh	1.804	6.864	0.000***	gfcf_lg → emp_tototh
	emp_tototh → gfcf_lg	1.118	0.128	0.898	
Sector 6: Wholesale and retail trade, catering sector					
1	gfcf_gg → emp_tototh	0.389	-7.029	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	2.420	12.907	0.000***	
2	gfcf_pg → emp_tototh	0.510	-5.849	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	2.602	14.695	0.000***	
3	gfcf_lg → emp_tototh	0.385	-7.068	0.000***	gfcf_lg ↔ emp_tototh
	emp_tototh → gfcf_lg	2.068	9.451	0.000***	

(Continued)

Table 3. (Continued)

Model	Null hypothesis	W-statistic	Zbar-statistic	p-value	Nature of direction
Sector 7: Finance, insurance, real estate sector					
1	gfcf_gg → emp_tototh	0.169	-9.194	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	5.838	46.459	0.000***	
2	gfcf_pg → emp_tototh	0.337	-7.546	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	6.013	48.182	0.000***	
3	gfcf_lg → emp_tototh	1.335	2.258	0.024**	gfcf_lg ↔ emp_tototh
	emp_tototh → gfcf_lg	1.589	4.751	0.000***	
Sector 8: Community, social and personal services sector					
1	gfcf_gg → emp_tototh	0.549	-5.466	0.000***	gfcf_gg ↔ emp_tototh
	emp_tototh → gfcf_gg	11.806	105.048	0.000***	
2	gfcf_pg → emp_tototh	0.601	-4.954	0.000***	gfcf_pg ↔ emp_tototh
	emp_tototh → gfcf_pg	11.414	101.197	0.000***	
3	gfcf_lg → emp_tototh	0.842	-2.582	0.010**	gfcf_lg ↔ emp_tototh
	emp_tototh → gfcf_lg	7.920	66.894	0.000***	
Note: → and → denote bidirectional and unidirectional causality respectively. → denote does not homogeneously cause (ie H ₀). *** p<0.01. ** p<0.05. * p<0.1. Source: Author's Computations					

Note: ↔ and → denote bidirectional and unidirectional causality respectively. → denote does not homogeneously cause (i.e. H_0). *** p<0.01, ** p<0.05, * p<0.1. **Source:** Author's Computations

Table 4. SGMM results for overall economic sectors

	(1)	(2)	(3)	(4)
Variables	POLS	POLS	SGMM	SGMM
L.lemp_tototh			0.941***	0.861***
			(0.011)	(0.005)
lwage_tototh	0.645***	0.730***	0.127***	0.097***
	(0.004)	(0.004)	(0.012)	(0.005)
lgfcf_oth	0.117***	0.179***	0.029***	0.058***
	(0.003)	(0.003)	(0.004)	(0.002)
lgfcf_gg	-0.038***		0.094***	
	(0.002)		(0.019)	
lgfcf_pg		0.131***		0.029**
		(0.003)		(0.012)
lgfcf_lg		-0.211***		-0.048**
		(0.003)		(0.019)
lgva_oth	0.157***	0.041***	-0.087***	-0.024***
	(0.005)	(0.005)	(0.014)	(0.006)
metro	-0.043***	-0.026***	-0.778***	0.054
	(0.003)	(0.003)	(0.133)	(0.060)
Sector 2	-0.336***	-0.295***	-0.022	0.043***
	(0.008)	(0.008)	(0.030)	(0.005)
Sector 3	-0.727***	-0.670***	-0.005	-0.024***
	(0.007)	(0.006)	(0.029)	(0.005)
Sector 4	-3.094***	-3.102***	-0.161***	-0.433***
	(0.006)	(0.005)	(0.048)	(0.017)
Sector 5	-1.168***	-1.171***	-0.020	-0.112***
	(0.005)	(0.005)	(0.031)	(0.007)
Sector 6	-1.418***	-1.463***	-0.123***	-0.190***
	(0.006)	(0.005)	(0.031)	(0.007)
Sector 7	-2.731***	-2.677***	-0.148***	-0.340***
	(0.006)	(0.006)	(0.042)	(0.015)
Sector 8	-0.727***	-0.705***	-0.010	-0.027***
	(0.007)	(0.006)	(0.029)	(0.005)
Constant	4.646***	4.510***	0.199***	0.628***
	(0.010)	(0.009)	(0.072)	(0.036)
Observations	54,887	54,887	52,688	52,688
R-squared	0.979	0.981		
Number of pid			2,197	2,197
Number of Instruments			304	305
Wald χ^2			8.35e+06***	7.53e+06***
Sargan test			2166.868	2168.128
p-value			0.000	0.000

