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Smallholders' Market Outlet Choice under Different Performance Level of Primary Coffee Marketing Cooperatives: The Case of Jimma Zone, Southwestern Ethiopia

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Abstract
Access to market in the form of different market outlet for coffee farmers is crucial to exploiting the potential of coffee production to contribute to increased cash income of rural households. Identifying factors affecting market outlet choice is therefore important. People form cooperatives to do something better than they could do individually or through a non-cooperative form of business. Forming a cooperative will not automatically solve business problems faced by individual households. This is because of cooperatives are subject to the same economic forces, legal restrictions and international relations that other business face. Choice experiments are highly structured method of data generation relying on carefully designed tasks or experiments to reveal the factors that influence choice. The choice experiment design development is described in terms of its attributes and the level each attribute takes. Survey data collected using choice experiment questionnaires produced by %choiceRun and the final efficiency design was produced using the %MktEx and %%choiceff SAS macros. The study shows that using a random parameter logit model. The availability of alternative market outlet attributes, ways of payment, distance from market, pre-transaction contract, and relationship, members of cooperative leader and fee of entrance could change the farmers attitude and there is different what they practice with they preferred.
Keywords: cooperative, market, attribute, multinomial logit

I. INTRODUCTION

In Ethiopia, the contribution of agriculture to both the national and household economies is significant. Eighty five percent of the population earns a living from this sector, and 43 percent of the GDP derives from agriculture. Ethiopian agriculture is generally characterized by declining land productivity resulting from soil erosion and land degradation; heavy dependence on rain-fed cultivation; very low usage of improved agricultural inputs and methods; subsistence farming; and progressive decrease in agricultural output. Labor productivity in agriculture is low and the country suffers increasingly from drought, which often leads to severe harvest failure and famine, affecting both current and future levels of consumption (Ayenew, 2008).

In the mid 1990s, the Government of Ethiopia adopted a broad national policy known as Agricultural Development Led Industrialization (ADLI) strategy in order to address Ethiopia's food security and agricultural productivity challenges. The Plan for Accelerated and Sustained Developments to End Poverty (PASDEP), implemented from 2005/6 to 2009/10, is another Ethiopian government-driven plan for poverty reduction through investment in agriculture. It sets clear targets and indicators to measure progress annually, which provide the framework for results oriented policies and strategies. Under PASDEP, poverty reduction has been pursued through a range of policies and instruments including: modernization of research and extension systems through investment in higher learning institutes, national and regional research, technical and vocational education and training and farmer training centers; enhancing competition and increasing efficiency in agricultural input and output markets (MOFED, 2006).

Ethiopia is also known by the origin and centre of diversity for coffee Arabica, where its highly differentiated variety is grown by smallholder farmers without chemical inputs (Dempsey, 2006). For the past three to four decades, coffee has been and remains the leading cash crop and major export commodity of the country. Coffee accounts 10% of total agricultural production, 5% of Gross Domestic Product and 41% of total export earnings of the country on average (Worako, 2008). The estimated number of coffee growers is about one million smallholder farmers. Most of them hold less than half a hectare of land, and grow 95 percent of national coffee output (Oxfam, 2008). Total annual coffee production is approximately 280,000 metric tons. In Ethiopia, the livelihood of approximately 15 million of the population depends on coffee sub-sector. In spite of its contribution to national economy, small holder coffee growers face high transaction cost, lack of market information, poor infrastructure and weak capital markets (Dempsey, 2006).

Ethiopian coffee value chain is composed of a large number of actors. It includes coffee farmers, collectors, different buyers, processors, primary cooperatives, cooperative unions, exporters and various government institutions (Gemech and Struthers, 2007). Ethiopian coffee is sold both at local and international market. The latter mainly operates through the newly established commodity exchange market and specialty

market channels of coffee cooperative unions. Before 2001, all Ethiopian coffee should pass through Commodity Exchange Market. Since 2001, however, cooperatives have been granted permission to by-pass coffee auction opening the way for direct export sales (Ibid).

