Returns to Schooling in Saint Lucia using a Mincerian Earning Framework

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Abstract

This paper sought to assess the returns to education in Saint Lucia. Having made significant public investment in education through school plant underscored by the universal primary and secondary education policy questions have emerged regarding the efficacy of this approach in the face of clear evidence that many person are go to and through school without learning which obviously defeats the purpose. Using the 2016 Survey of Living Conditions and the Household Budgetary Survey (SLC\HBS) we estimate a Mincerian Wage Function for Saint Lucia. The results show that there are huge returns to one additional year of schooling as well as one additional year of job experience. On that basis the paper suggest that Government should increase the years of schooling in Saint Lucia beyond the mandatory 5 to 15 year as per the Education Act, but the authors advocates that this increase should be in Early Childhood Education.

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1.0 Introduction

This paper is preoccupied with investigating the private returns one derives in Saint Lucia having made the investment decision to attain one additional year of education. The decision to pursue such a ubiquitous and widely researched area of study was largely as a result of two reasons; the first being that, despite the global academic community being awash with empirical research on returns to education from varying angles, there is clear evidence that Saint Lucia and the wider Caribbean community have not been adequately featured in this research deluge, a scenario which has become unfortunately commonplace in the Caribbean region. The second reason has to do with the fact that Saint Lucia has made massive public sector investment in education post-independence in keeping with the 1948 Universal Declaration on Human Rights which advocated children's right to free and compulsory education, and is anchored on the premise that education which is one of tried and tested vehicles to increasing human capital of a population is perhaps one of the best poverty eradication instruments and socio-economic equalizer available to humanity.

As a result, Saint Lucia is among the world's leaders were primary and secondary school enrolment is concerned, and has enshrined in its legislation universal primary and secondary education for every Saint Lucian. While such a progressive education policy is praiseworthy, having attained that goal, we are fast coming to the realization that universal school access and I reemphasize access to schools is not an end in and of itself, but rather a means. Having said so, I am also careful to not diminish the role of such public capital investments as an enabler of a well-functioning education system.

Notwithstanding, and on the contrary, the raison d'etre for any investment in school plants and training of teachers is to foster learning of a nation's citizenry, and as such, school ought to be learning institutions first and foremost among other things, in addition to be a socializing and moralizing agency as well. Put differently, there is clear evidence both globally and locally that many children matriculate through school systems while experiencing very little learning which is the foundation for human capital accumulation. Such a reality is subtle and consequential and is therefore worthy of concern and urgent action to say the very least. More importantly, it reinforces structural poverty and the perennial labour market skills mismatches which has protractedly hamstrung our poverty eradication and productivity improvement ambitions. If nothing else is remembered from the diatribe above, is that Schooling is not the same as Learning, although inextricably linked, one may attend school and not learn, while on the other hand one may attend school and learn, and also one may experience learning outside an educational institution, which leads to a related but tangential question which is not the remit of this study - of what is the definition of an educational institution, and is it the exclusive reserve of Government funded school facilities.

Establishing the above fact, that the global phenomena of schooling while not experiencing learning has reach our Saint Lucian shore and by extension our school system, one may ask and rightly so, how does this reality tie to the task at hand set out in this paper, which is the empirical estimation of returns to education in Saint Lucia. To do so, we make the very simplistic assumption that one of the many reasons that Saint Lucia has a very low tertiary and more importantly university education attainment rate, is that during the foundational years of primary

and secondary school, children experienced tremendous challenges in learning for a plethora of reasons which may result in them essentially having a disdain for the learning process, which we further infer as being a critical reason why once individuals transition from adolescents to young adult or from school to work, there is not an incentive to invest further in their learning and education, which has detrimental consequences at both the micro and macro level. Our paper therefore seeks to quantify the marginal increase in ones income from each additional year of education one attains in Saint Lucia with the goal of establishing and communicating the anecdotal education premium that exist in Saint Lucia which we hope will somehow encourage individuals to invest more in their education, in addition to spurring Government to create avenues for the population to continue investing in education and lifelong learning beyond the mandatory secondary education, both in the academic and technical streams.