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in Parentheses. H₀: Random effect model is appropriate, H₁: Fixed effect model is appropriate SGMM: Arellano-Bover/Blundell-Bond system dynamic panel-data estimation. **Note:** Sargan test of overidentifying restrictions: H₀: overidentifying restrictions are valid. **Source:** Author's computations

capital, total employment will increase by 0.09% in South Africa. In column four of Table 4, for every 1% increase in provincial ($lgfcf_pg$) and local government ($lgfcf_lg$) capital, total employment will increase and fall by 0.03% and -0.05% , respectively. This implies that the national government of South Africa contributes more to total employment creation when compared to the provincial and local governments. This finding is consistent with Belke et al. (2003) and Ahlawat and Renu's (2018) studies. According to Mashamaite and Lethoko's (2018) study, local governments/municipalities in South Africa are faced with numerous challenges, such as a lack of technical and financial resources, economic collapse, the absence of sufficient services, corruption, etc. Although the aim of this study was not to explicitly examine these challenges, they potentially contributed to local government capital's inability to prompt employment. The results in columns three and four of Table 4 also show that output levels did not positively contribute to total employment in South Africa. In Tables 4 and 6, the Sargan test results show that some of the instruments in the model are not valid. However, the power properties of the model are sufficient for policymaking since the Wald chi-square confirms the joint significance of key instruments in the estimation.

Table 5's results reflect whether different components of government capital's effects on employment differ across the various sectors. Several results for the different economic sectors are noteworthy. First, general/national government capital promotes employment across all sectors, except sectors 3 and 8 (i.e., manufacturing sector; and community, social and personal services sector). For every 1% increase in the general government capital, total employment in sectors 3 and 8 will fall by -0.18% and -0.60% , respectively. This implies that general government capital in the manufacturing sector and community, social and personal services sector has not promoted employment in these sectors as we would expect. Hence, there is a need for the national government to pay attention to these two sectors, especially the manufacturing sector. According to Kaldor (1966, 1967) and Opoku and Yan (2019), the manufacturing sector is vital to industrialisation and can subsequently act as an engine/driver of economic growth. Paying attention to the manufacturing sector can further catalyse industrialisation, improving job creation when the capital in the sector is effectively utilised. Secondly, provincial government capital promotes employment in sectors 3 and 8 (i.e., manufacturing sector; and community, social and personal services sector), while it negatively impacts the remaining sectors. For every 1% increase in the provincial government capital, total employment in sectors 3 and 8 will increase by 0.14% and 0.60%, respectively. Thirdly, local government capital promotes employment in sectors 2 and 3 (i.e., mining and quarrying; and manufacturing sectors), while it has a negative impact on employment in the rest of the sectors. For every 1% increase in the local government capital, total employment in sectors 2 and 3 will rise by 0.04% and 0.64%, respectively. These results imply that the provincial and local governments still have to put in a lot of effort to complement the national government's efforts in creating employment at the sectoral level. In Tables 5 and 7, the Sargan tests results show that the instruments in the models are valid, and the power properties of the model are sufficient for policymaking, given that the Wald chi-square confirms the joint significance of the instruments in the estimation.

Table 6 illustrates the results of the different components of government capital in the categories of total employment. In summary, the results reveal that general/national government capital creates jobs across the categories of employment (skilled, semi-skilled and low-skilled employment). Moreover, provincial and local government capital has a negative and significant impact on the categories of total employment in the South African economy. This implies the national government is playing a more significant role in creating jobs across employment categories in the South African economy, hence the provincial and local government should enact policies that will complement these efforts in creating skilled, semi-skilled and low-skilled jobs.

As previously stated, government capital has the potential to create employment. In Table 7, panels A, B and C show that general government capital has a positive and significant impact on skilled, semi-skilled and low-skilled employment in the agriculture, forestry and fisheries sector

