

# STUDYING DECISION MAKING OF ENTERPRISES UNDER NEW CIRCUMSTANCES

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## ABSTRACT

This paper is focusing on study of influence of China's recent economic adjustments and industrial structure changes on enterprises, particularly on these engaging in manufacturing. The paper analyzes major difficulties facing Shanghai, the largest industrial centre of China, and, using it as background, studies the decision-making strategy of a typical enterprise of Shanghai.

## INTRODUCTION

With the development of economic reforms and adjustments of economy, the enterprises in China, particularly these large or medium size engaging in manufacturing are facing severe challenges as well as great hopes. On one hand, China is beginning economic constructions in great scale which requires large number of equipments made by these enterprises. On the other hand, serious shortage of funds, ageing technology, shortage of supply in energy and raw materials are bringing a serious of problems to these enterprises. What is worse is that they are facing a completely strange market, from which they get most of raw materials and to which they sell most of products. But in the past, these buying-selling activities were arranged by government departments which provided orders, supplied raw materials and funds and were responsible for market of all products. Now an enterprise has to carry full duty on its management: value of output, profits, welfare of its staff, so on. This is a great change to enterprises and their managers. Facing this change, a manager, who wants to survive and develop, has to consider the new task of decision-making strategy of his enterprise which determines its success or failure and determines its future.

Decision making strategy of an enterprise is the major policies to determine its development in a fixed period and the important measures to ensure to achieve its goals. Economy nowadays is characterized by its high degree of information, technology, sociality and internationality. The managing activities of an enterprise is more and more influenced and restricted by

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\*Based on a important project funded by State Natural Science Foundation of China. Initially written in June, 1989, rewritten in March, 1990.

politics, society, culture and human ideas of value. The external environments of enterprises are changing more and more rapidly, the life cycle of technology and products is becoming more and more short. The faster speed of renewing and stronger competition in markets make the survive and development of an enterprise not only depend on its present management and condition, but also, even more, depend on the strategic decisions made by the enterprise based on its forecast for future development. The managers of enterprises in China are facing new challenges.

### SHANGHAI'S INDUSTRIAL PRODUCTION SITUATION AND DYNAMIC MODEL

Shanghai, the largest industrial city of China, is at a critical time and its industrial production is facing a severe situation. The whole industry is required to make adjustments in its structure and distribution; on the other hand, its ageing technology and products, together with the shortage of energy and raw material, result in decline of profits in industrial enterprises and "landslip" of government revenue. Therefore, it becomes an urgent task of rethinking about the present industrial development strategy of the city and the role of the city in the national economy.

Due to historical reasons, there are some serious problems existing in Shanghai's industrial structure. The increase of output value mainly relies on the input of a large amount of materials and energy, rather than on the progress of technology. So, the shortage of funds, energy and raw material facing the city now has greatly influenced its industry. In addition, because of the backward of industrial technology, together with serious pollutions and backlog in transportation, products made in Shanghai not only have less competitiveness in international markets, but also have been losing their technology advantages in internal markets. The rising prices of raw material now further aggravates the rise of product costs, decline of enterprise profits and "landslip" of government revenue.

These difficulties are reflected and studied in SDMSIS (System Dynamic Model of Shanghai Industrial Structure). The sensitive analysis, historical data examination and extreme condition test have shown the model is effective and can be used as a tool to analyze and simulate the dynamic changes of structure of Shanghai's industry.

#### A. BRIEF INTRODUCTION OF MODELSDMSIS STRUCTURE

Figure 1 is the main feedback loops of the model:

loop 1: GNP-->+INI-->+INDE-->+PROC-->+VAO-->+GNP is the positive feedback loop of industry growth.