The remained of the paper is organized as follows. Section provides some stylized fact on the education system in Saint Lucia which looks expenditure and the overall system. Section 3 captures the literature review and lay the theoretical framework for school as a vehicle for human capital, while section 4 looks at the data, estimation methodology and result, and section 5 focuses on the reviewing the findings and make where possible any recommendations.

2.0   Stylized Facts: Saint Lucia's Education System
2.1   Overview of Education System

Saint Lucia's education system is governed principally by the laws and regulations as set out in the Education Act of 1999 (Revised 2001). The legislation stipulates compulsory school attendance for children between the ages of 5 to 15 years. However, although not explicit stated the education system caters to the needs of infants under 2 years of age through to adolescents age 17 years and over. The structure of the education system comprises; (i) Early Childhood Education (ECE), Primary Education, Secondary Education, Tertiary Education and Skills Training.

Operationally, the system functions such that it allows infants to typically spend two (2) years at the pre-primary of ECE level, while pre-adolescents spend seven (7) years, three (3) of which is spent at the infant level while the remaining four (4) years are spent at the junior level. Adolescents are mandated by the Act to spend five (5) years at the secondary school level – three (3) at the lower secondary forms and two (2) at the upper secondary forms. Subsequent to the successful completion of secondary education, students keen on continuing their education may proceed to one of divisions of the country's main tertiary learning institution the Sir Lewis Community College or the Post-Secondary Department of the Vieux Fort Comprehensive Secondary School which caters primarily to the needs of students in the southern part of the island. Alternatively, the student has the option of proceeding directly to a University abroad, either regionally or internationally.

2.2   Public Expenditure on Education

Over the past nineteen (19) years dating back to 2000 to 2018 the average Government expenditure on education for all levels average 144.7 million per fiscal year, equivalent to 4.2 percent of annual Gross Domestic Product. By the same token, education expenditure as a

percentage of annual Central Government Expenditure on average is 22.5 percent, a fifth and in some years nearly a quarter of the country's budget.

Table 1: Annual Education Expenditure as % of GDP

Year	Education Expenditure (Millions)	Education Expenditure (% of GDP)	Education Expenditure (% of Gov't Exp)
2000/01	102.7	4.6	19.3
2001/02	110.0	5.1	22.9
2002/03	111.9	5.2	22.7
2003/04	109.4	4.6	21.5
2004/05	115.5	4.5	21.1
2005/06	118.5	4.3	22.1
2006/07	124.1	4.1	22.7
2007/08	128.5	3.7	20.1
2008/09	137.0	3.96	20.5
2009/10	148.4	4.35	23.7
2010/11	155.9	4.18	22.6
2011/12	161.2	4.15	23.1
2012/13	164.4	4.24	24.8
2013/14	170.2	4.23	23.5
2014/15	165.1	3.94	22.1
2015/16	175.2	3.93	23.6
2016/17	178.1	3.96	24.4
2017/18	181.5	3.72	23.9
2018/19	192.2	3.77	n/a
Avg.	144.7	4.2	22.5

It is worth noting that both Saint Lucia's education expenditure as a percentage of GDP, as well as a percentage of public expenditures complies with both the 2015 Addis Ababa Action Agenda and the Incheon Declaration Education 2030 Framework for Action which stipulates that Governments should allocate 4 to 5 percent of GDP and 15 to 20 percent of public expenditure to education. As a matter of fact, Saint Lucia on the basis of available education expenditure has met these benchmarks as far back as 2000, which underscores the unequivocal commitment of successive Governments to the educating its most abundant resource, its people.

3.0   Literature Review
3.1   Theoretical Framework for Returns to Education
The idea that schools can be used as a means to educating a population for greater productivity, economic growth, poverty eradication and equality has its genesis in the ground-breaking seminal work of luminaries and pioneers in the theory of Human Capital such as Gary Becker, Jacob Mincer and Theodore Schultz. This new strand of economic theory which is embedded in the neo-classical school of thought was motivate in large part by the realization by development economist that growth in physical capital explained only partially the variations noted in national

income growth. This consequently led to further inquiry for more appropriate measures for capturing physical capital accumulation initially, but more importantly, it also led to greater focus and investigation on the intangible factors known theoretically to influence economic growth, i.e., technological progress and human capital accumulation, the latter being the major concern of this paper.