Table 5. SGMM sectorial employment results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8
L.lemp_tototh	0.770*** (0.000)	0.466*** (0.000)	0.553*** (0.000)	0.711*** (0.000)	0.752*** (0.000)	0.729*** (0.000)	0.617*** (0.000)	0.434*** (0.000)
lwage_tototh	0.309*** (0.000)	0.779*** (0.001)	0.174*** (0.000)	0.064*** (0.000)	0.093*** (0.000)	-0.022*** (0.000)	0.118*** (0.000)	0.142*** (0.000)
lgfch_oth	0.215*** (0.000)	-0.035*** (0.000)	0.034*** (0.000)	0.038*** (0.000)	0.091*** (0.000)	0.225*** (0.000)	-0.050*** (0.000)	0.294*** (0.000)
lgfch_gg	3.631*** (0.030)	0.011** (0.005)	-0.183*** (0.008)	0.480*** (0.003)	0.529*** (0.003)	0.731*** (0.004)	1.373*** (0.008)	-0.604*** (0.005)
lgfch_pg	-3.403*** (0.028)	-0.056*** (0.004)	0.136*** (0.007)	-0.363*** (0.003)	-0.415*** (0.003)	-0.594*** (0.003)	-0.743*** (0.007)	0.601*** (0.005)
lgfch_lg	-0.339*** (0.004)	0.038*** (0.001)	0.064*** (0.001)	-0.098*** (0.000)	-0.009*** (0.001)	-0.229*** (0.001)	-0.416*** (0.001)	-0.007*** (0.001)
lgva_oth	-0.489*** (0.000)	-0.286*** (0.001)	0.053*** (0.000)	0.108*** (0.000)	-0.124*** (0.000)	0.085*** (0.000)	0.312*** (0.000)	0.011*** (0.000)
metro	-0.191*** (0.023)	-0.519*** (0.033)	0.266*** (0.017)	0.362*** (0.003)	0.584*** (0.014)	-0.081*** (0.002)	-0.544*** (0.007)	0.209*** (0.013)
Constant	1.636*** (0.016)	2.565*** (0.013)	2.203*** (0.008)	0.025*** (0.002)	1.073*** (0.005)	0.668*** (0.003)	-1.524*** (0.005)	2.988*** (0.004)
Observations	6,648	6,648	6,648	6,528	6,648	6,600	6,320	6,648
Number of pid	277	277	277	272	277	275	265	277
Number of Instruments	305	305	306	306	306	306	306	306
Wald χ^2	2.68e+07***	8.83e+07***	1.25e+08***	1.44e+08***	7.66e+07***	7.95e+07***	2.10e+08***	1.82e+07***
Sargan test	276.997	276.989	276.978	271.982	276.972	274.977	264.967	276.983
p-value	0.779	0.780	0.792	0.848	0.792	0.816	0.909	0.792

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in Parentheses. SGMM: Arellano-Bover/Blundell-Bond system dynamic panel-data estimation. **Note:** Sargan test of overidentifying restrictions: H₀: overidentifying restrictions are valid. **Source:** Author's computations

Table 6. SGMM results for skilled, semi-skilled and low-skilled total employment

	(1)	(2)	(3)
Variables	Skilled	Semi-Skilled	Low-Skilled
L.lemp_skoth	0.898*** (0.001)		
L.lemp_sskoht		0.886*** (0.001)	
L.lemp_lsoth			0.863*** (0.001)
lwage_tototh	0.162*** (0.002)	0.124*** (0.001)	0.130*** (0.001)
lgfcf_oth	0.052*** (0.001)	0.055*** (0.000)	0.040*** (0.000)
lgfcf_gg	1.234*** (0.042)	1.069*** (0.024)	1.049*** (0.030)
lgfcf_pg	-1.137*** (0.036)	-1.011*** (0.020)	-0.995*** (0.025)
lgfcf_lg	-0.162*** (0.007)	-0.118*** (0.004)	-0.112*** (0.005)
lgva_oth	-0.057*** (0.002)	-0.091*** (0.001)	-0.076*** (0.001)
metro	0.643*** (0.075)	2.094*** (0.149)	1.602*** (0.171)
Sector 2	0.192*** (0.024)	-0.047 (0.073)	0.081 (0.059)
Sector 3	0.055** (0.023)	0.050 (0.072)	-0.193*** (0.059)
Sector 4	-0.077*** (0.025)	-0.102 (0.069)	-0.308*** (0.056)
Sector 5	0.165*** (0.026)	0.126* (0.071)	-0.082 (0.058)
Sector 6	-0.126*** (0.027)	-0.048 (0.071)	-0.347*** (0.057)
Sector 7	-0.079*** (0.024)	-0.154** (0.067)	-0.367*** (0.056)
Sector 8	-0.086*** (0.031)	-0.288*** (0.078)	-0.451*** (0.065)
Constant	-0.509*** (0.037)	-0.298*** (0.073)	0.026 (0.073)
Observations	50,562	52,638	51,728
Number of pid	2,111	2,194	2,157
Number of Instruments	306	306	306
Wald χ^2	1.08e+06***	3.18e+06	1.93e+06
Sargan test	1966.498	2149.137	2082.115
p-value	0.000	0.000	0.000

