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Econometric Analysis of the Effects of Aggregate Expenditure on Job Growth in the Private Sector: The South African Case

Thomas Habanabakize¹, Daniel Francois Meyer², Paul-Francois Muzindutsi³

Abstract: The private sector contributes to job creation either directly by creating new positions for job seekers or indirectly by increasing growth that results in job creation for unemployed people. This study employed an Autoregressive Distributed Lag (ARDL) model to analyse the long and short run effects of aggregate expenditure on job creation in the private sector in South Africa. The findings indicated that there is a long run relationship between aggregate expenditure and job creation in the private sector. Investment spending and net exports are the aggregate expenditure components that create long-term jobs, whereas consumer consumption and government spending lead to possible long run job destruction. The Error Correction Model (ECM) results revealed that consumption and investment spending create jobs in the short run, while the Granger-causality test suggested that a bi-directional causal relationship exists between consumption, investment spending and employment in the private sector. The study concluded that the negative effect of consumption on private employment might be due to the consumption of imported goods and services. Thus, the employment situation in South Africa could be improved if more focus is placed on consumption of domestic products.

Keywords: Aggregate spending; ARDL analysis; employment; private sector; South Africa

JEL Classification: C5; E2

1. Introduction

The South African rate of unemployment has increased dramatically before, and even after, the election of the democratic government in 1994 (Altman, 2003). Unemployment creates an imbalance in income distribution, leading to income inequality and high poverty levels (Triegaardt, 2006). Consequently, people receiving a monthly income are expected to support those who cannot afford to pay

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for their daily expenses. This is done directly in the form of donations and social support or, indirectly, through government policies, such as the tax increases and government grants (Atkinson & Liem, 1986; Krueger & Meyer, 2002). In South Africa, social grants are a reality and more than 40 percent of South African households are dependent upon these grants (Schussler, 2013). The role of the private sector (which consists of business enterprises) as regards job creation has been a subject of discussion; different conclusions were reached in the past. Some studies have proven that the private sector does create jobs, while others demonstrated the opposite. In other words, the private sector both creates and destroys jobs (Birch, 1987; Neumark et al., 2011; Rosenberg, 2011; StatSA, 2016).

During the third quarter of 2016, employment increased in some sectors of the South African economy, while it declined in others. For instance, in the mining, manufacturing and financial sectors, it declined by 6.5 percent, 1.4 percent and 0.05 percent respectively. Notwithstanding, employment has increased by 1.3 percent in construction and 1.9 percent in the private sector (StatsSA, 2016). Despite the debate regarding the role of the private sector in job creation and the volatility that characterises employment in the private sector, this sector is considered to be one of the key areas that creates direct jobs (Dilger, 2017; IDC, 2016). In the South African context, this sector is an important economic one that contributes to GDP growth and to job creation (BER, 2016). Besides the direct contribution of the private sector to job creation, it impacts on productivity and job creation in collaboration with the public sector through knowledge diffusion and innovations (Kox & Rubalcaba, 2007). The private sector is therefore considered the engine that leads market success or failure (Cunningham, 2011). Therefore, spending on the private sector through consumer consumption, government spending, investment and exports are ways to boost and support job creation (Cray, 2011).

This paper aims to present the findings of analysis of the effects of aggregate expenditure on job creation in the private sector in South Africa. To achieve this, it attempts to answer the following questions: Do all four factors of aggregate expenditure (consumption, government, investment and net exports) contribute equally to job creation in the private sector? If not, which one of them is more effective than others? The following hypotheses are tested:

- Null hypothesis (H0): Components of aggregate expenditure do not affect employment in the private sector.
- Alternative hypothesis (H1): Components of aggregate expenditure do affect employment in the private sector.

2. Review of Literature

The concept that job creation could be stimulated through the private sector was generated by the work of Birch (1979), raising the issue of the way in which the US was losing jobs in the manufacturing sector to the benefit of employment in foreign countries. His aim was to distinguish whether new and small firms create more jobs than large and established firms or vice versa. The findings of that study were that between 1969 and 1976, more than two-thirds of net employment created resulted from new and small firms and that these firms were also hiring more youths than large firms were. Birch provided evidence of the role that small and medium enterprises play in the US economy regarding employment creation. Therefore, based on these findings, small firms deserve special attention. In the same regard, the International Finance Corporation (IFC, 2013) asserted that job creation in the private sector remains indispensable.