loop 2: GNP-->+INI-->+INDE-->PROC-->+ESDR-->-PCUR-->+VAO-->+GNP

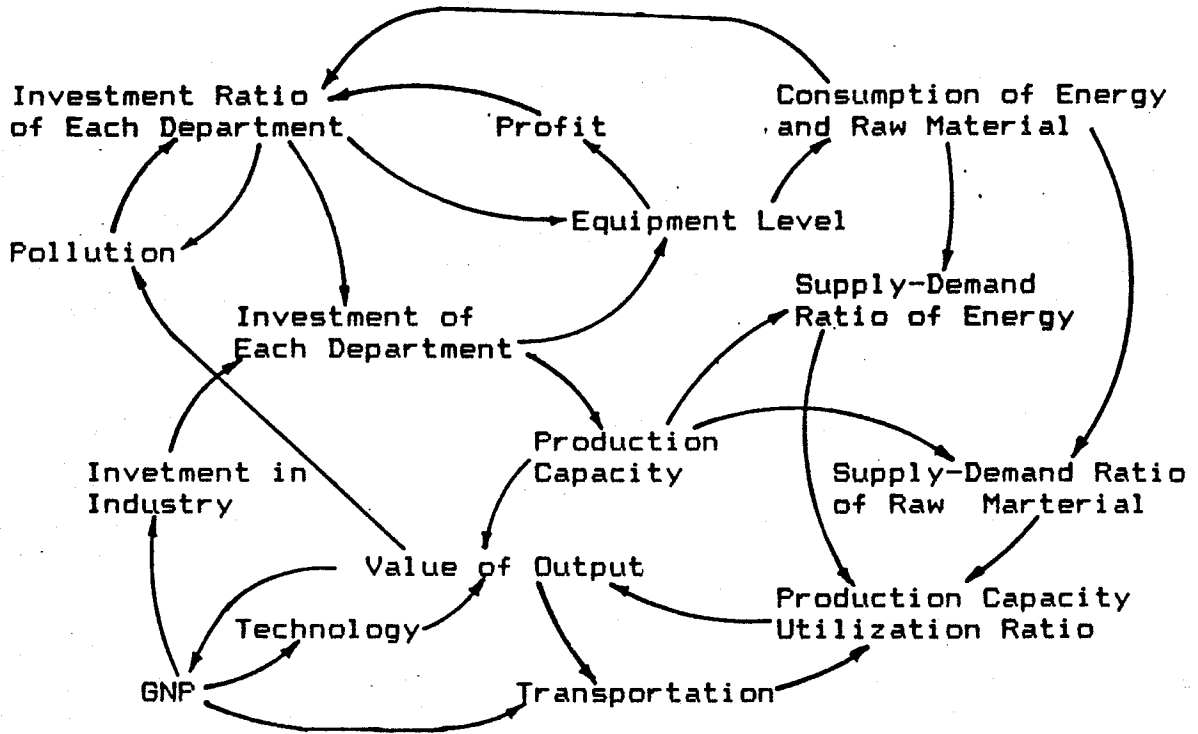


Figure 1. Main Feedback loops in the Model

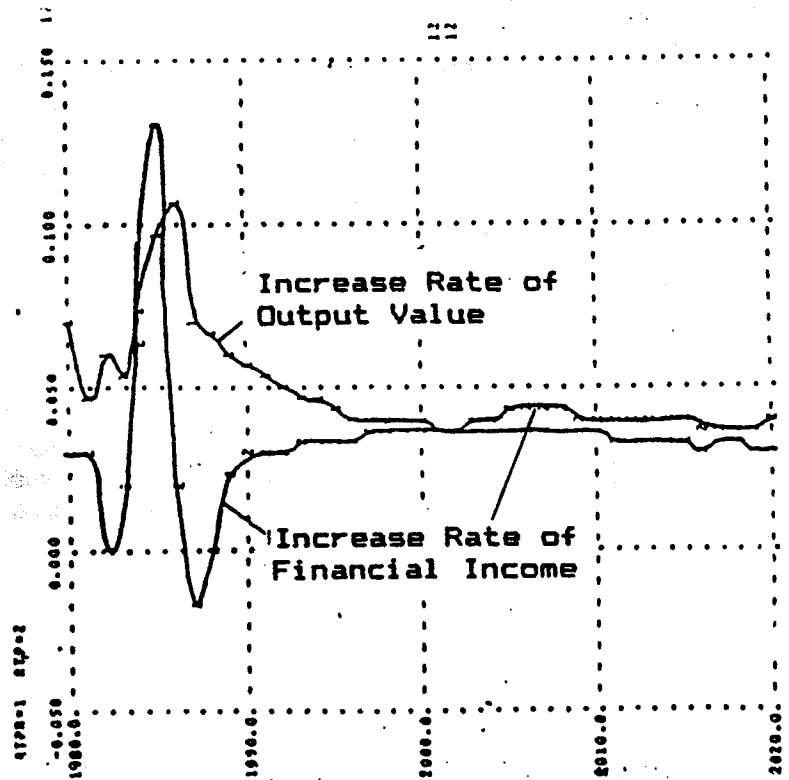


Figure 2. Increase Rate of Output Value and Financial Income

is the negative feedback loop restricting the industry growth by resources.

loop 3 : INRDE-->+INDE-->EL-->-CERM-->- INRDE is the positive  
 +PROF-->+  
 -POLL-->-  
 feedback loop resulting from the investment proportion of each industrial department.