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in Parentheses. SGMM: Arellano-Bover/Blundell-Bond system dynamic panel-data estimation. **Note:** Sargan test of overidentifying restrictions: H₀: overidentifying restrictions are valid. **Source:** Author's computations

Table 7. SGMM sectorial results for skilled, semi-skilled and low-skilled employments

Panel A: Skilled employment									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Variables	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8	
Ltemp_skoth	0.811*** (0.000)	0.958*** (0.000)	0.920*** (0.000)	0.861*** (0.000)	0.940*** (0.000)	0.879*** (0.000)	0.630*** (0.000)	0.885*** (0.000)	
lwage_tototh	0.449*** (0.000)	-0.106*** (0.000)	0.071*** (0.000)	0.092*** (0.000)	0.031*** (0.000)	0.065*** (0.000)	0.085*** (0.000)	0.197*** (0.000)	
lgfcf_oth	0.222*** (0.000)	-0.029*** (0.000)	0.029*** (0.000)	0.058*** (0.000)	-0.039*** (0.000)	0.064*** (0.000)	-0.041*** (0.000)	0.015*** (0.000)	
lgfcf_gg	5.147*** (0.015)	0.982*** (0.003)	-0.184*** (0.004)	1.206*** (0.004)	0.336*** (0.002)	0.487*** (0.003)	0.644*** (0.022)	1.016*** (0.004)	
lgfcf_pg	-4.666*** (0.014)	-0.943*** (0.002)	0.161*** (0.004)	-1.106*** (0.003)	-0.356*** (0.002)	-0.434*** (0.003)	-0.357*** (0.019)	-0.898*** (0.004)	
lgfcf_lg	-0.627*** (0.002)	-0.070*** (0.001)	0.033*** (0.001)	-0.164*** (0.001)	-0.036*** (0.000)	-0.126*** (0.001)	-0.159*** (0.003)	-0.101*** (0.001)	
lgva_oth	-0.468*** (0.000)	0.352*** (0.000)	-0.032*** (0.000)	0.060*** (0.000)	0.097*** (0.000)	0.044*** (0.000)	0.305*** (0.000)	-0.067*** (0.000)	
metro	-0.097*** (0.008)	-0.936*** (0.014)	-0.397*** (0.003)	0.073*** (0.001)	-0.085*** (0.001)	-0.100*** (0.001)	-0.527*** (0.005)	-0.103*** (0.002)	
Constant	-0.643*** (0.006)	-0.893*** (0.007)	0.344*** (0.003)	-0.698*** (0.002)	-0.023*** (0.002)	-0.171*** (0.002)	-1.400*** (0.010)	-0.342*** (0.001)	
Observations	6,648	6,648	6,624	5,443	6,648	6,263	5,640	6,648	
Number of pid	277	277	276	227	277	261	239	277	
Number of Instruments	306	306	306	306	306	306	306	306	
Wald χ^2	9.72e+07***	2.80e+08***	1.47e+09***	3.35e+08***	9.56e+07***	1.68e+08***	3.94e+07***	5.43e+07***	

(Continued)

Table 7. (Continued)