(Becker 1964) standard human capital workhorse theory assumes that education denoted by "s" is chosen to maximize the present value of future streams of incomes denoted by "w" representing wages, up to retirement at date "T", less the cost associated with acquiring that education, "c". Hence, for the decision to attain an additional year to be worthwhile the present value of the sth year of schooling must be equal to the cost of the sth year of education and is characterized in equilibrium state as follows;

$$\sum_{t=1}^{T-s} \frac{w_s - w_{s-1}}{(1 + r_s)^t} = w_s + c_s$$

From the equation above "r" is considered the internal rate of return, and it must be noted that "s" years of schooling is infinitely divisible which means that years should not be literally referred to as a year. On that basis, the optimal investment decision would mean that one would invest in the "s" year of schooling if $r_s > i$. That is, the internal rate of return has to be greater that the market interest rate. Following from (Harmon, Oosterbeek and Walker 2003) if one assumes that "T" is sufficiently large then the left hand side of the equation can be approximated to reflect the following equilibrium condition

$$\frac{w_s - w_{s-1}}{r_s} = w_{s-1} + c_s$$

(Harmon, Oosterbeek and Walker 2003) go on further to assume that if c_s is sufficiently small, the above equation can be rearrange accordingly an log linearized to represent the following expression

$$r_s \approx \frac{w_s - w_{s-1}}{w_s} \approx logw_s - logw_{s-1}$$

The above expression infers that the return to the sth year of schooling is approximately the difference in the log wages between leaving at s and at $s - 1$. Therefore, one can empirically investigate the returns to s by assessing how log wages varies with s, that is an additional year of education.

The empirical human capital theoretical framework represented by an earnings function was developed by Jacob Mincer in 1974 and has been coined the Mincerian Wage Function due to its popularity and has since become the standard workhorse model among scholars and development practitioners alike, and is usual represented by the following functional form;

$$logw_i = X_i\beta + rs_i + \delta x_i + \gamma x_i^2 + \mu_i$$

Where w_i is a measurement of earnings for the ith individual for instance hourly, fortnightly or monthly wage, s_i represents a measure of their schooling, x_i is an indicator for experience, x_i^2 represents experience squared which is used to capture the concavity nature experience on an individuals earning profile, X_i is a matrix of other variables that a traditionally expected to influence one earnings and μ_i is the stochastic disturbance error term, which are unobserved factors that may be influencing the ones earning potential but cannot be measured and is assumed to be independent. The main rationale of the Mincerian equation is that if one assumes no tuition cost then r can be considered the private financial return to schooling and can be interpreted as the proportionate effect on wages as a result of an incremental increase in schooling s.

4.0   Data and Empirical Methodology
4.1   Data

This paper utilizes the 2016 Enhance Country Poverty Assessment Dataset which comprises a Survey of Living Conditions and Household Budget Survey (SLC/HBS) funded by the Caribbean Development Bank. This survey comprises of a sample of 4,574 individuals across all seventeen constituencies in Saint Lucia. However, only 1,975 observations were obtained for individual earnings. To estimate the returns to schooling in Saint Lucia the ten (10) variables are used. These include; (i) Earnings which is the monthly income earned by individuals who participated in the survey, (ii) Yrs. Of Education capture the number of school years for each participant, (iii) Experience was derived using a similar employed by Jacob Mincer (1974) which involved subtracting the age left school from current age of the individual which although not perfect gives a good approximation of years of experience, (iv) Experience2 captures the exponential impact of on the job experience, (v) Sex, (vi) capture ethnicity of participants, (vii) Marital Status, (viii) Secto rand (viiii) Educational Level of Household Head captures the ability bias in the equation. It must be noted that while table 2 presents the data in levels the estimation will be conducted using log linear model hence the earnings, years of education, as well as the experience and experience squared variables will all be logged while the other variables that are binary in nature will remain in the model in levels.

Table 2 provide the summary statistic for the variables that will be used in this study. It suggests that mean earn on average $315.10 more than women although women on average has 1.1 more years of education than men. The data also indicates that men had on average 2.0 years more work experience than men, which could possible explain the wage differential given that experience has been proven to be a significant factor that influences wage growth. Further, it may be indicative that since women are spending more time in school they are entering the labour market later, and perhaps experience has a higher premium relative to one additional year of education in the Saint Lucia labour market. Additionally, it also reveals that women are concentrated in the services sector (Wholesale & Retail, Accommodation & Food Services, Education and Other Services) which reflects occupational segregation on the part of women and perhaps deep cultural norms regarding what sectors women should participate, however these sectors are traditionally considered low paying.

