YOUTH UNEMPLOYMENT AND ECONOMIC GROWTH IN SADC COUNTRIES: AN APPLICATION OF OKUN'S LAW USING PANEL DATA

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Abstract:

The study investigates whether policies, both regional and country specific, should mainly focus on accelerating economic growth in the region to reduce youth unemployment in the SADC region. In this endeavour, the study is based on Okun's law which prescribes that unemployment rates should generally begin to fall when economic growth rates rises above the economy's potential. The study uses panel data for selected SADC countries whose annual youth unemployment rate is above the region's average annual rate of 20%. Upon performing a variety of panel model mis-specification tests, the systems GMM model was chosen as the suitable model. Our findings support Okun's proposition of a negative relationship between changes in economic growth and changes in unemployment rates. Our model predicts a 9.85 percent reduction in youth unemployment for every one-point increase above the region's GDP growth rate.

JEL classification: **F43, E24**

Key words: Unemployment, Growth, Okun's Law

1. INTRODUCTION

While Okun's law is a staple of macroeconomics textbook [see some leading macroeconomics textbooks such as Blanchard (2017) and Mankiw (2019)], the relationship between unemployment and economic growth cannot be taken for granted (Hooper, 2017; Zanin, 2014). The law stipulates that to reduce unemployment rate in any economy, the rate of growth of the economy should be higher than it's potential (*Ibid*). Since the discovery of Okun's (1963) law, researchers have subjected it to empirical analysis and currently there is no consensus on whether this principle always holds true [see Table 2, on the summary of some of the studies carried out by different researchers and their findings].

Therefore, the intellectual argument that needs to be cross-checked by any policymaker is to find out if Okun's law holds in different contexts. This is more pronounced by the fact that unemployment and economic growth rates have generally become the primary macroeconomic variables upon which others can be explored to steer economic stability and prosperity, especially for regions that are hard-hit by high unemployment rates (Zanin, 2014).

Economic growth is understood to be the rise in the quantity of goods and services measured at constant price level and per given time period, usually per year. In principle, an increase in economic growth should translate to the availability of more goods and services. In the absence of income inequalities, the greater output should entail improvement in the living standards for all. Although both Gross Domestic Product (GDP) and Gross National Product (GNP) can be useful in the measurement of economic growth, this study focuses on the former as it directly measures the region's local economy. The latter would have been more suitable in a study that focuses on the overall economic strength of a country or region after its net gains on overseas investment are taken into consideration (Dynan and Sheiner, 2018).

SADC's performance on average GDP growth rate can be assessed in comparison with other parts of the world that are still developing, as well as the world's average in general. This is facilitated by presenting the trend of the GDP growth rate data for the past decade in Table 1, beginning from year 2009 to 2018. Except for the East Asia and Pacific, all other regions reported in the table shows a low GDP per capita growth in the year that marked the end of the global economic recession in 2009. The SADC region's economic growth rate picked up in 2010 before it began to fall steadily over the past decade. Although still low when compared with the East Asia and Pacific, the ECOWAS has maintained higher economic growth rates than the SADC region over the three years upto 2018.

Table 1: Comparative statistics on annual GDP (%) growth and youth unemployment (%) rates for SADC & other developing parts of the world

SADC & other developing parts of the world	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
SADC	2.5 (21.3)	6.7 (22.1)	5.8 (20.9)	5.6 (20.1)	5.1 (20.4)	4.6 (20.2)	3.4 (20.2)	2.7 (20.4)	2.8 (20.2)	3.1 (20.3)
ECOWAS	3.3 (8.1)	5.1 (8.1)	4.1 (8.4)	6.1 (8.5)	6.2 (8.4)	4.3 (8.4)	2.4 (9.3)	4.7 (9.9)	5.5 (9.6)	5.2 (9.6)
East Asia & Pacific (Developing only)	7.7 (10.3)	9.8 (9.8)	8.5 (9.9)	7.5 (9.9)	7.2 (10.0)	6.8 (10.1)	6.5 (10.5)	6.4 (10.3)	6.5 (10.2)	6.3 (10.3)
Latin America & Caribbean (Developing only)	-1.9 (15.1)	6.0 (14.3)	4.4 (13.8)	2.7 (13.6)	2.7 (13.7)	1.0 (13.5)	-0.5 (14.6)	-1.7 (17.2)	0.7 (17.7)	0.4 (17.6)