Many developing countries including Ethiopia relied on agricultural cooperatives ability to overcome market failures and to adapt with changes in market environment. Because, cooperatives are assumed to reduce transaction costs and improve the bargaining power of smallholder farmers' vis-a-vis increasingly integrate markets. The plan aimed to unlock Ethiopia's agricultural growth potential providing a better institutional environment integrating smallholder farmers to international market (FDRE, 2005). Despite farmers' negative attitudes developed towards cooperatives established during the socialist regime in the country, recently, a new generation of cooperatives is emerging. With the aim of securing small holders' better coffee price and tying with world market, Ethiopian government promulgated proclamation no 147/1998. The proclamation outlines the layered organizational structure of the cooperatives, which was not permitted by the previous regimes. According to this proclamation, cooperative organization can have four layers, i.e., primary cooperatives, unions, federations and cooperative leagues, although only primary and union levels have been formed to date in the country (FCC, 2004). Cooperative union is defined as an organization composed of more than one primary cooperative society that has similar objective. Since primary coffee cooperatives lack required human resources and logistic capacity, the Ethiopian government took the initiative to establish Coffee Farmers Cooperative Unions to manage coffee export being on behalf of primary coffee marketing cooperatives.

In principle, people form cooperatives to do something better than they could do individually, making cooperatives important institution for rural development. Acting together, members having alienated small scale produce can develop bargaining power, enjoy the benefits of economy of scale and can access information which an important impact in the process of marketing. Despite people's belief, automatic solution of individual members' business problems through cooperation, cooperatives are subjected to the same economic forces, legal restrictions and international relations that businesses faces (Krisiinaswami and Kulandaiswamy, 2000).

Based on the principles of cooperatives, coffee farmers' marketing cooperatives are expected to genuinely perform their marketing activities and provide adequate services to their members. In spite of government efforts to insure cooperatives potential to stabilize coffee market, some members of cooperatives have an experience of selling their product to other marketing channels. In addition, there are various problems in collecting coffee from members and exporting through cooperatives. Nevertheless, there a lack of empirical studies on smallholders' market outlet choice and its attribute preferences in general to fulfill this knowledge gap.

II. RESEARCH DSIGN AND METHEDOLOGY

2.1Description of the Study Area

The study was conducted the Jimma zone which, is located at about 335 km to the South west of Addis Ababa is lying between latitudes 7°15´ N and 8°45´ N, and longitudes 36° 00´ E and 37°40´ E . The zone is characterized by a tropical highland climate with heavy rainfall, warm temperatures and a long wet period. The mean annual rainfall ranges between 1,200mm and 2,500mm, with mean annual temperature of 20 to 250c. The number of perennial rivers makes the zone a potential area for irrigation and hydroelectric power generation.

According to the population projection of the Central Statistical Agency the total population of the Jimma zone is estimated to be 2,732,791; of which 1,358,475 are female and 1,374,316 are male. Its major ethnic groups are Oromo (81.6 per cent), Yem (5.3 percent), Amhara (4.9 percent), Dawro (2.9 percent) Kaffa (1.8 percent) and others (3.5 percent). Oromiffa and Amharic are the most widely spoken languages. The crude population density is 175 persons per km^2. About 38.3 percent of the total population is economically active.

The main farm activity of Jimma Zone is the production of cereals (barley, wheat, teff, maize and sorghum), pulses (beans, peas and lentils), cash crops (coffee and chat), oil seeds, fruits, vegetables and livestock rearing. Out of the total households in the rural area, about 80 per cent has one or more farming oxen. Those households without oxen, but the land, are accustomed to use a sharecropping system. The average size of a land holding is around one hectare per household (Haile and Tolemariam, 2008).

The two districts selected for the study are very important for the economy and livelihood of the smallholder farming population in Jimma Zone. Jimma is one of the major dominant coffee producing zones of the country. Coffee is produced in 13 out of 17 districts in Jimma zone. As such, coffee is the major contributor to the income of the zone as well as national exports for Ethiopia. The total number of coffee producing farmers is estimated about 33.8 percent is from Gomma and Limmu Kossa districts.

In Jimma zone, there are 420 primary coffee farmers' marketing cooperatives distributed in all Woredas of the zone among which Gomma and Limmu Kossa Woredas have 12 coffee marketing cooperatives each. Total members of cooperatives in both woredas are 16,522 (8.12% female) and mobilizes a total capital of Birr 28,544,256.68. These primary coffee marketing cooperatives have formed secondary coffee marketing cooperative called Jimma Farmers Coffee Marketing Cooperatives union.