Globally, most jobs are created by the private sector; and in particular, more than 90 percent of the total number of jobs in developing countries are created by it (ILO, 2014). Consequently, countries with high rates of unemployment are those with weak job creation processes in the private sector. Increasing the amount of spending on private sector goods and services could be one of the strategies that might stimulate job creation, leading to poverty reduction (Toosi, 2002; Boushey & Ettliger, 2011). The private sector, due to its ability to innovate, is a major influence on the GDP and job creation. A study conducted in 18 OECD countries, to determine how business enterprises affected employment between 2001 and 2011, found that approximately 75% of total employment emanated from employment generated by small business (OECD, 2015). This study also revealed that if small and medium businesses were supported through aggregate spending, even more jobs could be created. The study of Neumark *et al.* (2008) highlighted the important contribution made to the total employment and job creation endeavour by those small and medium enterprises. They stated that small businesses increase employment opportunities, especially in informal employment due to lower qualifications and skill requirements; just a few talented entrepreneurs are needed to develop employment opportunities for local communities.

The World Bank (2013) states that a higher rate of new jobs is created by small and medium firms due to their propensity for rapid growth, while large firms remain the ones with higher productivity and large numbers of employees. Therefore, increasing financial support for starting up and existing small businesses, without ignoring mature and large firms, allows both types of firms to access new technology and innovation and create more jobs. Although the public sector is a major employer in South Africa, the partnership between public and private sectors is a key factor in eradicating the high levels of unemployment (National Treasury, 2017). Wessels and Ellis (2012) argued that The National Development Plan (NDP) of 2011 aimed to eliminate unemployment and should focus on small and growing firms, as 90% of

the needed jobs should be created through both types of firms. These new jobs would assist in increasing the total number of employment opportunities. The International Labour Conference (2015) confirmed this assumption, stating that small and medium businesses remain the engine of economic growth and job creation for all countries, especially in developing countries, regardless of incomes levels.

Inversely, Kerr *et al.* (2014) found that in South Africa more jobs were created by large firms, not by small ones. In support of Kerr *et al.*, Freund's (2011) study reported that small and medium businesses were not a final solution to the problem of unemployment because they function like a two-edged sword. On the one hand, the private sector (business enterprises) creates jobs, while on the other these firms also destroy jobs. The reason why some business enterprises do so resides in their inability to stay competitive for long periods. When these firms are outdone by the competition, their employees become jobless (Neumark *et al.*, 2008). Therefore, what matters most regarding the labour force is not the number of employment opportunities created, but rather the net jobs created. In addition, young firms grow fast and create more jobs, yet they have a higher probability of failure compared to mature firms. This movement creates a disturbance in the labour force - destroying more jobs than creating new ones (Edmiston, 2007). For example, a study conducted in the US on how businesses create and destroy jobs, found that between 1976 and 2005, the annual rate of jobs created was 17.6% while the rate of jobs destroyed was 15.4%. As a result, the growth rate of employment was only 2.2% (Haltiwanger *et al.*, 2010). The main findings emerging from the study were that the size of a firm affects its growth and capacity to create and maintain jobs. However, the theory that new firms could destroy jobs was refuted by Criscuolo *et al.* (2014). In a study undertaken on 18 OECD countries, including the US and Brazil, they found that unlike the more mature small businesses, new start-up firms play an indispensable role in creating jobs even during cycles where there is economic crisis. In this regard, the study by Federica and Bernt (2013) established that as a firm matures, its capacity to create jobs starts declining, until it reaches a negative effect on employment creation.

In contrast to this, the studies of Haltiwanger (2010) and Ayyagari *et al.* (2011) opposed the concept that supports the existence of a relationship between a firm's size, their growth and their ability to create jobs. The balance of success and failure of firms based on their sizes was found by the study conducted by Page and Söderbom (2015). Analysing the impact of a firm's size on job creation, the finding confirmed that more jobs are created in new and start-up firms; however, the likelihood of a firm's growth goes together with the probability of failing, leading to job destruction. Hence, more jobs are created and destroyed in small enterprises. The net jobs created by the small and medium enterprises decline as firms expand. Large and mature firms are characterised by higher salaries and high levels of job security. Consequently, the aggregate spending should be allocated to both types of firms.