Figures in parentheses shows the average annual % of youth unemployment rate, while the above figures are annual % of GDP growth rate

Source: Authors 'computation from World Bank Data (2019)

Is there any link between economic growth and youth unemployment? The standard definition of unemployment is the proportionate of the labour force actively searching for employment and have not yet secured one. When applied on youth, it is the total number of the youth, aged from 15 to 24 actively looking for jobs, but are without jobs (United Nations, 2015; ILO, 2018). It is expressed as a percentage of the total labour force. At the surface level, it seems correct to assume that countries that sustain higher economic growth rates are capable of supressing lower unemployment rates. For instance, Table 1 shows that the East Asia and Pacific region with higher economic growth rates have also kept youth unemployment rates lower than that of SADC. However, the data in Table 1 is not conclusive, as ECOWAS experienced lower economic growth rates but still reported lower youth unemployment rates. The high youth unemployment percentages in the SADC justifies concerns of the regional leaders who have declared it a common problem for all SADC countries and in 2016 have launched a blueprint called "Youth Employment Promotion Policy Framework" to contain it (Pharatlhatlhe and Byiers, 2019). In fact, the region has attempted to harmonize its labour and employment standards with the main goal of curbing unemployment amongst the member countries (*Ibid*).

The logic of Okun's law on unemployment

The law was conceived from Okun's (1962) which shows that there is evidence of a negative relationship between potential output and unemployment rate in the US economy (Soylu. Çakmak and Okur, 2018). The simplified version of the law can be explained by the direct connection between employment and output, implying that to produce more output more labour should be employed. However, Okun recognises that the relationship may not be that straightforward given the ever-rising numbers in the labour force compounded by progressions in labour productivity. The law specifically states that a one percentage point decrease in unemployment rate per annum, calls for a two percentage points increase in the potential GDP growth (Hooper, 2017). Therefore, to reduce unemployment rate each year, GDP growth rate must rise twice faster than the pace of unemployment rate.

Knotek (2007) models a differenced version of Okun's law for a group of countries, as expressed in the econometric equation (1) (Garavan, 2017):

$$\Delta U_{i,t} = \beta_0 + \beta_1 GDPg_{i,t} + a_i + \varepsilon_{i,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, the left-hand side is the change in unemployment rate for an individual country *i* in year *t*, is mainly explained by the GDP growth rate of the same country *i* in year *t*. Its coefficient β_1 has a negative expected sign because of the depicted relationship between unemployment rate and GDP growth rate. The individual country *i* time invariant intercept is represented by variable a_i. It embraces all the unobserved factors that are time invariant such as labour markets and cultural characteristics that are specific to individual countries. All other time invariant characteristics that are common to all countries are captured by the constant term β_0, while any residues relating to both time and individual country *i* are represented by the idiosyncratic error term $\varepsilon_{i,t}$. Although the analysis is extended to depict a group of countries, in his original writing, Knotek (2007) focuses on a single country (USA) modelling.

Apart from the differenced version stated in (1), some researchers have promoted the gap version of Okun's law. Okun (1962) yields a much-formalized model as indicated in (2).

$$U_t - U_t^* = \beta_0 + \beta_1(y_t - y_t^*) + \varepsilon_t \cdots\cdots\cdots\cdots (2)$$

Where U_t^* stands for natural unemployment rate, y_t^* represents natural log of potential output, U_t and y_t is the observed unemployment rate and log output all in year t. β_0, β_1 are the coefficients of the model with the former being the intercept and the later expected to be negative. The biggest limitation of the gap model in (2) is that both U_t^* and y_t^* are not observable to the extent that Okun had to arbitrarily use 4 percent as the natural rate of unemployment for United States economy (Bande and Martín-Román (2017). Nonetheless, Okun's contributions regarding academic thinking on unemployment-output relationships remains a two-sided empirical regularity. On one hand, Okun's law can be used to analyse how economic performance as portrayed by economic growth can be directed to deal with unemployment, while on the other it reflects how unemployment can be an impediment to output growth.

