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Economics Analysis on Petroleum Enterprise's Marketing Decision Function

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Abstract: In order to give the Influence factors a further research which is of petroleum enterprise marketing based on the Dynamic hypothesis, using the Least squares method of multiple linear regression and correlation test to built the econometrics model of petroleum enterprise marketing. After elimination of the influence factors of marketing flow security which has a highly linear correlation with marketing flow, get the final econometrics model of petroleum enterprise marketing $F=e^{3.760348}\times Q^{0.571771}\times V^{0.425999}\times e^{u}$. That is, for the marketing force, Output elasticity of marketing flow and flow rate were determined as 0.571771 and 0.425999.

Key words: Petroleum enterprise, marketing force, determining function, economics analysis

INTRODUCTION

The evaluation of enterprise marketing based on the Dynamic hypothesis has the difference with the evaluation among previous theoretical branch, such as the resources branch, the competitive ability branch, strategic competence branch (Kato, 1990). The main reasons are as follows. First of all, the enterprise marketing based on the Dynamic hypothesis is a very complex dynamical system, that there are a wide range of Nonlinear factors, Time-varying factors and Uncertainty factors in it. Secondly, since the marketing power of forces between dynamical systems (such as Power products and the image force) and the single internal force exists a wide range of synergies, the size of Marketing force will have a certain degree of instability (Martin *et al*., 2006). Finally, the enterprise marketing based on the Dynamic hypothesis is a driving force. According to physics knowledge, we know that force is not able to directly observe and measure (Wen, 2004).

In view of this, based on previous studies (Yang *et al*., 2010), I believe that the evaluation of enterprise marketing based on the Dynamic hypothesis should focus on the marketing flow's effect (marketing flow, velocity and security). This is the goal and value of marketing evaluation. The choice of evaluation tool should be concerned with the parallel distributed, self-organizing, self-learning, dynamic simulation and other characteristics of complex method.

PETROLEUM ENTERPRISE'S MAKETING DECISION FUNCTION

Farm machinery purchase subsidy transmission mechanism: Petroleum Corporation marketing Force (F) Size is determined by Quantity (Q), Velocity (V) and Safety (S). Based on previous studies and the distribution of scatter, virtual model of marketing power econometrics is proposed to be $F=e^{C}\times Q^{x_1}\times V^{x_2}\times S^{x_3}\times e^{u}$.

After taking the logarithm on both sides becomes $\ln F=C+x_1\ln Q+x_2\ln V+x_3\ln S+u$.

Wherein, Q, V, S as the explanatory variable, F is the explained variable, C is a constant, u is the disturbance term, X1, X2, X3 for the generation of the constant. Through all the tests of the model and ultimately get the Petroleum enterprise's marketing decision function:

$$F=e^{3.760348}\times Q^{0.571771}\times V^{0.425999}$$

ECONOMICS ANALYSIS ON PETROLEUM ENTERPRISE'S MARKETING DECISION FUNCTION

Marginal product of marketing power: In the marketing power of decision function, the marginal product means that increasing the ratio of some factor's inputs and increased outputs when the other elements are constant factor (Nounou *et al*., 2001). You can examine that how a factor affect output. Expressed by the Eq.:

$$MP_Q=\frac{\Delta f}{\Delta Q}=\frac{\partial f}{\partial Q}$$

$$MP_V=\frac{\Delta f}{\Delta V}=\frac{\partial f}{\partial V}$$

In the Petroleum enterprise's marketing decision function $F=e^{3.760348}\times Q^{0.571771}\times V^{0.425999}$, there have:

$$MP_Q=\frac{\Delta f}{\Delta Q}=\frac{\partial f}{\partial Q}=0.571771e^{3.760348}V^{0.425999}\Big/Q^{0.428229}$$

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And:

$$MP_V = \frac{\Delta f}{\Delta V} = \frac{\partial f}{\partial V} = 0.425999e^{3.760348} \times Q^{0.571771} \Big/ V^{0.574001}$$

The output elasticity of marketing power factor The output elasticity means a ratio that of some factor's relative change value and relative output change value, when the other elements are constant factor (Michael, 2005). Expressed by the Eq.:

$$E_Q = \frac{\partial Y / Y}{\partial Q / Q} = \frac{\partial Y}{\partial Q}\frac{Q}{Y} = \alpha$$

$$E_V = \frac{\partial Y / Y}{\partial V / V} = \frac{\partial Y}{\partial V}\frac{V}{Y} = \beta$$

In the Petroleum enterprise's marketing decision function $F = e^{3.760348} \times Q^{0.571771} \times V^{0.425999}$, there have $E_Q = 0.571771$ and $E_V = 0.425999$.

Marginal substitution rate of marketing power factor: When the two elements can substitute for each other, it can be used in different combinations to create the same marketing. Marginal substitution rate refers to the ratio of some increased factor and some declined factor in the case of certain marketing output. It can also be the ratio of two factor's marginal product (Hamel and Prahalad, 2004).Expressed by the Eq.:

$$MPS_{Q \to V} = \frac{\Delta Q}{\Delta V} = \frac{MP_V}{MP_Q}$$

$$MPS_{V \to Q} = \frac{\Delta V}{\Delta Q} = \frac{MP_Q}{MP_V}$$

In the Petroleum enterprise's marketing decision function $F = e^{3.760348} \times Q^{0.571771} \times V^{0.425999}$, there have:

$$MPS_{Q \to V} = \frac{0.425999Q}{0.571771V}$$

And:

$$MPS_{V \to Q} = \frac{0.571771V}{0.425999Q}$$

Substitution elasticity of marketing power factor: The substitution elasticity of marketing power factor is a ratio of the two parts which are the increasing rate of two inputs' proportion and the increasing rate of Marginal substitution rate (Zhang and Zhang, 2009). Expressed by the Eq.:

$$\sigma = \frac{d(\frac{Q}{V}) \Big/ (\frac{Q}{V})}{d(MP_V/MP_Q) \Big/ (MP_V/MP_Q)} = \frac{d(\frac{Q}{V}) \Big/ (\frac{Q}{V})}{d(\frac{\alpha Q}{\beta V}) \Big/ (\frac{\alpha Q}{\beta V})} = 1$$

This indicates that exists between the two elements is always equal to a constant elasticity of substitution which is equal to one.