Panel A: Skilled employment								
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8
Sargan test	276.984	276.966	275.87	226.594	276.971	260.937	235.750	276.978
p-value	0.792	0.792	0.805	0.999	0.792	0.935	0.996	0.792
Panel B: Semi-Skilled employment								
Ltemp_sskoth	0.750*** (0.000)	0.727*** (0.000)	0.775*** (0.000)	0.808*** (0.000)	0.877*** (0.000)	0.861*** (0.000)	0.680*** (0.000)	0.705*** (0.000)
lwage_tototh	0.364*** (0.000)	0.788*** (0.001)	0.168*** (0.000)	0.028*** (0.000)	-0.006*** (0.000)	-0.038*** (0.000)	0.053*** (0.000)	0.283*** (0.000)
lgfcf_oth	0.225*** (0.000)	-0.019*** (0.000)	0.002*** (0.000)	0.021*** (0.000)	-0.017*** (0.000)	0.050*** (0.000)	-0.042*** (0.000)	-0.031*** (0.000)
lgfcf_gg	4.496*** (0.032)	1.381*** (0.006)	-0.153*** (0.005)	0.501*** (0.003)	0.611*** (0.004)	1.126*** (0.006)	2.049*** (0.008)	0.429*** (0.004)
lgfcf_pg	-4.166*** (0.030)	-1.427*** (0.005)	0.062*** (0.004)	-0.416*** (0.003)	-0.552*** (0.003)	-0.969*** (0.005)	-1.526*** (0.007)	-0.416*** (0.004)
lgfcf_lg	-0.496*** (0.005)	-0.091*** (0.001)	0.088*** (0.001)	-0.081*** (0.000)	0.040*** (0.001)	-0.239*** (0.001)	-0.391*** (0.001)	-0.038*** (0.001)
lgva_oth	-0.538*** (0.000)	-0.478*** (0.001)	-0.022*** (0.000)	0.104*** (0.000)	-0.054*** (0.000)	0.175*** (0.000)	0.326*** (0.000)	0.064*** (0.000)
metro	0.158*** (0.020)	0.079*** (0.007)	0.083*** (0.005)	0.257*** (0.001)	0.747*** (0.009)	-0.120*** (0.001)	-0.010* (0.006)	-0.046*** (0.004)
Constant	1.208*** (0.014)	0.642*** (0.004)	1.041*** (0.003)	-0.201*** (0.001)	0.565*** (0.005)	-0.273*** (0.003)	-1.788*** (0.003)	0.425*** (0.003)
Observations	6,648	6,648	6,648	6,528	6,648	6,600	6,270	6,648

(Continued)

Table 7. (Continued)

Panel A: Skilled employment								
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6	Sector 7	Sector 8
Number of pid	277	277	277	272	277	275	262	277
Number of Instruments	306	306	306	306	306	306	306	306
Wald χ^2	1.35e+07***	3.76e+07***	1.36e+08***	6.28e+07***	6.20e+07***	9.35e+07***	1.07e+08***	2.46e+07***
Sargan test	276.998	276.997	276.970	271.985	276.993	274.967	261.398	276.983
p-value	0.792	0.792	0.792	0.848	0.792	0.816	0.933	0.792
Panel C: low-skilled employment								
L.lemp_ Isoth	0.769*** (0.000)	0.471*** (0.000)	0.881*** (0.000)	0.945*** (0.000)	0.862*** (0.000)	0.875*** (0.000)	0.662*** (0.000)	0.830*** (0.000)
lwage_tototh	0.393*** (0.000)	0.981*** (0.001)	0.058*** (0.000)	0.061*** (0.000)	-0.039*** (0.000)	-0.001*** (0.000)	0.076*** (0.000)	0.254*** (0.000)
lgfcl_oth	0.247*** (0.000)	-0.011*** (0.000)	0.013*** (0.000)	0.014*** (0.000)	0.002*** (0.000)	0.031*** (0.000)	-0.069*** (0.000)	-0.026*** (0.000)
lgfcl_gg	3.870*** (0.031)	1.555*** (0.013)	-0.913*** (0.005)	0.364*** (0.007)	1.473*** (0.003)	0.665*** (0.004)	1.041*** (0.014)	0.135*** (0.002)
lgfcl_pg	-3.675*** (0.028)	-1.624*** (0.011)	0.738*** (0.004)	-0.373*** (0.006)	-1.349*** (0.003)	-0.591*** (0.003)	-0.542*** (0.013)	-0.177*** (0.002)
lgfcl_lg	-0.361*** (0.004)	-0.094*** (0.002)	0.167*** (0.001)	-0.049*** (0.001)	-0.089*** (0.000)	-0.132*** (0.001)	-0.325*** (0.002)	0.004*** (0.000)
lgva_oth	-0.550*** (0.000)	-0.521*** (0.001)	0.005*** (0.000)	0.034*** (0.000)	0.074*** (0.000)	0.108*** (0.000)	0.303*** (0.000)	-0.000 (0.000)
metro	-0.113*** (0.019)	1.207*** (0.077)	-0.380*** (0.014)	0.127*** (0.002)	0.168*** (0.004)	-0.330*** (0.002)	-0.288*** (0.008)	-0.161*** (0.007)

(Continued)

Table 7. (Continued)

