BRAZILIAN RUBBER PRODUCTION: RISK ANALYSIS IN CAPITAL INVESTMENT

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SUMMARY

Brazil was the most important rubber producer from 1850 to the first years of this century. The period was called "The rubber cycle" when rubber was extracted from native trees.

Some years later, around the 30's, in this century, the production of cultivated rubber trees from south east Asia overcomes Brazilian production by offering a cheaper product in the world market. With lack of competitiveness the Brazilian production of native rubber decreased and started being substituted by the production of synthetic rubber.

After the petroleum crisis in 1973, the increasing necessity of energy opens up perspectives to cultivated rubber to work as an alternative source of energy.

By trying to reduce the increasing necessity of importation of natural rubber as well as of synthetic rubber, the Government interferes on the sector and creates the First Incentive Program for Cultivated Rubber Production (PROBOR) in 1972.

This program aimed to increase rubber production and yield as well as the little by little substitution of cultivated for native rubber. Because it is subsidized, credit funds were quickly absorbed by producers and soon a second program (PROBOR II) was set in 1978.

The programs were subsidized through low interest rates taking into account that rubber has a long maturation process where the first tapping practices are made in the sixth or seventh years after planting. Besides this type of subsidy the Government tries to stimulate production setting prices in the domestic market higher than the ones in the international market.

The results of several studies show that in spite of these program, domestic production will not be enough to substitute importation. For that domestic production would have to increase even more.

This research proposed itself to analyse private investment in productive sector trying to help decision makers with respect to future policies to be adopted for this sector. The analytical techiniques used are payback period, cost-benefit ratio and internal rate of return.

The data used were from Amazon Region (States of Amazonas, Mato Grosso, Pará and Rondônia) and states of Bahia, Espírito Santo and São Paulo which are the main producers of cultivated rubber in Brazil.

The length of the project period is long (27

years) and so it is not possible to guarantee that expectations about benefits and costs on investiments analysis will be completely accomplished. Therefore, risk was introduced considering that there is a probability distribution on yield, prices and operating costs.

Monte Carlo method was used. Simulation models used triangular distribution with subjective probabilities. Three approaches were considered with variations on international prices, domestic prices and project prices (trend line) based on deflated international prices.

The analysis assumed two situations, onw with and another without land prices as an investiment. The discount rate is 12%.

The results showed that the States of Amazonas and Pará due to frontier expansion costs and lower yields have smaller internal rate of return, cost-benefit ratio about 14.5% and 1.15 respectively) than the States of Rondônia and Mato Grosso (about 17.0% and 1.35 respectively). Payback period for the States of Amazonas and Pará is on average 19.5 years while for states of Rondônia and Mato Grosso it is 15.5 years.

The projects with more than 20 hectares of rubber in the States of São Paulc and Espírito Santo presented the lowest payback period. These States showed an internal rate of return of approximately 19% and cost-benefit ratio of 1.50. Whithout considering land worth the payback period in

these regions was about 14 years. These States have better yields than the others.

The State of Bahia presented lower internal rate of return (abour 15.5%) when land price is not considered and a payback period of 17.0 years. Diseases problem ("Mal das Folhas","Microcyclus ulei") has lowred its yields.

Simulations based on deflated international prices showed that internal rates of return would be lower in the future if domestic prices comes to the level of international prices of rubber. On the other hand, if current domestic prices are kept, a bigger number of producers will be attracted to the rubber sector.