Returns to scale of marketing: The returns to scale of marketing refers to the changes in the quantity of output which caused by the changes in the quantity of input in the certain technical conditions (Feng and Song, 2007).

Assuming>1, then the marketing decision function has the following three cases.

As $f(\lambda Q, \lambda V) = \lambda f(Q,V)$, for a constant returns to scale.

As $f(\lambda Q, \lambda V) \rangle \lambda f(Q,V)$, for a Increasing returns to scale.

As $f(\lambda Q, \lambda V) \langle \lambda f(Q,V)$, for a Decreasing returns to scale.

In the Petroleum enterprise's marketing decision function $F = e^{3.760348} \times Q^{0.571771} \times V^{0.425999}$, there have:

$$f(\lambda Q, \lambda V) = A(\lambda Q)^{\alpha}(\lambda V)^{\beta} = \lambda^{\alpha+\beta} A Q^{\alpha} V^{\beta} = \lambda^{\alpha+\beta} f(Q,V)$$

And $\alpha+\beta \approx 1$ is the constant returns to scale of Petroleum enterprise's marketing.

TECHNICAL PROGRESS OF MARKETING

Concept of marketing's technical progress: Technical progress means that it can have more improved technology of Production in the same input conditions. The technical progress of Petroleum enterprise's marketing decision function, not only refers to the improvement of technology standards and science but also refers to the technical progress of economic System. It is a macro measure of overall efficiency. To be exact, it should be called generalized technical progress (Xu, 2006).

In practice, Application of more is the assumed of Hicks neutral technical progress. Be introduced into the Petroleum enterprise's marketing in the areas of study, we can get the general form of decision function that it is $\ln F = A_0 e^{\mu} \times Q^{\alpha} \times V^{\beta}$.

Logarithm on both sides have $\ln F = \ln A_0 + \mu t + \alpha \ln Q + \beta \ln V$

Both sides with respect to t get:

$$\frac{1}{F}\frac{dF}{dt} = \alpha(\frac{1}{Q}\frac{dQ}{dt}) + \beta(\frac{1}{V}\frac{dV}{dt}) + \mu$$

In the formula, the left represents the growth rate of marketing, the right first is the growing segment of marketing caused by the Marketing flow growth. α is the marketing flow flexibility of marketing. The right second is the growing segment of marketing caused by the

Marketing flow rate growth, β is the marketing flow rate flexibility of marketing. The last μ is the growing segment of marketing caused by technical progress (Liu and Wang, 2010).

Estimated rate of technical progress: Do the multiple linear regression to $\ln F = \ln A_0 + \mu t + \alpha \ln Q + \beta \ln V$ which uses the time-series data on Petroleum enterprise, so we can get the estimates rate of technical progress. Or replace the formula of each variable with the annual growth rate, we can get:

$$\frac{\Delta F}{F} = \mu + \alpha \frac{\Delta Q}{Q} + \beta \frac{\Delta V}{V}$$

Simultaneously, do the multiple linear regression which uses the annual growth rate of each variable, we can get the estimates rate of technical progress.

Contribution rate of technical progress:

For Equation:

$$\frac{\Delta F}{F} = \mu + \alpha \frac{\Delta Q}{Q} + \beta \frac{\Delta V}{V}$$

To do transform, we can get:

$$\frac{\mu}{\Delta F/F} + \frac{\alpha \Delta Q/Q}{\Delta F/F} + \frac{\beta \Delta V/V}{\Delta F/F} = 1$$

There can have:

$$\eta_T = \frac{\mu}{\Delta F/F}$$

$$\eta_Q = \frac{\alpha \Delta Q/Q}{\Delta F/F}$$

And:

$$\eta_V = \frac{\beta \Delta V/V}{\Delta F/F}$$

In the Equation,η_T is the contribution rate of marketing which caused by technical progress.η_Q is the contribution rate of marketing which caused by marketing flow. η_V is the contribution rate of marketing which caused by marketing flow rate. Since I did not get the Petroleum enterprise-related time series data, so just make a general study in the issue on Petroleum enterprise's marketing.

CONCLUSIONS

By do the economics analysis on Petroleum enterprise's marketing decision function, we can get the following points:

- The marginal product of marketing power on Petroleum enterprise's marketing were:

$$0.571771e^{3.760348}V^{0.425999} \Big/ Q^{0.428229}$$

And:

$$0.425999e^{3.760348} \times Q^{0.571771} \Big/ V^{0.574001}$$

- The output elasticity of marketing power factor on Petroleum enterprise's marketing E_Q and E_V were 0.571771?0.425999
- The Marginal substitution rate of marketing power factor on Petroleum enterprise's marketing MPS_{Q-V} and MPS_{V-Q} were:

$$\frac{0.425999Q}{0.571771V}$$

And:

$$\frac{0.571771V}{0.425999Q}$$

- Existence between the two elements of marketing model is always equal to a constant elasticity of substitution which is equal to one
- The returns to scale of Petroleum enterprise's marketing is constant
- Since didn't get the Petroleum enterprise-related time series data, so just make a general study in the issue on Petroleum enterprise's marketing

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