

The Transmission Mechanism of Dutch Disease in Nigeria

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Abstract- This study was on the transmission mechanism of Dutch Disease in Nigeria. The term Dutch Disease otherwise known as Hollandis syndrome, came into existence in 1977 when the British Journal titled the Economist first used it. It was used to connote a situation in which discovery of natural gas in large quantity in the Netherland led to mass movement of labour from their industrial sector to their newly discovered gas sector, reduction in agricultural and industrial exports and increase in gas export. This study investigated at least two sources through which Dutch Disease could be transmitted to the Nigerian economy namely: through non-diversification of the economy and through foreign aid received. Data covering the period of 1960 – 2015 were sourced from the Central Bank Statistical Bulletin and World Development Indicator 2016. Data on Gross Domestic Product (GDP), oil, agriculture, industry and manufacturing sectors were analysed using both the Ordinary Least Squares and the Bayesian Vector Autoregressive techniques and found that the oil sector dominated and relegated agricultural, industrial and especially manufacturing sub-sector of industry to the background. This confirmed existence of Dutch Disease in Nigeria. Data on foreign aid received, import and export and GDP were also analysed using the Bayesian version of autoregressive model and found that as foreign aid received was rising, import was rising and export falling which further confirmed the existence of Dutch Disease in Nigeria. Based on these findings the study recommended (i) diversification of the economy through improved and mechanised agricultural and industrial sector especially the manufacturing sub-sector. (ii) Reduction in foreign aid receive to boost export and decrease import or alternatively to divert such foreign aid to improve our agricultural and industrial productions. (iii) Government should fight corruption by

demonetising the over pampered and over monetised political sector of the economy and divert such money to diversify the economy.

Indexed Terms- Dutch disease, non-diversification, Bayesian Auto regression, transmission mechanism, foreign aid

I. INTRODUCTION

The concept of DD appears to be relatively new in the world economics as a field of study today. But there were few cases of situations that could be liken to existence of DD in the 16th century in countries like America, Spain and Australia where gold was discovered in large quantities. According to Koutassila (1998) the term DD only came into the limelight in June 1977 when the British Journal titled the Economist used it to described the scenario that emanated following the suddenly discovery of large deposit of natural gas in Netherland in 1960s and when they began to tap it for exports. Before and after then, many other countries of the world have discovered abundant supply of different natural resources. Nigeria for instance discovered large deposit of oil in 1960. Economist use the term “Dutch disease” to describe a reduction in a country’s export performance as a result of an appreciation of the exchange rate after a natural resource such as oil has been discovered (Barder 2006)

The term DD simply refers to a situation where the discovery of new deposit of certain natural resource (i) increase the export of that particular resource at the expense of other exports (ii) create unemployment in other sector of the economy as a result of exodus of workers to the newly discovered natural resource sector (iii) leads to appreciation of the country’s currency (iv) non-diversification of the economy. (v) Increase in foreign aid received by the country (vi) increase in import volume of the country.

(vii) Total collapse of the manufacturing or agricultural sectorial outputs, and so on. In this study these factors will be examined under two sub-sections namely: non-diversification of the economy and inflow of foreign aid. The first four factors will be classified and examined under non-diversification of the economy due to the new discovery while the remaining factors will be categorised and analysed under inflow of foreign aid.

The purpose of diversification is for the country to avoid being a monoculture economy but instead exploit other sectors and develop them for more exports to generate more foreign exchange for the country. When most countries discover new natural resource(s) it used to turn out to be a curse rather than a blessing to them because the leaders would see it as an avenue to get rich quick and squander it in a wasteful manner at the expense of national development. This is in line with the observation made by Nelson (1990) that natural resources rich countries are always exposed to the menace of Dutch Disease syndrome in such a way that what supposed to be a blessing turn out to be a curse for them. This has been the case in many countries, Nigeria inclusive, but with the single notable exception of Norway, though some countries have begun to turn the situation around of recent. Failure to diversify and too much reliance on mono product as a means of national income will relegate the other sectors like agriculture as in the case of Japan and industry as in the case of Netherland, to the background. Diversification connotes a situation whereby different sectors of the economy, ranging from manufacturing to agriculture, natural resources, distributive and other sectors contribute their quotas to the Gross Domestic Product, in accordance with their ability to contribute and not necessarily dominated by the newly discovered natural resource sector. Exports of agricultural products like Cocoa, coffee, fishery and forest reserves have led to development of Dutch Diseases in countries like Nigeria, Cote d'Ivoire, while export of natural resources like petrol and gas have generated Dutch Diseases in countries like Kuwait, Venezuela Netherland, Algeria, Nigeria and other oil dependent countries of the world. Wijnbergen (1984), made it abundantly clear that diversity is preferable to singularity of export base as a secured future insurance for the economy.