Table 2: Descriptive Statistics

Variable	Full Sample	Male	Female	Difference
Earnings[1]	2018.5	2178.2	1825.1	353.1
Individual Characteristics				0.0
Age	42.3	41.8	40.6	1.1
Yrs. of Schooling	12.1	11.6	12.7	-1.1
Experience	24.7	25.6	23.6	2.0
Rural	684	394	290	104
Urban	1290	687	603	84
Married				
Educational Stream				
Academic				
Technical Vocational	1974			
Sector				
Agriculture	210.0	176.0	34.0	142.0
Manufacturing	135.0	87.0	48.0	39.0
Construction	175.0	166.0	9.0	157.0
Wholesale and Retail	309.0	124.0	185.0	-61.0
Accommodation and Food Services	285.0	127.0	158.0	-31.0
Transport, Storage and Communication	106.0	86.0	20.0	66.0
Public Administration and Defense	189.0	98.0	91.0	7.0
Education Services Gov./Public	96.0	23.0	73.0	-50.0
Other Services not stated	399.0	151.0	248.0	-97.0
Activities not defined	70.0	43.0	27.0	16.0
Occupation				
Manager	106	44	62	-18
Professional	168	72	96	-24
Technical and Associate Professionals	143	70	73	-3
Clerical Support Workers	115	23	92	-69
Service and Sales Workers	555	185	370	-185
Skilled Agricultural, Forestry and Fish	191	162	29	133
Craft and Related Trade Workers	244	224	20	204
Plant and Machinery Operators	118	103	15	88
Elementary Occupation	264	154	110	44
No of Observation	1975.0	1081.0	894.0	

Figure 1 below tries to capture the distribution of earnings and year of schooling across the Saint Lucia population using the 2016 SLC\HBSdisaggregated by sex. The graph clearly shows that

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[1] Mean is calculated for Earnings, Age, Years of Schooling and Years of Experience, while the other variable the frequency is used.

majority of the distribution earn below $5,000.00, while the lionshare of the population has on average 12 years of schooling. In both cases, the distribution is not significantly different for women and men. However, one will notice that earnings desity function is skewed to the left, ie. towards Lower wages, while years of education is more normally distributed, which reflects to a large extent government policy of compulsory education, which does not disadvantage persons.

Figure 1: Kdensity of Earnings and Yrs. of Education by Sex
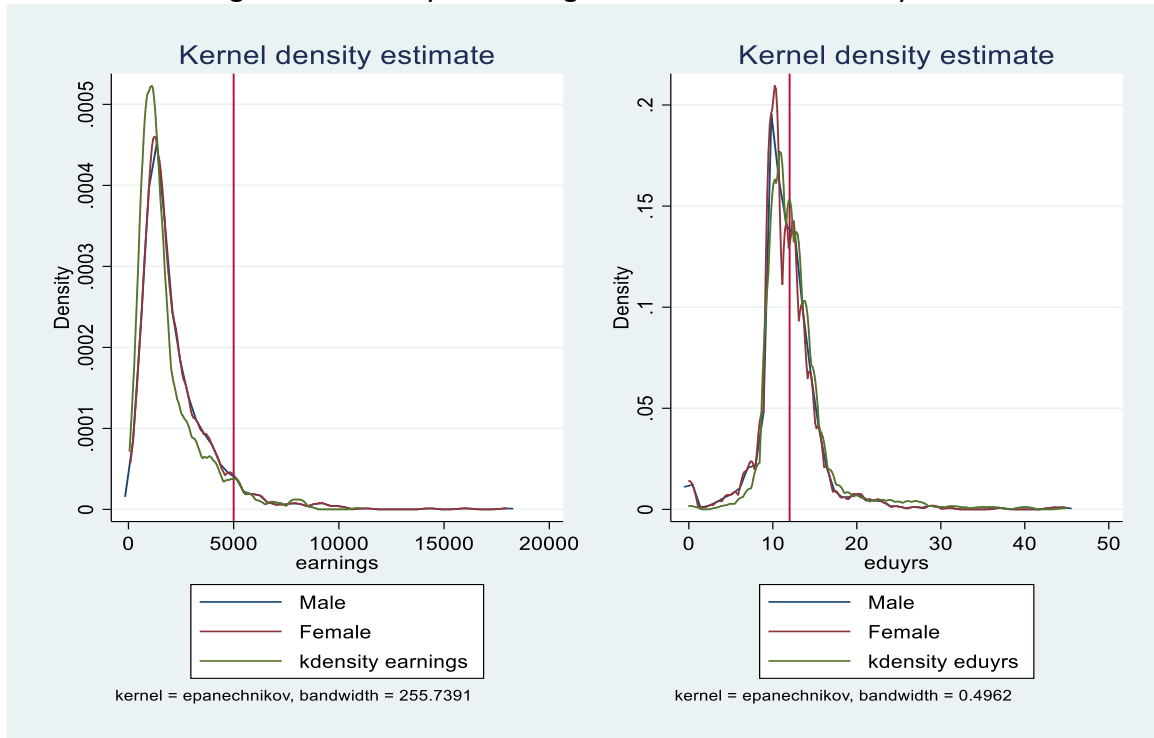
4.2   Empirical Methodology