2.2. *Choice experiment design and data administration*

2.2.1. *Setting attributes and attributes levels for the choice experiment*

In order to fulfil data required for market outlet choice experiment was conducted. A choice experiment is a highly 'structured method of data generation' (Hanley *et al*., 1998a), relying on carefully designed tasks or experiments to reveal the factors that influence choice. The first step in choice experiment design development is to define the goods to be described in terms of its attributes and the level each attribute takes. Theoretical setting of choice profiles are assembled in choice sets, which are in turn presented to the respondents, who are asked to choose their preferred alternative among alternatives in a choice see (Louviere *et al.,* 2000). Subjects are usually asked to perform a sequence of such choices. In the choice experiment study of this research, the most important market outlet attributes and their levels were identified through focus group discussions with farmers, experts and surveyed households during the first leg of the data collection process. Six attributes were prioritized by participants of group discussions of the six attributes that were selected, three of them took three levels and the remaining three were binary. The chosen market outlet attributes and their respective levels are presented in (Table 1) below. SAS's Branded choice experimental design method was employed to construct 18 choices sets having three coffee market outlet profiles (alternatives) in terms of the identified attributes and attributes levels. To be specific, a choice experiment questionnaire was designed from the linear arrangement produced by %choiceRun and the final efficient design was produced using the %MktEx and %choiceff SAS macros. Using the generated a choice experiment questioner, a choice experiment, survey was conducted on randomly selected 60 farmers from the total sampled farmers for formal household survey. Every choice set contained three unlabeled options (market outlets) with six attributes which have different levels. Therefore, each respondent had been asked to make 18 choice experiments (observations) taking one alternative among three different choice options, i.e. answering 18 different choice tasks.

Table 1 Attributes Attribute levels and their descriptions

Attributes/factors	**Attribute description**	**Attribute levels**
Payment arrangement	It is the time of farmers receives their money after selling coffee	Two (in cash or credit)
Distance	It is the distance from the three market outlet choice.	Three (1km, 2km and 3km)
Fee payment	The amount of money the Farmer pays to a member of cooperative.	Three (30 birr, 60 birr and 90 birr)
Pre-transaction contract	It is formal agreement one for sale of property before harvesting.	Two (it may be available or not).
Relationship with traders	The connection b/n the farmers and traders**.**	Three (it may be family member, neighbor or friend)
Member coop leader	It is the action of guided in front of the all others.	Two (is it a member of coop leader or not)

Data source: own data

2.3. Market outlet choice attributes characteristics

In this particular choice experiment component of the research, investigation was made to identify the effect of community level identified relevant market outlet attributes on the coffee farmer's market outlet choice. The presence or absence of attributes and its levels were hypothesized to guide farmers' market outlet choice. Therefore, the attributes are characterized in relation to their possible interaction with market outlet choice.

Payment arrangement is a dummy market outlet attribute taking 1 if the transaction is undertaken in cash form and 0 if it is transacted on credit base. Logically, credit transaction is possible if sellers and buyers know each other, the buyer has fixed place where the seller can find it and can a contractual agreement in which the agreement execution is enforceable. In this research, local traders and cooperatives were assumed to possibly transact with coffee farmers on credit, but local market, having significant number of buyers and sellers cannot be concluded to transact on credit base. If it is possible (except), it was assumed to be local traders. This condition had been recognized in the choice experiment design preparation. Therefore, cooperatives and local traders have 1 or 0 values in the choice cards depending on the design result, while local market was restricted to take only 1 thoroughly for its choice profiles.

Distance to market out let is a continuous attribute taking three levels (1km, 2km, and 3km). It is the possible distance between farm households and market outlets. Each market outlet can take every level without restriction.

Fee payment is the possible payment that levied on farmers on annul base in order to get services from cooperative. It is only cooperative attribute; in which the other market outlets cannot share since there is no logical base to request fee for the services they provide as they mainly work for profit not for service provision. It is a continuous variable taking three levels (30 Birr, 60 Birr and 90 Birr) appearing alternatively in the choice

profile of cooperative.

