CES ESTIMATION ON MILK SUPPLY OF ULAANBAATAR

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ABSTRACT

Food security is a worldwide problem that has called the attention to Governments and the scientific community. In Mongolia, insecurity of dairy products is considered most serious in urban rather than rural. Therefore, we discuss a supply of milk, self-sufficiency in Ulaanbaatar and determine the optimal distribution of the production and imports using CES function.

KEYWORDS: CES function, self-sufficiency, imports of milk.

INTRODUCTION

The objective of food security, as defined by the Food and Agriculture Organization of the United Nations (FAO), is to assure that all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This has to be achieved at three levels simultaneously: individual, household, and national/regional levels. This definition implies that there is the need not only to have adequate supplies of food available, but also to maximize their stability and to secure their access. It also indicates 5 dimensions for food security: availability, accessibility, stability of supply and access, utilization/nutrition and food & nutrition safety[1]. Both food insecurity and food security programming are concentrated in rural areas where a large portion of the population is engaged in crop-based, subsistence agriculture. In Mongolia however, rural households are largely food secure. Livestock based agriculture provides rural households with large quantities of meat and dairy products and informal safety nets are strong (FAO/UNICEF/UNDP 2007). Instead, food insecurity is considered most serious in urban areas where a large (60%) and growing proportion of the Mongolian population lives (NSO 2004). A recent assessment by the FAO, UNICEF and UNDP estimated that approximately 30% of urban residents (Ulaanbaatar and aimag centers) were food insecure [2]. According to the 2010 census, Mongolia has 31.8 million livestock. The national average of milk production per capita was 130.8-147.6 liters, which is well above the average person's needs; however, urban dwellers consume 4 times less milk than their rural counterparts. Therefore, we aim to analyze supply of milk at the regional level (UB), during the period from 2004 to 2011, and determine the optimal distribution of the production and imports.

RESEARCH METHODS

It is considered that over 854 million people in the world are affected by food insecurity from which - According to assessments made by the Food and Agriculture Organization of the United Nations (FAO) in the years 2001/2003- 820 million are in developing countries, 25 million in countries in transition and 9 million in industrialized countries (FAO, 2006). A common strategy among different nations of the world to reduce or eliminate all manifestations of hunger and tackle food insecurity is currently under implementation as the World Food Summit and the Millennium Development Goals have proposed, i.e., to achieve the halving in the proportion of people in the world who suffer from hunger. The time horizon raised for the achievement of this goal is the year 2015, focusing on developing countries to generate food plans, national and regional programs, and public policies aimed at improving the FS.

These initiatives should basically pursue three objectives: ensure adequate food production, ensuring maximum stability in the flow of food and guaranty access to available food of those in need. Figure 1 shows the related factors of FS expressed in terms of supply, demand and stability related to nutritional needs[3].

Table 1

Levels of Food Security		
Food Secure		Food Insecure
Supply>Demand Demand>Needs	Nation – Region	Supply<Demand Demand<Needs
	Markets	
	Government distribution	
Demand>Needs	Household	Demand<Needs
	Intra-household relationships	
Consumption>Needs	Individuals	Consumption<Needs

Source: (Thomson, A. and Metz, M., 1999)

Our report presents summary findings from study of milk supply in UB, focusing on the determinants of food security. These are supply of milk, self-sufficiency and its further tendency. Our analysis is based on figure 1. The specific objectives to:
- Determine consumption and needs of milk in Ulaanbaatar
- Determine supply demand situation of milk in Ulaanbaatar
- Determine a ratio of net production and import of milk in Ulaanbaatar
- Determine a indicator of import dependency
- Determine the optimal distribution of net production and import

In order to achieve the first 4 objectives the methodology developed by NSO is approached[4]. In order to achieve 5th objective, we use CES function. The formal specification of a CES production function with two inputs is;

$$y = \gamma(\delta x_1^{-\rho} + (1-\delta)x_2^{-\rho})^{-\frac{\vartheta}{\rho}} \qquad (1)$$

Where y is the output quantity, x_1 and x_2 are the input quantities, and γ, δ, ρ and υ are parameters. Parameter $\gamma\epsilon$ [0;∞) determines the productivity, $\delta\epsilon$ [0;1] determines the optimal distribution of the inputs, $\rho\epsilon$ [-1;0) υ (0;1) determines the (constant) elasticity of substitution, which is $\sigma = 1/(1+\rho)$, and $\upsilon\epsilon$ [0;∞) is equal to the elasticity of scale[5].