Göçer and Erdal (2015) depicted a much-simplified mathematical version of Okun's law as explaining the relationship between changes in unemployment-economic growth rates per each time period:

$$\Delta U_t = \beta(g_t - \bar{g}) \cdots\cdots\cdots\cdots (3)$$

Where, the change in unemployment rate in the left-hand side is explained by the excess of current economic growth rate g_t over the average economic growth rate of the period on analysis $\bar{g}$. Both the left- and right-hand sides in (3) are easily computed from the practical point of view. As a result, the expression has been embraced, in this study, to develop the empirical model for the SADC region. Moreover, Okun (1962) also suggests a dynamic version of the unemployment-output relationship with lagged variables for both output and unemployment (Knotek, 2007).

2. EMPIRICAL LITERATURE

Okun's law has been subjected to a lot of empirical analysis in many different parts of the world since its publication in 1962. During episodes of economic prosperity, there are better chances of dealing with unemployment. Likewise, periods of economic recessions usually trigger job losses which worsens the plight of the youths who already have historically been facing challenges to secure employment (Göçer and Erdal, 2015). For instance, the global recession of 2008 shook the global labour markets, with the youths getting affected the most as they were laid off first owing to their comparative lack of work experience (*Ibid*). In fact, an economic downturn is likely to suggest a manifold negative impact on youth's prospects to secure jobs in the short run and long run periods of their active lives (Matsumotoi, Hengge and Islam, 2012). Getting laid off today reduces their chances of building the ever-needed work experience required for obtaining new employment in the future. The empirical question that needs to be explored is whether improving economic growth rates can effectively slow down unemployment rates. In other words, is Okun's law always tenable in all economies, especially those that are facing high unemployment rates? To what extent does this theory apply to youth unemployment? Table 2 summarises some of the studies from around the world that have examined Okun's law.

Table 2 represents a sampled summary of the different researches that have focused on testing the significance of Okun's law on various economies. A general survey

of these and many more articles clearly indicates that indeed there is an inverse relationship between economic growth and unemployment. It is the strictest sense of this relationship as prescribed by Okun (1962) that needs careful handling of the methodologies implemented to validate the researches. Several researchers have demonstrated a diversity of reasons that rules out a simple linear relationship between changes in GDP growth rates and changes in unemployment rates. Gordon (2010) argues that it is difficult to verify Okun's law on account of the controversies that surrounds some measurement errors in the total number of conventional labour hours in the formal sectors and unconventional ones in the informal sectors. This argument would imply that if the data used to examine the law is invalid, then the research output would also be flawed.

Table 2: Summary of some of the empirical work that explored Okun's law in recent years

Author(s), year of study	Research title and country/region of study	Econometric methodology	Findings
Esmeraldo and Kurtsmajlaj (2019)	Estimating Okun's Law for Albania (1993 -2017)	OLS regressions that are split into pre-recession, post-recession and combined timeframe. Used time series data (1993 to 2000; 2001 to 2017; and 1993 to 2017)	Mixed results, Okun's law did not hold during periods of economic turmoil. Held true during periods of stability
Soylu. Çakmak and Okur, (2018)	Economic growth and unemployment issue: Panel data analysis in Eastern European Countries	Pooled Panel OLS and Panel Johansen Cointegration tests for 8 Eastern European countries, for period 1992 to 2014	Supported Okun's law
Garavan (2017)	Okun's Law: An empirical investigation into Eurozone growth and unemployment	Fixed effects regression on 19 European Union member states, covering period 2002 to 2013	Okun's law remains the rule of thumb
Hooper (2017)	Okun's Law Revisited Within the Context of High Eurozone Unemployment: A Note	Univariate pooled regression, for 185 countries whose data spanned from 2011 to 2015	Strongly supported Okun's law
Ebaidalla (2016)	Determinants of youth unemployment in OIC member states: a dynamic panel data analysis	Fixed effects model; and two steps systems GMM. Panel data of 32 countries & the period of study is 1993 to 2012	Supported Okun's law & goes on to Suggest determinants of youth unemployment.
Göçer and Erdal (2015)	The Relationship between Youth Unemployment & Economic Growth in Central & Eastern European Countries: An	Panel cointegration tests of Okun's law	Economic growth rates above-average reduces youth unemployment in