The pre-transaction contract arrangement works only for trader but not for local market and cooperatives, therefore, its value 1 or 0 alternate only in trader's choice profile and thoroughly 0 in other market outlets.

Relationship with traders is an attribute representing the relationship between interviewed farmers and trader. It is a discrete variable having three values (i.e. family member, neighbor or friend) coded in dummy variables format in the model. It is functional only in the profile of trader's choice and not in other market outlets.

Cooperatives leadership membership is dummy variable taking 1 if the interviewed household sample was among the members of the cooperatives leaders and 0 otherwise. It can take 1 or 0 alternatively only in the choice profile of cooperative and 0 in the other market outlet choice sets.

Generally, these all attribute characteristics, exceptions and restrictions were recognized and employed in the designing of choice experiment questioner.

III. METHODS OF DATA ANALYSIS

3.1. Econometric models

Depending on the objectives of this research, different econometric models were employed. However, all models employed can be categorized under Random utility modeling and simultaneous linear regression modeling frameworks.

3.2. Random utility modeling theoretical framework

Utility theory plays significant role to model economic agent's choice decision. It is useful to analyze individual's laws of choices while welfare theory is prime tool to discuss the scientific conclusion of the relationship between the choice individuals made and its possible consequence on social interest (Rothbard, 1997). Small scale farmers are expected to decide on the sell and market channels to which they sell their agricultural produce. The heart of rational economic theory is the thought that a rational decision makers seek to maximize the utility of innate and stable preferences over the quantities and attributes of their decision. As a result, any farmers' decisions have an implication on utility maximization of the household.

According to the consumption technology theory (Lancaster, 1966), the utility derived from a decision not comes from the decision itself that one made, rather from the attributes of the decision. It asserted that the value of a good is then given by the sum total of the value of its attributes. Further, under random utility theory first developed by (Thurstone 1927) and later empirically applied by (McFadden, 1974ab, 1978), a decision maker visages a choice among alternatives with a utility decomposable in to two components. According to this theory, the total utility that a decision maker obtains among alternatives is known to the decision maker.

Following, some attributes of the choice alternatives and characteristics of a decision maker are observable for the analyst and the function that relates these observed factors to the decision makers' utility can be specified. However, the other component of the utility that an individual knows is not observable. Individuals face a choice among alternatives and choose the alternative that provides greatest sum of both utility components. It chooses one alternative if and only if its utility is greater than other alternatives (Samuelson, 1950)

3.3. Random utility Empirical models specifications

Lancaster's theory of consumption technology (Lancaster, 1966) and Random utility theory (Thurstone, 1927) established foundation for generation of multitudes of econometric models among which some following fitting models used in thesis.

3.3.1. Multinomial logit model

Households consider three coffee market outlets; local markets, cooperatives and traders among which it made one selection. Hence, households' market outlet choice follows multinomial distribution. Based on Lancaster's theory of consumption technology (Lancaster, 1966) and random utility theory (RUT) dating back to (Thurstone, 1927), McFadden (1974) formulated basic multinomial logit econometric model. The underlying assumption in this model is that, a household selects its outlet according to a latent utility function where a chosen alternative among prevailing nominal options has the highest utility for choosing household. Following (McFadden, 1974ab, and 1978), the composite empirical utility model of market outlet choice is specified as:

$$\boldsymbol{y_{ij}}^{*} = \boldsymbol{x_i \beta_j} + \varepsilon_{ij} \qquad 1$$

Where y_{ij} is the utility that household **i** obtain from choosing outlet j, j is the number of market outlets (j=0, 1... J; J+1)

Xi is the vector of household-specific explanatory variables, ß is the set of parameters that reflect the impact of changes in household-specific explanatory variables on the utility, and ε_{ij} is the error term, which contains information that are not included in the model.