In the case of foreign aid it has been observed that most foreign aid are attached to imports. Even if it involves physical cash the receiver may be asked to use it to buy goods from the donor country and import it to his country. This tend to increase the import volumes of the aid receiving country. Excessive foreign aid may therefore, boost imports to exceed exports with the deficit balance of payment problem in view. It is when a substantial amount of aid leads to a drastic reduction in the country's export volume that Dutch Disease sets in, which may become harmful and hazardous to the economic performance of the country in the long-run. The harm attached to aid can be avoided on condition that aid which is a transfer of foreign currency as gift is sustainable and predictable. Foreign aid becomes a disease because of its requirement to reduce domestic production of tradable goods and increase production and consumption of non-tradable goods in the short run. According to Van Wintergreen (1986), Usui (1996), and Laplagne et al (2001) external aid received by developing countries leads to (i) growth in consumption (ii) appreciation of the real exchange rate (iii) decline in national production (iv) dwindling exports of the tradable commodities, and rising imports. The problem that triggered off this study is the undeniable fact that Nigeria is one of such countries that have discovered abundant supply of a natural resource called crude oil in the early 70s. Almost all the factors identified as symptoms of Dutch Disease above are emanating from Nigerian economy today. Many industries have shut down, existing ones are in ailing conditions, and agriculture has been abandoned, people are hungry, graduate unemployment soaring high, poverty level rising, inflation rising and many more. The question that arises is that is Nigeria suffering from Dutch Disease? It is therefore, the aim and objective of the study to answer this question.

II. LITERATURE REVIEW

The term Dutch Disease came into existence in June 1977 even though the phenomenon of Dutch Disease has been in existence unrecognised since the 16th century in some countries. But some writers like Meade & Russell (1957), Corden & Neary (1982) and Corden (1984) made concerted efforts to write on the phenomenon of Dutch Disease. Since then the

literature has been flooded with papers on the exact meaning, causes, consequences and abatement of the problem called Dutch Disease. The phenomenon has become so popular and widely spread to the extent that it has been variously described as Hollandis syndrome, Hollandis sickness, Netherland syndrome and Dutch Disease in the Nordic countries of Australia, Finland, Norway and Iceland (Coussy 1991, Nowak 1994, John 1998, Thorvaldur 1999 and Chistine 2003).

According to Otaha (2012) discovery of new natural resource lead to high export revenues, high exchange rates, adverse balance of payment when prices fall and reduced incentive to risk investment in other sectors meaning non-diversification to other sectors. The Dutch disease theory therefore, refers to the situation in which a boom in an export sector leads to a shift of production factors towards the booming sector and an increase in the prices of non-tradable goods and services. Thus, hurting the rest of the tradable goods sector. According to Auty (2001) Dutch Disease means the slump in other sectors of the economy that accompanies influx of revenues from oil exports. In the view of Lane (1996) political Dutch disease occurs where natural resources or windfalls do not only lead to slower economic growth but it also generates and reinforces authoritarian tendencies in third world political regimes and that dictatorship and slow growth are the possible outcome of resource dependence. According to the following sources, Corden and Neary (1982), Corden (1984), Rosenberg and Saavaliainen (1998), higher wealth caused by booming demand for the exports of newly discovered natural resource leads to shift of an economy's productive resources from the tradable sector to the non-tradable sector. The decline in the exports of the tradable sector is called Dutch Disease. This was the fate of Netherland's manufacturing sector when large deposit of natural gas was discovered in 1960s. According to Auty (1991) features of DD includes accelerated inflation, exchange rate appreciation and retardation of diversification into competitive non-oil tradable such as resources-based industry (RBI). Koutassilla (1998) observed that it was the rise or appreciation of Cameroonian currency through exports of oil that created a DD situation in the country, but the rise of petroleum prices in the late

1970s and early 1980s in Congo's exports was less than that of Cameroon. Cameroon appears to have escaped from the disease now because of her diversification to her agricultural sector while Congo is still suffering from Dutch Disease. According to Nowak (1994), it was the boom in exports of coffee and cocoa beans of the late 1970s that led to Dutch Disease in Cote d'Ivoire.