	Empirical		the region
Ball, Leigh, and Loungani (2013)	Okun's law: Fit at 50?	Estimated Okun coefficients for individual OECD countries using OLS regression. Also estimated the panel coefficients using SUR. Sample covers quarterly data from 1971 to 2011	Okun's law remains valid in most countries & did not change during the great recession. However, the coefficients vary across countries
Meyer and Tasci (2012)	An Unstable Okun's Law, Not the Best Rule of Thumb	OLS regression. Estimated coefficients of the annualised quarterly unemployment rates to changes in GDP growth rates	Suggested that the relationship is unstable and cannot be used as a rule of thumb.
Gordon (2010)	The Demise of Okun's Law and of Procyclical Fluctuations in Conventional and Unconventional Measures of Productivity	Used dynamic specification; estimated two components of output identity on US data, (1954: Q1 to 1986: Q1); and (1986: Q1 to 2010: Q1).	Okun's law does not hold in its purest sense. Controversies in active labour hours, conventional robust tests.

A slightly similar argument might also exist concerning reported statistics on youth unemployment rates in the SADC region. Particularly, there have been concerns about why some countries within the region have low official unemployment rate figures that widely differ from the unofficial reports (Pharatlhatlhe and Byiers, 2019). For instance, The Mo Ibrahim Foundation reports that six of SADC countries are amongst the top 12 African countries that have the highest youth unemployment rates in 2017 (*Ibid*). The six countries included on the list are South Africa, Botswana, Namibia, Lesotho, Mozambique and eSwatini. If Zimbabwe's unofficial youth unemployment rate of between 80% to 90%[1] is relevant, then the country would have been amongst the topping list. It is unclear whether all countries in the region that report lower rates truly perform better than these six on this metric. To reduce the likely problems of errors in measurement of the unemployment rates, this study selects only countries whose average unemployment rates are above the region's average[2].

Besides limitations in acquisition of correct data, some researchers have discouraged the use of simple linear regressions to model Okun's law (Ball, Leigh, and Loungani, 2013); Meyer and Tasci, 2012; and Gordon, 2010). Ball *et al* (2013) finds that Okun's law remains a stable relationship in many countries even though the one percentage change effect in GDP growth rate on unemployment rate differs significantly across countries. They introduce the idea of lags to bring into shape the fact that labour is not perfectly flexible in responding to output changes. A similar idea is suggested by Gordon (2010) who develops a dynamic specification model that factors in cyclical responses of the output components for the period of study. This paper considers some of

[1] BBC News. Reality Check: Are 90% of Zimbabweans unemployed? 3 December 2017

[2] see the methodology section for further explanation

these ideas in developing the empirical models that are applied in the study as discussed in the next section. Specifically, the random effects and dynamic specification models are applied to a panel data of the selected SADC countries. Therefore, Okun's law does not necessarily need to be proven by the same magnitude in coefficient of output changes to unemployment changes as stipulated in the original theory. Rather it is the traces in the principle that must be examined (Ball *et al*, 2013).

Recent studies of the Okun's law have started to focus on the relevance of the relationship of output growth and youth unemployment, rather than the general unemployment. Zanin (2014), analyses Okun's law by age cohorts in OECD countries (1998–2012) and finds that Okun's coefficients are not statistically significant for some sub-groups except for the young generations. The findings show that the youth generations are the most exposed to business cycle than older generations. Esmeraldo and Veton (2019) carries out an almost similar study and tests it on the Albanian economy for the period 1993 to 2017. The study reveals that economic growth to unemployment relationship breaks down during periods of economic turmoil but emerges stronger afterwards. They also find that vulnerable cohorts like the youth and female tend have a greater inclination to benefit as employment is generated from economic growth. Similarly, Hutengs and Stadtmann (2013) investigate youth unemployment and Okun's law on Central and Eastern countries, covering period 1993 to 2011. They also find that the youths exhibits larger Okun coefficients than their elders, which they interpret to imply that the youths are more susceptible to higher unemployment rates resulting from macroeconomic shocks.