The standard multivariate Ordinary Least Square (OLS) has traditionally been widely used to estimate the Mincerian Wage Function and has been generally lauded for producing acceptable and consistent results. However, it must be noted that as a result of the ability bias that is inherent in wage function that some have resorted to using the Instrumental Variable estimation method to deal with this deficiency.

Base Model Specification

The base model specification reflects the standard Mincerian wage function and represented as follows;

$$\log(Y_i) = \beta_0 + \beta_1 S_i + \beta_2 X_i + \mu$$

Where the dependent variable is the natural log of earnings calculated as monthly wage denoted as $\log(Y_i)$. The term S_i represents a vector depicting years of schooling. X_i is a vector of which captures the individual characteristics, (i) Age which is depicted as a discrete variable which

captures the persons age at his or her last birthday. Moreover, there is a growing evidence that the age and earnings share a non-linear relationship and therefor empirical wage function estimations also include quadratic representations of age, i.e. either age^2 or age^3 or both. The second variable is experience which has shown from numerous empirical studies to be a significant factor influencing wages. For instance (Mincer 1974) using 1960 US Census data found that one additional year of experience resulting in an 8 percent increase in wage. Similar to the age variable, there is also consensus that experience and earnings has a non-linear relationship and hence quadratic versions of the experience variables are usually included in the standard Mincerian wage function. Other binary variables such as sex, marital status, urban or rural and sectors within which one works are included in the specification. μ which is mu captures the stochastic error term, that is, changes to wage that are not directly influenced by the dependent variables. A critical consideration for the error term is to ensure that it is not correlated with any of the dependent variables, if this exist there is the presence of endogeneity which may result in inaccurate results and misleading inferences.

4.2   Results

Table 3 below present the result from the Ordinary Least Squares estimation for the Mincerian Wage function in Saint Lucia. A five model stepwise estimation was carried out starting the base model which looked at the impact of years of education, experience and age on wages for the full sample of observation. The full model shows very convincing evidence that one incremental year of school does positively impact on wage estimate at over 100 percent increase in wages, which exceedingly high. Similarly experience has a positive and significant impact on wages estimated at a 19.8 percent increase in wages for every additional year of experience in the labour market.

Table 3: OLS Regression Results

VARIABLES	Full Earning	Male Earnings	Female Earning	Sector Earning	Occupation Earnings
leduyrs	1.095***	0.969***	1.550***	1.064***	0.775***
	(0.103)	(0.125)	(0.132)	(0.104)	(0.0998)
lexper	0.198***	0.304***	0.210***	0.173***	0.191***
	(0.0551)	(0.0699)	(0.0687)	(0.0562)	(0.0500)
lage	-0.214*	-0.359**	-0.313*	-0.160	-0.306**
	(0.129)	(0.168)	(0.166)	(0.132)	(0.121)
Sectors					
Manufacturing				-0.0746	
				(0.0913)	
Construction				0.346***	
				(0.0765)	
Wholesale and Retail				-0.123*	
				(0.0749)	
Accommodation				0.132*	
				(0.0742)	
Transport & Storage				0.325***	
				(0.0916)	