According to Coussy (1989), following the discovery of crude oil in Nigeria in the 1960s, the three causes of DD in Nigeria include: rise in nominal exchange rate, rise in general price level and abolition of restrictions to changes. While other oil producing countries like Algeria, Indonesia, Iran, Nigeria, Venezuela, Trinidad and Tobago, were developing gradually with their oil revenues, Henry (1991) remarked that Nigeria was the only country that fell below poverty line among them because the level of quality of life of her citizen fell below the shock level with the rising oil revenues. This was as a result of the government to use oil revenue to ameliorate and savage the dwindling agricultural exports as a co-foreign exchange earner with oil exports. This situation persists till today. Agricultural sector has collapsed almost completely as farmers and would-be farmers have moved to the oil-sector and other services sectors of the economy especially the town-service transport sector popularly called Okada transport services. According to Utomi (2003) instead of real economic growth, every windfalls in oil revenue had led to mass retrenchment of workers in Nigeria. The problem in Nigeria is the general problem of most oil producing countries which is the tendency by the leaders to perpetuate themselves in power to enjoy the oil revenue till death do them part. With the exception of Abdulsalami who ruled for one year and handed over power on scheduled, the following former leaders have over stayed their useful existence in power due to excessive oil revenues: General Gowon (1966-1975), Shagari (1979-1983), Babangida (1985-1993), Abacha(1993-1998) and Obasanjo(1999-2007). Outside Nigeria, MbutoSeseSeko, held on to power for 32 years in Zaire and MuamahGhadaffi was in power for 42 years in Libya. The people of these countries remained impoverished, suffering in the midst of plenty because of high level of corrupt practices on the part of the leaders. Nigeria and these other oil-

rich economies have failed to comply with the golden advice by Stiglitz (2003) that discovery and subsequent exports of new natural resources belongs to both the current and future generation of the populace and not necessarily the current government in power alone. Carting revenues from such resources into private pocket by the current generation tantamount to leaving the future generations impoverished and stealing their patrimony. It has been observed by Auty (2004) that countries that became rich through export of natural resources perform economically less significantly than countries that lack natural resources. This assertion makes some writers (Ross 2001, Sachs & Warner 2001, Gylfason 2001a, Adedeji 2006) to believe that discovery of new natural resources could be a curse rather than blessing to the resource-endowed countries. Gylfason (2001a) noted that the GDP of Nigeria remained constant forty years after oil discovery. Resource rich-countries that have exhibited or demonstrated that discovery of new resources could be a curse rather than blessing include Coted'Ivoire, Congo, Algeria, Angola, Netherland, Nigeria, Iran, Saudi-Arabia, Venezuela and others.

This study summarises Dutch Disease in Nigeria as follows: Consequent upon the discovery of crude oil in Nigeria the following conditions prevailed: (i) unprecedented rise in oil exports (ii) drastic reduction in export of agricultural product (iii) exodus of workers from agriculture to the oil sector which marked the collapse of agricultural sector (iv) fall in the export of industrial products (v) mass retrenchment of workers in industrial sector (vi) closing down or merger in industrial sector (vii) reduction in industrial capacity utilization rate (viii) retrenchment, merger and acquisition in the banking sectors (ix) school leaver and graduate unemployment (x) two-digit inflation rate (xi) abnormal exchange rate (xii) high level official corrupt practices among the leaders (xiii) mass killing by the Boko-Haram sect in quest for share of the national cake (xiv) kidnapping of oil workers in quest for recognition and share of the national cake (xv) kidnapping of the big-wigs for ransoms in quest for share of the national cake (xvi) recent mass killings by the herdsmen across the country in quest for recognition for the share of the national cake (xvii)

armed robbery, daylight bank robbery, hire killing and other social vices. (xiii) Increase in foreign aid (ix) increase in import volumes (xx) non-diversification of the economy. All these are the by-products of the oil discovery in Nigeria which constitute nothing but Dutch Diseases in the country