Small firms are in need of investment support to be competitive and to grow, whilst large firms need to be supported in order to extend and safeguard existing jobs (Page & Söderbom, 2015). Consequently, the next section focuses on the analysis of the effect of total spending on private sector (combining different type of businesses) goods and services in the South African economy and a description of the methodology as used in the study.

3. Methodology

3.1. Data and Model Specification

The empirical section of the study is based on quantitative processes. Quarterly data was employed to analyse the relationship between aggregate expenditure components and job creation in the private sector. The data was acquired from the South African Reserve Bank (SARB), for the period ranging between the first quarter of 1994 and the second quarter of 2016. Variables comprise ok employment in the private sector and four components of aggregate expenditure: i.e. private consumption expenditure, government spending, investment spending and net export. These components of expenditure are in real values. Employment in the private sector is regarded as the dependent variable, while other variables are considered independent variables. An Autoregressive Distributed Lag model (ARDL) developed by Pesaran *et al.* (1996) and revised by Pesaran *et al.* (2001) was adopted to analyse the long run relationship amongst variables. The benefit of this model is its flexibility regarding the cointegration order of variables. It can be used whether variables are integrated at levels I (0) or first order I (1) or a mixture of the two. Furthermore, with the ARDL model, different numbers of the optimum lags can be simultaneously used. The following model was formulated to determine the relationship between the aggregate expenditure components and employment in the private sector:

$$\begin{aligned} \Delta LEBUS_t = & \alpha_0 + \sum_{j=1}^k \beta_j \Delta LEBUS_{t-j} + \sum_{j=1}^k \gamma_j \Delta LCONS_{t-j} + \sum_{j=1}^k \delta_j \Delta LGOVS_{t-j} \\ & + \sum_{j=1}^k \tau_j \Delta LINVES_{t-j} + \sum_{j=1}^k \vartheta_j \Delta LNEXP_{t-j} + \varphi_1 LEMP_{t-1} + \varphi_2 LCONS_{t-1} + \varphi_3 LGOVS_{t-1} \\ & + \varphi_4 LINVES_{t-1} + \varphi_5 LNEXP_{t-1} + u_t \end{aligned} \quad (1)$$

Where $\Delta LEBUS_t$ denotes the change in the natural logarithm of employment in the private sector at time t ; $\Delta LCONS_t$ denotes change in the natural logarithm of household consumption at time t ; $\Delta LGOVS_t$ symbolises change in natural logarithm of total government spending at time t ; $\Delta LINVES_t$ symbolises change in the natural logarithm of investment spending at time t ; whilst $\Delta LNEXP_t$ symbolises change in the natural logarithm. The α_0 denotes the intercept, k represents the number of lags used, β_j , γ_j , δ_j , τ_j and ϑ_j represent the short run dynamic, while φ_1 , φ_2 , φ_3 , φ_4 and φ_5 denote the long run relationship. Equation 1 was used to estimate four ARDL model applied to the four components of the aggregate expenditure (consumption,

government spending, investment and net export). From Equation (1), the following null and alternative hypotheses were formulated to determine whether variables co-integrated or not.

- For no co-integration, the null hypothesis (H0): $\varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = 0$
- For cointegration, the alternative hypothesis (H1): $\varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq 0$

The bound test, known as the Wald F-test in the ARDL model, was employed to test these two hypotheses. The test aimed to compare the estimates of the F-value and the critical value from the Pesaran *et al.* (2001) Table. If the estimated F-value is greater than the critical value from the table, the null hypothesis is rejected, suggesting that in the long run, the analysed variables co-integrate. In other words, a long run relationship exists amongst variables. However, if the calculated F-value is lower than the critical value from the table, the null hypothesis is not rejected. In other words, there is no long-run relationship among variables. In the absence of further information, the results are inconclusive if the calculated F-value lies between the lower and upper critical values (Dube & Zhou, 2013). The next step of error correction (ECM) depends upon the outcome of the cointegration test. Without a long run relationship among variables, there is no error correction. Nevertheless, the presence of co-integration suggests the error correction ipso facto. If variables in Equation 1 co-integrate, the following is the equation for the error correction:

$$\Delta LEBUS_t = \alpha_0 + \sum_{j=1}^k \beta_j \Delta LEBUS_{t-j} + \sum_{j=1}^k \gamma_j \Delta LCONS_{t-j} + \sum_{j=1}^k \delta_j \Delta LGOVS_{t-j} + \sum_{j=1}^k \tau_j \Delta LINVES_{t-j} + \sum_{j=1}^k \vartheta_j \Delta LNEXP_{t-j} + \delta ECT_{t-1} + u_t \quad (2)$$

Where ECT denotes the error correction term and is the coefficient of the error term δ measuring the speed of adjustment towards the long run equilibrium. The correlation analysis was performed to establish relationships between variables. Based on its accuracy, regardless of the size of employed data, Schwarz's Bayesian information criterion was chosen to determine the maximum number of lags to be used by the study (Brooks, 2014). Additionally, a number of diagnostic tests, i.e. serial correlation, heteroscedasticity, normality and stability, were performed; and the model passed all of these tests.

3.2. Granger Causality Test with the Toda–Yamamoto Approach

Since the ordinal Granger causality (1969) test assumes that the series are integrated at the same order and may provide invalid results if variables have different order of integration (Toda & Yamamoto, 1995; Giles & Mizra, 1998; Mavrotas & Kelly, 2001). This study employed the modified Wald (MWALD) test as suggested by Toda and Yamamoto (1995) to avoid the mentioned issues. The Toda-Yamamoto approach ignores whether variables are I (0), I (1) or I (2); this minimises the risk of deriving incorrect results that may be caused by disparities in order of integration

and the size of variables' simple size (Giles, 1997). Using the Toda and Yamamoto (1995) approach to test for Granger non-causality, the following VAR equations were estimated:

$$LEBUS_t = \alpha_0 + \sum_{j=1}^k \beta_1 LEBUS_{t-j} + \sum_{j=k+1}^{k+dmax} \beta_2 LEBUS_{t-j} + \sum_{j=1}^k \gamma_1 LCONS_{t-j} + \sum_{j=k+1}^{k+dmax} \gamma_2 LCONS_{t-j} + \sum_{j=1}^k \delta_1 LGOVS_{t-j} + \sum_{j=k+1}^{k+dmax} \delta_2 LGOVS_{t-j} + \sum_{j=1}^k \tau_1 LINVES_{t-j} + \sum_{j=k+1}^{k+dmax} \tau_2 LINVES_{t-j} + \sum_{j=1}^k \vartheta_1 LNEXP_{t-j} + \sum_{j=k+1}^{k+dmax} \vartheta_2 LNEXP_{t-j} + \varepsilon_{1t} \tag{3}$$

Equation 3 is derived from Equation (1) and they are also defined in the equation. Granger causality from Equations 3 to 7 implies that β_1 to β_2 ; γ_1 to γ_6 ; δ_1 to δ_6 ; τ_1 to τ_6 and ϑ_1 to ϑ_6 differ from 0 \forall_t ; the estimation of the model was based on the seemingly unrestricted regression suggested in Rambaldi and Doran (1996). In the Equations 3 to 7, *dmax* denotes the maximal order of integration.

4. Empirical Findings and Discussion

4.1. Unit Root Tests

Unit root tests are important tests in econometric analysis, in determining the type of model to be estimated. Tests were conducted using the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests. The results, as exhibited in Table 1, show that all variables passed the unit root test at either the first difference I(1) or at levels I(0). Therefore, the ARDL model can be used to analyse the relationship among variables.

Table 1. Results of ADF and PP Unit root test (p-values)

Variable	ADF	PP	ADF	PP	Integration order result
	Levels	Levels	1 st difference	1 st difference	
LCONS	0.642	0.593	0.0113*	0.0117**	I(1)
LGOVS	0.5224	0.2705	0.0000**	0.0000**	I(1)
LINVES	0.4630	0.3517	0.000**	0.000**	I(1)
LEXP	0.4801	0.6114	0.0001**	0.0001**	I(1)
LEBUS	0.0000**	0.0000**	0.0000*	0.000**	I(0)

* denotes the rejection of the null hypothesis of unit root at the 1% level of significance

** denotes the rejection of the null hypothesis of unit root at the 5% level of significance

4.2. Model Selection and Long-Run Analysis

The number of lags to be utilised in this study was determined; the optimum number of lags was 4. Using the Akaike Information Criteria (AIC), the best model selected was: ARDL (2, 4, 1, 3, 1).