The parameters of the CES function (1) estimated from the parameters of the restricted translogfunction.

$$lny = a_0 + a_1 lnx_1 + a_2 lnx_2 + \frac{1}{2}\beta_{11}(lnx_1)^2 + \frac{1}{2}\beta_{22}(lnx_2)^2 + \beta_{12} lnx_1 lnx_2 \qquad (2)$$

1. Research outcome

Ulaanbaatar city milk demand and need have been shown on Figure 1.

■ Demand ■ Needs

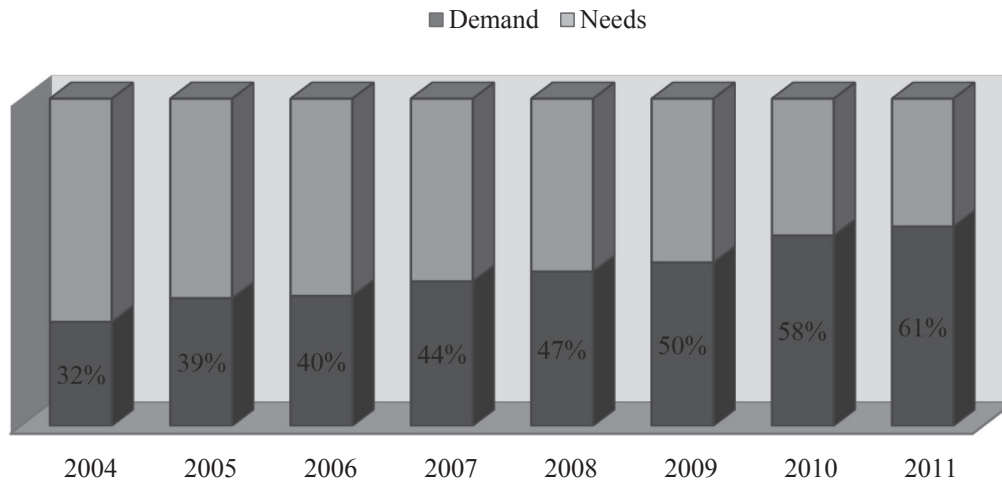
Figure 1.The rate of demands of milk and needs of milk in UB

Demand can be considered as unification of need and purchasing capability. From Figure 1,people purchasing capability has been increasing permanently. In 2004-2005 it increased by around 8 percent, which caused by more money spent on milk and increased consumption of milk.

Decrease of milk demand in 2008, 2009 years has been related with world economic crisis. As a prove of it in 2010 milk demand increased by 8%. Although

demand has been increasing consumers are still cannot fulfill their needs. Thus from 2010 years they are in position to meet only above 50 percent of their requirements.

There is need to study milk demand more deeply. It might be that a small portion of population with high income constituted majority of milk demand increase. If so, milk demand of population with low income has to fall.
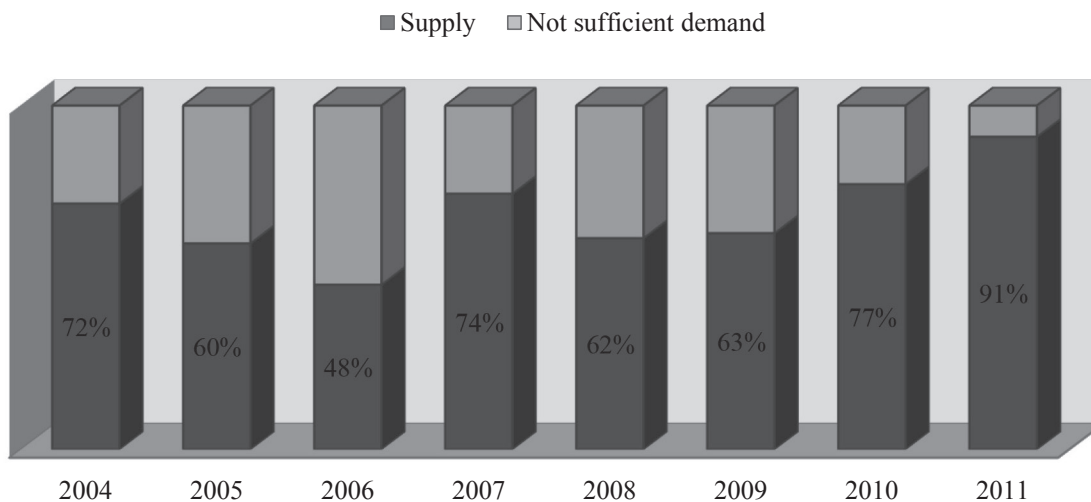
■ Supply ■ Not sufficient demand