III. METHODOLOGY

This study looks at the Dutch Disease in Nigeria from two different perspectives: the non-diversification perspective and the foreign aid perspective. From the angle of non-diversification, it was observed that agriculture was the main engine of growth before the advent of oil in Nigeria in early 70s. Oil export has taken over the contribution of agriculture and other sectors of the economy in the Gross Domestic Product. Model 1 of this study looks at the contributions of the oil sector (OSEC), agricultural sector (ASEC), industrial sector (ISEC), and manufacturing sectors (MSEC) to Gross Domestic Product (GDP). The double logarithm model for this study is specified as:

$$\ln \text{GDP}_t = \beta_0 + \beta_1 \ln \text{OSEC}_t + \beta_2 \ln \text{ASEC}_t + \beta_3 \ln \text{ISEC}_t + \beta_4 \ln \text{MSEC}_t + \mu_t \quad (1)$$

a priori expectation: $\beta_0 > 0, \beta_1 > 0, \beta_2, \dots, \beta_4 < 0$.

This will enable us to establish the existence of DD in Nigeria if the a priori expectations are fulfilled.

Table 1: Ordinary Least Squares Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnOILEXP	0.632840	0.415181	1.524251	0.1379
lnAGR	-0.117393	0.122354	-0.959453	0.3450
lnIND	-0.116045	0.097809	-1.186443	0.2448
lnMNF	-0.527422	0.489693	-1.077046	0.2900
C	36.09958	12.60845	2.863125	0.0076

$$R^2 = 0.694192$$

$$\text{adj.}R^2 = 0.653418$$

The results of the double logarithm model of this study was presented in table 1 above and it revealed that both the agricultural and industrial sector and the manufacturing sub-sector of the industry were all

negatively related to Gross Domestic Product, and hence the economy. The results indicated that 1% increase in agricultural, industrial and manufacturing sectors led to about 11.7%, 11.6% and 52.7% decrease in GDP respectively. Whereas a corresponding 1% increase in oil sector led to about 63.3% increase in GDP, a clear pointer to the existence of Dutch Disease in Nigeria.

Table 2: Bayesian VAR Estimates

Variable	Coefficient	Std. Error	t-Statistic
lnGDP(-1)	0.002990	0.09045	0.03305
LnGDP(-2)	0.001236	0.04862	0.02542
LnOSEC(-1)	0.763419	0.31202	2.44668
LnOSEC(-2)	0.175367	0.25796	0.67984
lnASEC(-1)	-0.001565	0.04080	-0.03836
lnASEC(-2_)	-0.000301	0.02248	-0.01339
lnISEC(-1)	-0.004504	0.03230	-0.13947
LnISEC(-2)	-0.000878	0.01793	-0.04896
LnMSEC(-1)	-0.04919	0.16045	-0.27995
LnMSEC(-2)	-0.014610	0.09716	-0.15037
C	23.54512	4.19791	5.60878

R2 = 0.657237, adj.R2 = 0.501436, F = 4.218430

The above double log model result was supported by the following Bayesian estimates of the vector autoregressive model. Oil sector was positively related to GDP in both the first and second periods to the extent that a unit increase in the oil sector led to about 0.76 and 0.18 units increase in GDP in the first and second period respectively. Whereas, agricultural, industrial and manufacturing sectors exhibited negative relationship to GDP during the period of study. This is an evidence to prove that the discovery of oil in Nigeria has actually caused a phenomenon of Dutch Diseases in Nigeria. The Vector autoregressive estimates as well as its multiple graphs in the appendix demonstrated the same pattern of relationship among the variables. They all confirmed the hypothesis that Dutch Disease exists in Nigeria.