The long-run relationship amongst the selected variables was tested using the bound test of co-integration and the method used to formulate hypotheses as well as by

comparing the estimated F-value to critical values. A summary of results obtained is displayed in Table 2. The estimated F-value of 9.4974 is greater than the upper bound critical value, at all levels of significance (10%, 5%, and 1%), 5.06; 4.49; 4.01; and 3.52 respectively, implying that the null hypothesis of no long-run relationship (no co-integration) can be rejected in favour of the alternative hypothesis. These results suggest that there is a long-run relationship between aggregate expenditure components and job creation in the private sector. This relationship can be explained by the fact that the private sector accommodates people with different skills. Highly skilled as well as lower skilled people can be employed in the private sector, depending upon the type of business or firm in which those skills are needed. Moreover, the private sector is the niche of self-employment, especially in urban and rural areas. Therefore, this can explain why higher levels of spending in this sector could positively affect job creation. Numerous other studies from various scholars such as Birch (1979), Neumark *et al.* (2008), Freund (2011), Criscuolo *et al.* (2014) and Kerr *et al.* (2014:2) reported that increasing spending in the private sector could be one of the remedies for reducing unemployment as well as inducing the creation of employment. Based on the outcome of the long run relationship analysis, the following equation was constructed:

$$LEBUS = 28.3672 - 3.1063LCONS - 4.2371LGOVS + 0.4491LINVES + 1.8213LEXPO \quad (4)$$

Equation 4 indicates a long run coefficient of 28.3672 and that two (investment spending and net exports) of four components of aggregate expenditure have positive long run effects on job creation in the private sector. The values represented in equation 4 indicate that a 1 percent increase in investment spending and an increase of 1 unit in net exports could result in 0.45 and 1.82 percent increases respectively in jobs created in the private sector. However, households' consumption and government spending have a negative effect on private sector employment. Thus, a 1 percent increase in this consumption and such spending causes employment in the private sector to decline by 3.11 and 4.24 percent respectively. Exports have a high positive effect on private sector job creation while government spending has an even higher negative effect on jobs in the private sector. These results contradict the Keynesian theory, suggesting that consumer consumption and government spending increase employment (labour demand). In this case it should be indicated that most of the South African government's spending is allocated for consumption and social welfare, which in this study has proven to have a negative effect on job creation in the private sector.

4.3. Short-run Relationships and Error Correction Model

Due to the fact that the results from the Bounds co-integration test revealed the presence of a long-run relationship, it was necessary to analyse the short-run relationship amongst the variables and perform the error correction model (ECM) in

order to determine the time it takes for changes in the system to return to the long run equilibrium.

Table 2. Bounding co-integration test for Private sector

Dependent variable LEBUS	Estimated F-Statistic: 9.4974		
Critical Values*	Lower Bound Value	Critical	Upper Bound Critical Value
1%	3.74		5.06
2.5%	3.25		4.49
5%	2.86		4.01
10%	2.45		3.52

Note: * critical values from Pesaran *et al.* (2001) Table CI (V)

The short-run results would also determine whether spending in the private sector could create short-term employment or not. In addition, it would indicate which component of aggregate expenditure favours short-term jobs in the private sector. The results of short-run relationships between aggregate expenditure and job creation in the private sector are depicted in Table 3. From this table, consumer consumption and investment spending are statistically significant at a 5 percent level of significance. Government spending is significant at just 10 percent, indicating a weak short-run relationship with employment. Therefore, to stimulate job creation in the private sector in the short term, more resources should be allocated towards consumption and investment spending. This result suggests that government spending has a weak significant effect on employment in private sector, while export revenues do not affect employment in the private sector. These results are supported by the findings of Haltiwanger *et al.* (2010) and Freund (2011). Their studies reached the conclusion that the size of firm affects its level of employment so that, in many cases, starting businesses may destroy more jobs than are created.