The household would select the outlet y_i that maximizes its utility:

$y_i = \max (\boldsymbol{y_{i1}, y_{i2}, \ldots y_{iN}})$

Where N is the number of market outlets. Following McFadden (2000) multinomial logit Model of market outlet choice takes the form:

$$P\ (y_i = J|\boldsymbol{x_i}) = \frac{\exp(\mathrm{x_k}\beta_\mathrm{i})}{1 + \sum_{\mathrm{k=1}}^{\mathrm{K}} \exp(\mathrm{x_k}\beta_\mathrm{j})} + \varepsilon_{kj} \quad 2$$

Where $\varepsilon_{\boldsymbol{kj}}$ independently and identically distributed with type I extreme value distribution. Then, the logarithm of odds ratio is given as:

$$ln\left[\frac{p_{ij}}{p_{ik}}\right] = \ln\left[\frac{\exp(\mathrm{x_k}\beta_\mathrm{i})}{1 + \sum_{\mathrm{k=1}}^{\mathrm{K}} \exp(\mathrm{x_k}\beta_\mathrm{j})}\right] = \beta_i x_k \quad 3$$

This model can be estimated by maximum likelihood with the log-likelihood function defined as:

$$LnL = \sum_{k=1}^{k}\sum_{j=1}^{N} y_{kj} \ln \mathrm{p_{ij}} \quad 4$$

Where $p_{ij} = \frac{exp(x_k\beta_i)}{1+\sum_{j=1}^{J} exp(x_k\beta_j)}$ is the choice probability and found as an integral over all values of ε_{kj}.This integral has a closed form solution. Following, the log likelihood value is calculated by substituting the probability of choice in the log likelihood function specified as:

$$LnL = \sum_{k=1}^{k}\sum_{j=1}^{J} y_{kj} \ln \frac{\exp(\mathrm{x_k}\beta_\mathrm{i})}{1 + \sum_{\mathrm{j=1}}^{\mathrm{J}} \exp(\mathrm{x_k}\beta_\mathrm{j})} \quad 5$$

IV. RESULTS AND DISCUSSION

4.1. Determinants of Market Outlet Choice

Using household survey data generated by structured household questioner, STATA 11 categorical outcome multinomial logit procedure was employed to fit multinomial logit model to estimate determinants of farm households' market outlet choice. Table 2 reports the results of estimation, marginal effects and standard error of each of the variables in each of both jointly determined models. The model chi-squared statistic (138.73 with 36 degrees of freedom) is significant at the 1% level of probability. For both market outlet options, there are four coefficients of observable household characteristics under consideration that provide statistically significant (at different significance levels) predictive power for choosing a given market outlet.

The model was determined as systems of equations in which equations for various market outlet choices among the coffee producing community members were jointly determined. The parameter coefficients of such models are difficult to interpret directly. Instead the marginal effects are the only means to effectively interpret the effect of explanatory variables on the dependent variables likelihood.

Marginal effects are the probability of change in favor of a probability of choice of a specific market outlet option with respect to each independent variable, measured from the mean of that variable. A positive or a negative sign of marginal effects indicates an increase or decrease in the probability of choosing the market outlet under consideration.

There are statistically significant variables' marginal effects that provide predictive information of households' market outlet choices. Overall, variables including family size, elementary education level, secondary education level, total annual coffee produce and total coffee sell to cooperatives provide positive predictive power whether or not the household choose cooperative as market outlet, whereas total land holding, total coffee farm size, the total coffee sell to other market outlets, income from coffee and chat, income from coffee, and income from coffee and cereal crops were found to negatively affect households' probability of choice decision of cooperative a market outlet for coffee sell.

On the other hand, family size, the total land holding size, the total annual coffee sell, the total annual to other market outlets, income from coffee, income from coffee and chat and income from coffee and cereal crops were found to be statistically significant in positively determining the likelihood that a household choose traders whereas, family size, total annual coffee produce and the total coffee sell to cooperatives were statistically significant variables in negatively determining the farm households' market outlet choice to be traders.

Although the marginal effect of family size was statistically significant at 10% in cooperative market outlet and it statistically significant at 5% for trader market outlet choice models, it was positive in cooperative