The second model of this study is on the relationship between aid received and the level of imports and exports. Since it is assumed that as the volume of aid

received rises, imports will be rising and exports will be falling, meaning that foreign aid is expected to Granger cause import positively and export negatively. It is the structural vector autoregressive model (SVAR) that captures such relationship well. The SVAR model is therefore specified as follows: then we specify the following model:

The standard form of the SVAR in Mohammed (2016) was specified as:

$$X_t = A_0 + A_1X_{t-1} + e \tag{1}$$

Where: X_t = row vector of the endogenous variables in period t and they are all in logarithm forms. The structural form of equation 1 above was specified as:

$$BX_t = \partial_0 + \partial_1X_{t-1} + \varepsilon_t \tag{2}$$

By multiplying equation 2 by B^{-1} equation 2 was normalised as to yield: $B^{-1}BX_t + B^{-1}\partial_0 + B^{-1}\partial_1X_{t-1} + B^{-1}\varepsilon_t = A_0 + X_{t-1} + e_t(3)$

Where: $e_t = B^{-1}\varepsilon_t = (e^{gdpt} e^{expt} e^{cpi} e^{impt} e^{faidt}) (5 \times 1)$ (4) and equation 4 was a row vector of error terms.

In this case the study assumes that the error terms are serially uncorrelated and that the elements of the vector of innovation are equally assumed to be independently and identically distributed with zero mean and constant variance - covariance such that $\varepsilon_t \sim iid(0, \sigma^2\varepsilon_i)$. The ε_t innovation is referred to as shocks in the variables like GDPt, EXPt, IMPt and FAIDt.

We therefore, specify the structural shocks vector for this study as follows:

$$\varepsilon_t = [\varepsilon^{gdpt} \varepsilon^{expt} \varepsilon^{impt} \varepsilon^{faidt}] \tag{5}$$

Each of these elements is the shock of the corresponding variable.

Next we specify our $B^{-1} = 4 \times 4$ matrix as follows.

$$\begin{pmatrix} \varepsilon^{gdpt} \\ \varepsilon^{expt} \\ \varepsilon^{impt} \\ \varepsilon^{faidt} \end{pmatrix} = \begin{pmatrix} 1 & \rho_{12} & \rho_{13} & \rho_{14} \\ \rho_{21} & 1 & \rho_{23} & \rho_{24} \\ \rho_{31} & \rho_{32} & 1 & \rho_{34} \\ \rho_{41} & \rho_{42} & \rho_{43} & 1 \end{pmatrix} \begin{pmatrix} \varepsilon^{gdpt} \\ \varepsilon^{expt} \\ \varepsilon^{impt} \\ \varepsilon^{faidt} \end{pmatrix}$$

If shocks that exhibit both short run and long run effects on import prices with nominal exchange rate are represented by zeros as the main variables of interest, then the following matrix will indicate the effects of those shocks as follows:

$$\begin{matrix} \begin{pmatrix} e^{gdpt} \\ e^{expt} \\ e^{impt} \\ e^{faidt} \end{pmatrix} \\ A \end{matrix} = \begin{matrix} \begin{pmatrix} 1 & 0 & 0 & 0 \\ \rho_{21} & 1 & 0 & 0 \\ \rho_{31} & \rho_{32} & 1 & 0 \\ \rho_{41} & \rho_{42} & \rho_{43} & 1 \end{pmatrix} \\ B \end{matrix} \begin{matrix} \begin{pmatrix} \varepsilon^{gdpt} \\ \varepsilon^{expt} \\ \varepsilon^{impt} \\ \varepsilon^{faidt} \end{pmatrix} \\ C \end{matrix}$$

The column vector A is obtained by multiplying B and C to obtain the following import prices forecast error equations generated by nominal exchange rate and other variables as follows:

$$\begin{aligned}
 e^{gdpt} &= \varepsilon^{gdpt} \\
 e^{expt} &= \rho_{21}\varepsilon^{gdpt} + \varepsilon^{expt} \\
 e^{impt} &= \rho_{31}\varepsilon^{gdpt} + \rho_{32}\varepsilon^{expt} + \varepsilon^{impt} \\
 e^{faidt} &= \rho_{41}\varepsilon^{gdpt} + \rho_{42}\varepsilon^{expt} + \rho_{43}\varepsilon^{impt} + \varepsilon^{faidt}
 \end{aligned}$$

where: FAID is foreign aid received.

IMP is import volume, EXP is export volume, and GDP is gross domestic product, all in logarithm forms and in time t.