Figure 2.The rate of supply of milk and demands of milk in UB

Though, milk supply is increasing up the level to meet milk demand, one have to remember that it not reached levels when all needs are met. Thus between 2004-2006 milk provisions has been falling

constantly, but in 2007 it has been rising. In 2008-2009 milk supply has been decreasing again due to import decrease caused by melamine problem.
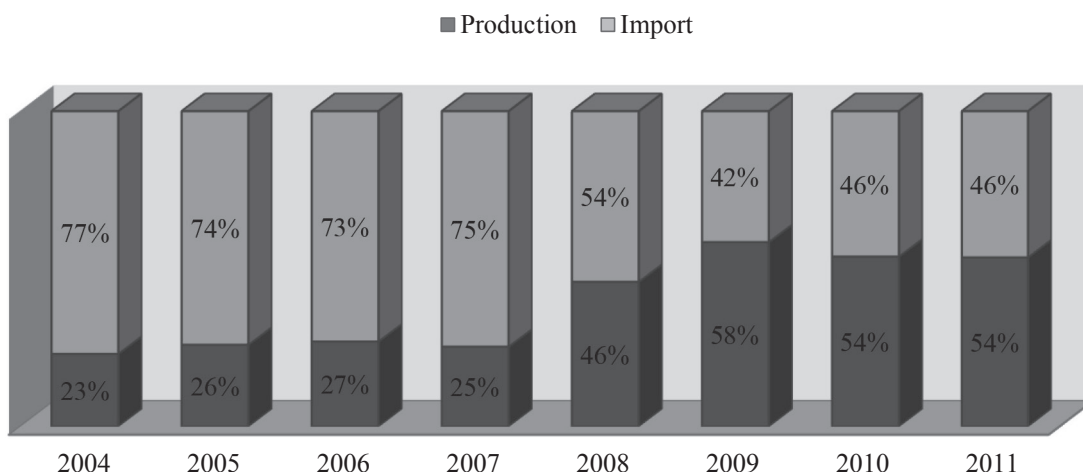
Figure 3.The rate of net production and imports of milk

2008 year boom in domestic production was caused by import decrease due to melamine issue and beginning of two-stage "Milk" national program implementation.But from 2010 year percentage of import milk has been raising.
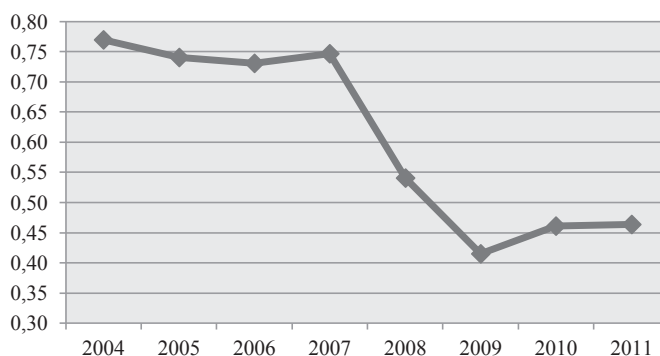

Figure 4. Indicator of import dependency

Estimated indicator of Ulaanbaatar milk dependency from import revealed that between 2007-2009 it has been decreasing sharply and from 2010 it raised.
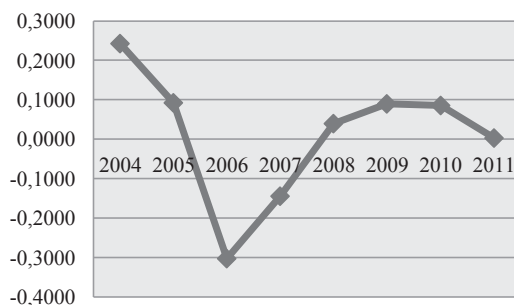

Figure 5. The fluctuation of net production of milk

According to Figure 5, though domestic milk production has been decreasing in recent years, but there is a tendency of its stabilization.

Table 2

The parameters of the CES function estimated from the parameters of the restricted tranlog function

Parameters	Coefficients	Explanation
δ	0.21673	Optimal ratio of domestic production and import
ρ	0.72607	Substitution elasticity of domestic production by import

There is possibility to increase domestic production up to 80 percent of total milk supply. In other words, an optimal import size is 20 percent. To reach this ratio, there is need to conduct detailed investigation on how to decrease imports and to enhance domestic production.

CONCLUSION

Ulaanbaatar city inhabitants' milk provision level is in danger. Though milk supply is increasing only 50 of milk need is met.

Stabilization of domestic milk production and increased milk provision, as a result of government measures, implies that in future competition in this sector will increase and in long run the milk market will become efficient.

On other hand, if additional measures on the strengthening domestic producers will not be taken, there is a tendency of losing milk market to the import milk. Current ratio of domestic and import of 79:21 shows that consumers are more positively inclined to domestic production. Therefore, in order not to lose this proportion it is important for domestic producers to work seriously on production of quality products.

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