market outlet choice model and negative in trader market outlet model. More specifically, if a household size increases by one person, it increases the likelihood of farm household to choose cooperative market outlet option by 3 percent and decreases the probability of choosing trader as market outlet by 3.2. The marginal effects of elementary and secondary education were statistically significant at 10% in cooperative market outlet model but not in trader market outlet model. It indicated that, it is 17.4 and 14.3 percent more likely to choose cooperative than illiterate households if a household is elementary level and secondary level educated respectively. The marginal effect of total landholding is statistically significant at 1% significance level in both models. The result revealed that, if land holding size of a household increases by one hectare, a household is 7.4 percent less likely to choose cooperative and 7.8 percent more likely to choose trader. The marginal effect of total annual coffee produce is statistically significant at 10% significance level in cooperative choice model and the 5% significance level in the trader choice model respectively. If annual coffee produce increases by one quintal, the household is 0.4% more likely to choose cooperative and 0.4% less likely to choose trader. The marginal effects of total coffee sell to cooperative and total coffee sell to other market agents were statistically significant at 1% significance level in both choice outlet models but with different signs. The result indicated that, the first factor has positive effect on choice model one and negative effect on trader choice where as the second factor has negative effect on cooperative choice model and positive effect on traders choice. Specifically, if total coffees sell to cooperative increases by one quintal, the household is 3.4% more likely to choose market cooperative and 2.8% less likely to choose trader's. However, if the total coffee sell to other market agents increases by one quintal, the household is 2.8% less likely to choose cooperative market outlet and 3.6% more likely to choose trader market outlet. A Farmer generating high income from coffee and chat, coffee and coffee and cereals is less likely to choose cooperative and is more likely to choose trader. The first two variables were statistically significant at 5% significance level in the cooperative market outlet choice model and at 5% significance level in the trader market outlet choice model while, the second variable is statistically significant at 10% significance level in the cooperative market outlet and at 5% significance level in the trader market outlet choice models. An increase in income generated from coffee and chat, coffee, and coffee and cereals by one Birr decreases the likelihood of farmers' cooperative market outlet choice by 16%, 35.5% and 15.1% , while the factors increase the likelihood of trader market outlet choice by 37.7%, 39.8% and 54.2% respectively keeping the other factors constant (i.e. cetriparibus)

Table 2. Multinomial logit model result of market out let choice

	Cooperatives		**Traders**	
Independent variables	Coef. (sd)	dy/dx (sd)	Coef. (sd)	dy/dx (sd)
Age	0.031 (0.041)	0.003 (0.003)	0.003 (0.035)	-0.003 (0.003)
Family size	0.184 (0.221)	0.030* (0.016)	-0.127 (0.182)	-0.032** (0.015)
Elementary education	1.963* (1.027)	0.174* (0.093)	0.356 (0.849)	-0.120 (0.073)
Secondary education	2.454* (1.216)	0.143 (0.122)	1.287 (0.990)	-0.042 (0.086)
Total land holding in hectare	-0.455 (0.312)	0.074*** (0.026)	0.313 (0.239)	0.078*** (0.021)
Total annual (2011/2) coffee produce	0.011 (0.023)	0.004* (0.003)	-0.028 (0.019)	-0.004** (0.002)
Total quantity (2011/2) coffee sell to cooperative in quintal	0.357*** (0.097)	0.034*** (0.012)	0.012 (0.073)	-0.028*** (0.006)
Total quantity (2011/2) coffee sell to formal trader in quintal	-0.456*** (0.091)	-0.044*** (0.010)	-0.018 (0.017)	0.036*** (0.006)
Source of income (Coffee-chat)	0.490 (1.707)	-0.160** (0.068)	3.293* (1.767)	0.377** (0.163)
Source of income (Coffee)	0.087 (1.468)	0.354* (0.206)	3.194** (1.574)	0.398** (0.155)
Source of income (coffee cereal)	-0.965 (2.012)	-0.151*** (0.051)	3.636** (1.848)	0.542*** (0.177)
Constant	-2.928 (3.489)		-1.059 (3.015)	-0.003 (0.003)
Log likelihood	-103.23039			
Number of observation	211			
Pseudo R^2	0.4019			

Source: own data collected in 2011, informal market is the base option, ***, **, * Represents level of significance at 1%, 5% and 10 % respectively

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Mengistu Jifara

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Mengistu holds Bsc degree in Agricultural Resource economics and management from the University of Hawassa and Msc in Agricultural Economics from Haramaya University. Mengistu has six Years of Experience in Research, program management, monitoring and evaluation in the area of research and development issues in mandate of his jobs. He also certified by design & analysis of experimental data using 'SAS' and 'research proposal writing from EIAR and Jimma university college of agriculture and veterinary medicine with collaboration of Ministry of Science and Technology respectively.

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