The desire to direct more effort in studying youth unemployment has emanated from the soaring rates of joblessness amongst the young people in many different parts of the world. Some studies have resorted to focusing on determinants of youth unemployment, with the hope of suggesting solutions that addresses the identified determinants. Ebaidalla (2016) explores into determinants of youth unemployment without disengaging Okun's law analysis on Organisation of Islamic Countries (OIC) for 1993 to 2012 period. The paper highlights that high inflation rate, low domestic investment and high fertility rates tend to worsen youth unemployment rates. The results also uphold Okun's law by indicating a negative relationship between economic growth and unemployment rates.

Within the SADC region some studies have concentrated on the role of the regional block, capacity building and inventive approaches in fighting youth unemployment. Pharatlhatlhe and Byiers (2019) look at the role of SADC in pushing for prioritising youth unemployment strategies in the region. They find that the collective effort of the region in addressing youth unemployment sometimes suffers setbacks when Member States trades off regional commitment to gain their own domestic needs. Factors such as rural to urban migration, lack of infrastructure particularly in rural areas, and education systems that did not align to the demands of the labour market, among others, exacerbate the high youth unemployment in the region. The African Capacity Building Foundation (2017) evaluates the causes and effects of youth unemployment in a sample of four SADC countries, namely Botswana, Namibia, eSwatini and South Africa. The paper argues that there are some capacity gaps in addressing youth unemployment in the region. These include institutional frameworks, development and implementation of effective policies and programs. Quality of education is also underlined as lacking in immediately dealing with the job needs for the youths. The study underscores that some sectors such as

the mining sector are capital intensive and very limited in generating jobs. Employment-creating sectors in the region are mainly manufacturing, agriculture and the small to medium enterprises.

Despite the importance of focusing on studying the causes and effects and garnering a diversified solution that directly seek to reduce the high levels of unemployment levels, Okun's law remains a widely accepted empirical regularity. As a tool, policymakers use the law to measure the gain and cost of changes in economic growth and unemployment. This paper contributes to the body of knowledge by exploring the connection of changes in GDP rates to changes in unemployment rates in the SADC region based on Okun's law.

3. METHODOLOGY- ECONOMETRIC SPECIFICATION

To examine the impact of changes in GDP growth rates on changes in youth unemployment in the SADC region, Okun's simplified version suggested earlier in equation (3) (Göçer and Erdal, 2015; Esmeraldo and Veton, 2019) is embraced. The model can be stated as:

$$\Delta U_{it} = \alpha_i + \beta_{1t}(g_{it} - \bar{g}_t) + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where ΔU_{it} is the change in youth unemployment rate in the SADC country *i* in year t., $(g_{it} - \bar{g}_t)$ is the excess of current GDP growth rate of country i in year t over the average GDP growth rate of all SADC countries in year t, α_i are random individual specific effects of the individual SADC country *i*, and ε_{it} are the idiosyncratic error term. The Hausman specification test is usually used to determine the appropriate static panel model between the fixed effects and random effects because the unemployment rates and GDP growth rates in the panel would be likely to have both country and time effects.

Further to the simplified version of the specified model in (4), researchers have suggested a modified version that captures the effect of previous year output changes, current output changes and previous year youth unemployment changes on current youth unemployment changes (Farole, Ferro and Gutierrez, 2017). The dynamic specification that removes serial correlation in a static model (4) has been adopted from Arrellano and Bover (1995) and Blundell and Bond (1998). They proposed inclusion of some instrumental variables that contains both lagged levels as well as lagged differences in a model that is commonly known as the System GMM. The model eliminates some country-specific effects as the first differences are taken. The estimated System GMM model is specified in (5).

$$\Delta U_{it} = \alpha_i + \beta_0 \Delta U_{i(t-1)} + \beta_{1t}(g_{it} - \bar{g}_t) + \beta_{2(t-1)}(g_{i(t-1)} - \bar{g}_{t-1}) + \varepsilon_{it} - \varepsilon_{i(t-1)}$$

….. (5)

The following moment conditions are satisfied by the GMM estimator:

$$E[\Delta U_{it} - s(\varepsilon_{it} - \varepsilon_{i(t-1)})] = 0 \; for \; s \geq 2; t = 3, \ldots, T$$

$$E[(g_{it} - \bar{g}_t) - s(\varepsilon_{it} - \varepsilon_{i(t-1)})] = 0 \; for \; s \geq 2; t = 3, \ldots, T$$

These conditions are specified under the assumption that the idiosyncratic error term, ε_{it}, is not serially correlated. Also, the explanatory variable, $(g_{it} - \bar{g}_t)$, is weakly exogenous.