Table 3: VAR Estimates

	LNFAID	LNIMP	LNEXP	LNGDP
		T	T	C
LNFAID(-1)	1.11757	-	-	2.535345
	1	1.10969	0.50442	
	(0.15030)	(1.37459)	(1.91770)	(0.43228)
	[7.43565]	[-0.80729]	[-0.26304]	[5.86502]
LNFAID(-2)	-	1.98022	-	-
	0.28477	4	0.32796	2.403044
	(0.15777)	(1.44290)	(2.01301)	(0.45377)
	[-1.80499]	[1.37239]	[-0.16292]	[-5.29579]

The VAR estimates above showed that as foreign aid received in the first period was rising, import volume

fell but rose in period two. Export volume reduced right from period one to period two according to expectation, while GDP fell in period two.

Table 4: Bayesian Estimates

	LNFAI	LNIMP	LNEXP	LNGDP
	D	T	T	C
LNFAID(-1)	0.78304	0.19085	-	0.70631
	1	8	0.22936	9
	(0.04769)	(0.47696)	(0.57203)	(0.16566)
	[16.4208]	[0.40016]	[-0.40096]	[4.26369]
LNFAID(-2)	0.16273	0.15262	-	-
	7	6	0.04705	0.00903
	(0.04303)	(0.42971)	(0.51535)	(0.14913)
	[3.78158]	[0.35518]	[-0.09131]	[-0.06059]

The results of the Bayesian estimates behaved according to expectation for all the variables. As foreign aid received was rising from period 1 to 2, import was rising and export was falling as expected while Gross Domestic Product maintained its falling trend. All these are indications of the presence of Dutch Disease in Nigerian economy during the period under review.

IV. CONCLUSION AND RECOMMENDATIONS

This study was on the transmission mechanism of Dutch Disease in Nigeria. Dutch Disease otherwise known as the Hollandis syndrome manifests in any economy when new discovery of a natural resource leads to reduction in production, employment and exports volume of other sectors of the economy especially, agricultural and manufacturing sector of the economy. There are many sources through which Dutch Disease can be transmitted to the economy, but in this study, we focused our attention on (i) non-diversification of the economy and (ii) foreign aid received in the country. In the case of non-diversification, we look at the relationship between

the economy proxy by Gross Domestic Product (GDP), and the oil sector, industrial sector and manufacturing sub-sector of the industrial sector. From the Ordinary Least Squares (OLS) and the Bayesian vector autoregressive analyses, it discovered that while oil sector exhibited positive relationship with the GDP, other sectors of the economy especially manufacturing, industrial and agricultural sectors exhibited negative relationship to GDP during the period under review. This showed that the discovery of oil in Nigeria has brought about reduction in the performances of these other essential sectors. This study therefore, concluded that Dutch Disease existed in the economy as a result of overconcentration and over dependence on the oil sector (as a mono-product) and non-diversification to other foreign exchange earning sectors. Secondly, the study also investigated the relationship between foreign aid received and the performances of import and export in the country. The structural VAR and the Bayesian estimates revealed negative relationship with import and positive relationship with export as the foreign aid received was increasing. This conformed to the a priori expectation for this second line of transmission. The study therefore, concluded again that Dutch Disease existed in Nigeria during the period of study.

On the basis of these findings, the study recommended as follows: (i) Nigerian economy should be diversified from its mono-product nature to multi-product economy. This can be achieved by concerted effort to practice highly mechanised agricultural system involving availability of loan facilities, tractors, improved high yielding seedlings, fertilisers, insecticides, herbicides, harvesters, storage facilities, good transportation system, marketing facilities and adequate and commensurate product prices. These facilities must be targeted towards the unemployed youths and genuine farmers and not the money-mongering-politicians. (ii) Concerted effort should also be made to improve the manufacturing sector in particular and the industrial sector in general. The mechanised agricultural recommended above will provide most of the raw materials needed by the industrial sector in order to reduce importation of raw materials to a manageable proportion. Both the agricultural and industrial sectors would general high level of employment and foreign exchange to the country. (iii) The study equally recommended a drastic reduction in foreign aid from other countries in order to reduce import and increase export of

goods and services in the country. In alternative, if foreign aid cannot be reduced then it must be directed towards financing both the recommended mechanised farming and improved industrial sectors of the economy. (iv) Finally, the over-monetised Nigerian political system must be demonetised and high level of corruption in the high places must be eliminated so as to divert public funds from private pockets to public use. If all these recommendations were faithfully implemented Nigeria would turn the curse associated to oil discovery to blessing and avoid the disease.

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