Other Services					-0.0442
					(0.0720)
Public Administration					0.284***
					(0.0802)
Educational Services					0.120
					(0.103)
Not Stated					-0.00338
					(0.100)
Occupation					
Professional					0.00896
					(0.0971)
Technical & Associate Professionals					-0.142
					(0.100)
Clerical Support					-0.312***
					(0.0945)
Service and Sales					-0.596***
					(0.0897)
Skilled Agriculture					-0.421***
					(0.108)
Craft and Trade Work					-0.223**
					(0.0949)
Plant & Machine Operator					-0.165
					(0.106)
Elementary Occupation					-0.708***
					(0.0955)
Constant	4.849***	5.512***	3.871***	4.732***	6.379***
	(0.305)	(0.422)	(0.437)	(0.327)	(0.347)
Observations	1,897	1,042	855	1,897	1,832
R-squared	0.132	0.119	0.230	0.182	0.230

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

The next two model labelled male and female seeks to assess whether any gender differential exist in Saint Lucia's Mincerian Wage function. The result are consistent with the base model, however, females higher a higher return on one additional year of schooling estimated at over 150 percent increase in their wages, while mean around 97 percent increase. Interestingly though, men have a higher return on experience in the labour market than women at 30 percent relative to 21 percent for women.

At the sectorial level four sectors showed positive and significant impact on wages, i.e., the construction sector (35 percent), the transport and storage sector (33 percent), public administration (28 percent) and the Accommodation and Food Services at (13.2 percent). Turning

our attention to occupation in most cases either they were negative and significant or positive and not significant.

5.0   Conclusion

Saint Lucia like most Small Island developing States have looked to schooling as the major means by which to increase the human capital of their citizens which ultimately will translate into increase productivity, the eradication of poverty and the an improvement in the quality of well measured by the GDP per Capita. However, of late there has emerged the realization that despite the best intentions of policy makers in Government's in making schooling universal, there is growing evidence that many a children are matriculating through such public learning institution while learning very little, consequently it has lead development practitioners to recognize that schooling is not learning.

For Saint Lucia while significant expenditures have been made annually on education estimate at 4.2 percent of GDP and 22.5 percent of public expenditure the country has not fully reaped the dividends from its investment. This can be seen in the low level of tertiary and university educational attainment.

The writers of this paper assumes that many students during their foundation years, i.e., primary and secondary school years' experience tremendous difficulties and as a result once they matriculate from the mandatory secondary school, individuals do not have an incentive to invest further in their education. As such, the paper seeks to assess the returns to education as a means of advocating and communicating the tangible benefits one can derive from one additional year of schooling in Saint Lucia.

Using a Mincerian Wage Function and the Saint Lucia Enhanced Country Poverty Assessment for 2016 funded by the Caribbean Development Bank, five models were estimated. In every case the models reveal that one additional years of schooling is associated with in almost a double of wage, which is consistent across sexes. Similarly experience is also seen to have a very influential impact on earning, however, experience seems to be more significant for men rather than women in the labour market, these result are instructive since men have on average 2 more years job experience than women. Notwithstanding, women's returns to education is higher than of their male counterparts, and may essential neutralize the difference in experience premium that mean may have.

Given that little to no work has been empirically done for Saint Lucia, this paper has bridge this gap and has shed some light on the issue of returns to schooling in Saint Lucia. However, the remains tremendous opportunity to refine this paper, such as the use of other econometric methods such as Instrumental Variables that deals adequately with the ability bias that plagues wage function estimation among other things. Other potential areas for further research may include doing a similar study for the OECS as a whole and to assess he factors inhibiting participation in higher education, additionally more focus can be place on TVET verse the standard Academic pathways and how returns differ.

From a policy perspective, if there is clear evidence that one additional years results in such high levels of return, then Government's should consider lengthen the mandatory school of 5 to 15

years, either by including mandatory universal Early Childhood Education perhaps starting at 3 or 4 years or alternatively increase the years in secondary school, although our preference is the democratization Early Childhood Education which has proved to be more impact full.

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