Additional moment conditions that creates the System GMM estimator are:

$$E\left[\left(\Delta U_{i(t-s)} - \Delta U_{i(t-s)-1}\right)(\alpha_i + \varepsilon_{it})\right] = 0 \; for \; s = 1$$

$$E\left[\left(g_{i(t-s)} - \bar{g}_{t-s-1}\right)(\alpha_i + \varepsilon_{it})\right] = 0 \; for \; s = 1$$

Only the latest difference is applicable in the levels' specification, since lagged levels are employed as instruments in the specification. Arellano and Bover (1995) state that older lagged variables become redundant.

Data

To run the empirical econometric model specified in (5), panel data on six selected SADC countries covering the period of 1991 to 2018 is extracted from the World Bank (2019) database. Selection of sample countries is based on two criteria. Firstly, Seychelles is excluded in the sample because it is the only country that does not have statistics in the World Bank database on youth unemployment in the region. Secondly, as mentioned before, some countries report very low unemployment rates but there exist numerous unofficial statistics that seek to reveal that the real situation on the ground is otherwise. A moderate decision is therefore taken to include only countries whose youth unemployment rate is above the SADC annual average of 22%. These are Angola, Botswana, eSwatini, Lesotho, Namibia and South Africa.

Empirical results

The results discussed in this section are based on the static and dynamic models specified in (4) and (5). Table 3 reports results for both models as well as their diagnostic tests. The table reports two diagnostic test statistics: Wald Statistic and the Sargan test. The former checks for the joint significance of regressors, with the null hypothesis stating that there is no correlation between the regressand and the regressors. On the other hand, the latter measures the possibility of over-identification of restrictions and consequently authenticity of the instrumental variables used in the estimation (Greene, 2018).

Table 3: Results estimated on Random Effect Model and Systems GMM

Variable	Dynamic *(1-step systems GMM)*	
	Coefficient	P-value
ΔU_{it} lagged once	0.281317	0.000*
$\Delta(g_{it} - \bar{g}_t)$	-0.0985388	0.04**
Constant	-0.1037898	0.545
Wald Chi-sq. test (p-value)		0.000*
Sargan test (p-value)		0.0507

*NB: Superscripts * and ** denotes that variable coefficients are significantly different form 0 at 1%, and 5%.*

The Sargan test statistic is insignificant at five percent level, which means the instrumental variables used are appropriate and the model is not over-identified. Contrariwise, the Wald statistic confirms that there is no autocorrelation between the regressors as its p-value is less than five percent.

Results of the dynamic model endorses Okun's law as it shows a negative relationship between changes in youth unemployment rate and increases in the positive gap between current GDP growth rate and average GDP growth. Specifically, a one-point

increase exceeding the average GDP growth rate in the region would have an impact of reducing the youth unemployment rate by 9.85 percent. However, the effect of a percent increase in the preceding year's youth unemployment rate has a positive impact of 28.13 percent increases in the current levels of youth unemployment rates. The implication is that policymakers should set realistic targets when fighting youth unemployment. If previous year unemployment rates rose, it would be difficult to expect the region to achieve drastic falls in the magnitude of the youth unemployment. Such a finding is also supported by many other researchers including Ebaidalla (2016), Hooper (2017) and Ball *et al* (2013).

4. CONCLUSIONS

This research has unpacked some new empirical evidence arising from Okun's law and applied on the impact of increases in GDP growth rates above the region's average output growth on youth unemployment. The theory that proclaims the need to sustain higher output growth rates as a matter of minimum policy to consistently lower unemployment is applicable to the region's agenda for addressing the high youth unemployment rates. The gap model connecting changes in youth unemployment rates and changes in GDP growth rates above the region's average growth rate has been used as the baseline. Modifications that allowed for the lagged dynamics in the Okun's law were accommodated with the Systems GMM. Such dynamics permits the analysis of the effect of previous periods' endogenous variables on the regressand, which is the changes in youth unemployment rates. This study has concluded that Okun's law is applicable in the context of the SADC region.

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