Panel A: Skilled employment								
Variables	(1) Sector 1	(2) Sector 2	(3) Sector 3	(4) Sector 4	(5) Sector 5	(6) Sector 6	(7) Sector 7	(8) Sector 8
Constant	1.419*** (0.015)	2.010*** (0.029)	0.981*** (0.005)	-0.412*** (0.004)	-0.072*** (0.002)	0.016*** (0.002)	-1.762*** (0.005)	0.089*** (0.002)
Observations	6,648	6,648	6,648	5,856	6,648	6,576	6,056	6,648
Number of pid	277	277	277	244	277	274	254	277
Number of Instruments	306	303	306	306	306	306	306	306
Wald χ^2	1.43e+07***	2.59e+07***	3.86e+08***	6.39e+07***	1.76e+08***	7.01e+07***	5.72e+07***	4.90e+07***
Sargan test	277.001	276.980	276.978	243.882	276.974	273.970	252.855	276.968
p-value	0.792	0.754	0.792	0.989	0.792	0.827	0.970	0.792

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in Parentheses. SGMM: Arellano-Bover/Blundell-Bond system dynamic panel-data estimation. **Note:** Sargan test of overidentifying restrictions: H₀: overidentifying restrictions are valid. **Source:** Author's computations

(sector 1). This indicates that approximately 5%, 4% and 4% more skilled, semi-skilled, and low-skilled jobs, respectively, can be created from increasing general government capital by 1% in sector 1. The positive impact in the agriculture sector is welcomed because the sector is more labour-intensive and has the ability to absorb a great deal of low-skilled workers. A similar interpretation also holds for general government capital in the rest of the sectors, except for sector 3 (manufacturing sector), where a negative and significant impact was shown across the employment categories. This is good news for the South African economy, which has recently faced higher unemployment rates (32.5%; Statistics South Africa, 2020). However, a large pool of unemployed individuals in the country is low-skilled (Quantec, 2017). In view of this, general government capital investment plans should take skills development programmes into account in all the sectors, given that it has a positive and significant impact on almost all the sectors of the economy. Furthermore, the results suggest provincial and local government capital does not promote skilled, semi-skilled, low-skilled jobs in all sectors of the economy. This illustrates that provincial and local governments have not done enough to create jobs in these sectors.

When glancing at wages, there is a greater negative impact on wages for semi and low-skilled jobs across the sectors, contrary to skilled jobs. This can be attributed to the possible presence of unionization among the semi and low-skilled workers. Higher levels of unionization are usually found among low-skilled workers, who are typically low-wage earners with less education (Callaway & Collins, 2018). According to Cardador et al. (2017), the labour unions' value originates from the "union premium", which is an agreement by labour unions to act as business agents for workers, fighting for their rights, including job security and higher wages. The results focusing on semi and unskilled workers suggest the likelihood of unionization presence since the wages are positive and significant.

6. Conclusion

As unemployment is becoming more challenging in South Africa, it is important to investigate government capital's role in creating employment in the economy. Therefore, the aim of this paper was to assess the dynamic impact of general/national, province and local government capital on total employment (and different categories of employment such as skilled, semi-skilled and low-skilled) in the South African economy. With panel data of 269 South African municipalities spanning from 1993 to 2017, the panel Granger causality and SGMM were used to achieve the objective of this study.

The results revealed strong evidence of bidirectional causality between general government capital and employment; provincial government capital and employment; and local government capital and employment in the overall economic sectors and each of the eight sectors under review. This suggests the various government capitals' importance in creating employment in the South African economy. The results from the SGMM show that national governments in South Africa contribute more to total employment than the provincial and local governments. Further analysis was undertaken to determine the types of jobs (that is, skilled, semi-skilled and low-skilled) emanating from the national, provincial and local government capital in the overall and specified economic sectors. The results show that the jobs that will be created are those by the general/national government capital for skilled, semi-skilled and low-skilled individuals.

This is worrisome since South Africa has been grappling with protracted unemployment, and there is the need to complement the national government's efforts in creating jobs across the skills level in the economic sectors. Moreover, the provincial and local governments' anticipated contribution to the Government's Medium Term Strategic Framework (MTSF) is to create decent employment and build a skilled and capable workforce. In the interest of that goal, skills development programmes are essential to prepare people for the skilled jobs that will ensue from capital investments. The snapshot given by this analysis illustrates that synergised general/national, provincial and local government capital that is well invested, coupled with a skills development programme, can create jobs and possibly grow the South African economy. In

order to complement the national government's efforts in creating employment opportunities, there is a need for policy measures that will ensure accountability and effective utilisation of provincial and local government capital aimed at creating jobs in South Africa. Policies that will re-industrialise the South African economy by improving performance through skills development using government capital are recommended in this study. Given that this study used annual data, we recommend a yearly review of employment created at the provincial and local government levels for the different skills categories in the sectors, possibly re-strategising with the aim of creating more jobs in the economy.

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