Table 3. Short-run relationship and error-correction results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EMP(-1))	0.1472	0.1127	1.3058	0.1959
D(LCONS)	27.3059	63.8101	0.4279	0.6754
D(LCONS(-1))	387.7393	114.5621	3.3845	0.0012*
D(LCONS(-2))	-270.7143	116.1190	-2.3313	0.0226*
D(LCONS(-3))	123.6799	64.2445	1.9251	0.0583
D(LGOVS)	26.9978	14.8185	1.8218	0.0727
D(LINVES)	19.6715	13.8237	1.4230	0.1592
D(LINVES(-1))	-52.0671	21.0563	-2.4727	0.0158*

D(LINVES(-2))	32.4029	14.2996	2.2659	0.0265*
D(LEXPO)	9.6151	6.6352	1.4491	0.1518
CointEq(-1)	-0.9760	0.1444	-6.7553	0.0000*

Note: *rejection of null hypothesis at 5% level of significance

In addition, the model presents a statistically significant error correction term (ECT) of -0.9760 with a negative sign. This means that approximately 97% of shocks in the system will be fixed in each quarter. In other words, it will take approximately 1.02 (1/0.9760) quarters for the changes in aggregate expenditure to affect job creation in the private sector. This suggests that aggregate expenditure can be used to stimulate jobs in business enterprises. Based on the aforementioned results, it is beneficial to determine the causality amongst the variables to indicate which variable of aggregate expenditure causes short run employment in the private sector and the responsiveness of employment towards aggregate expenditure components.

The modified Wald (MWALD) or Toda-Yamamoto Granger causality test was used to determine the short-run causal relationship between the variables. The results are indicated in Table 4. A bi-directional causal relationship exists only between consumption and employment in private sector, and between investment spending and employment in the aforementioned sector. However, there is no causal relationship between government spending, exports and employment in the private sector. A mutual causal relationship exists among all independent variables and private employment except export, which is neither causing nor being caused by any other component of aggregate expenditure (the outcome for causal relationships among independent variables analysis is not reported in this paper).

Table 4. Toda-Yamamoto Causality (MWALD) Test Result

Null hypothesis	Chi-sq	Prob.	Granger Causality
LCONS does not Granger Cause LEBUS	10.12855	0.0015*	Bidirectional causality
LEBUS does not Granger Cause LCONS	2.974287	0.0846**	
LGOVS does not Granger Cause LEBUS	0.029938	0.8626	No causality
LEBUS does not Granger Cause LGOVS	1.693334	0.1932	
LINVES does not Granger Cause LEBUS	13.52651	0.0002	Bidirectional causality
LEBUS does not Granger Cause LINVES	4.541558	0.0331	
LEXPO does not Granger Cause LEBUS	0.359915	0.5486	No causality
LEBUS does not Granger Cause LEXPO	0.000549	0.9813	

Note: * rejection of null hypothesis at 5% level of significance

** rejection of null hypothesis at 10% level of significance

4.4. Residual Diagnostic Tests

In this section of the study residual tests are performed to determine the correctness of the results. The Lagrange Multiplier test was carried out to detect the presence of auto-correlation among variables, while the White Heteroscedasticity was used to distinguish whether variables are homoscedastic or heteroscedastic. Finally, the normality test was performed using the Jacque-Bera test. Findings revealed that the used series was homoscedastic and also normally distributed, and residuals are not auto-correlated. This implies that the findings are trustworthy.

5. Conclusions

The study dealt with the interaction between aggregate expenditure and job creation in the private sector. The analysis revealed that sustainable jobs can be created in this sector by increasing the level of investment spending and the quantity of exported goods and services. In the long run, exports were found to be the key component for job creation in the private sector, while consumption and government spending destroy jobs in this sector. South African households seem to consume or spend more on imported goods and services, which might explain why consumption does not affect long term employment in the private sector. If government spending and consumption have a negative effect on employment creation in the private sector, the assumption should be that a positive correlation exists between households' consumption and government spending. Although consumption does not by itself have a long run effect on employment in the private sector, together with investment spending these two components of aggregate expenditure could be useful for short-term job creation.

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