Loop 1 is the stimulation of industry growth. Loop 2 is the restrictive factors in industry growing. Loop 3 is the key of the model reflecting the conflicts between the industrial growing and resource shortage.

The measures of adjusting the allocation of investment aims at controlling the development of each industrial department. In this model the investment proportion of each industrial department is produced by feedback of following variables: profit, material and energy consumption, productivity and pollution.

## B. THE SIMULATION RESULTS AND ANALYSIS OF SDMSIS

### 1. The growing trend of industrial production.

Figure 2 is the change trend of growth rate of city's industrial production and government revenue.

Figure 2 shows that growth rate of industrial production is in "landslip", and even negative growth arised recently in government revenue. This situation can not become normal until the middle of 1990's.

### 2. Restrictive factors.

Figure 3 is the utilization rate of production capacity which determines the growth rate of industry and is determined by supply-demand ratio of energy, supply-demand ratio of raw material and backlog ratio in transportation.

Backlog ratio in transportation (including harbours, railways and highways) will reach peak in 1990, coming up to 32%. After that, the rate will remain 1.2--1.3 if extra investment is not provided.

Table 1 is the energy & material demand-shortage situation by 2020. (Note: the numbers with negative sign mean that supply is greater than demand). From the table, we can see the shortage of energy and material is an important factor which will influence Shanghai's industry for a long period. It's necessary to consider this fact in adjusting economy and changing industrial structure.

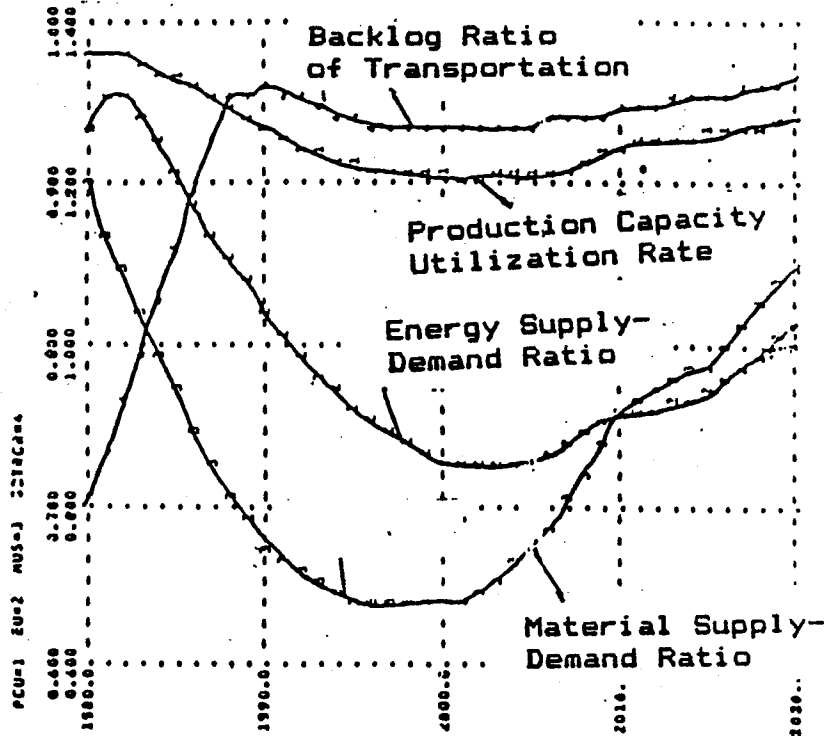


Figure 3. Restrictive Factors

Table 1. Energy and material demand-shortage situation by 2020

|              | Coal<br>(10000 ton<br>/year) | Electricity<br>(100000000 Kwt<br>/year) | Steel<br>(10000 ton<br>/year) | Lumber<br>(10000 m <sup>3</sup><br>/year) |
|--------------|------------------------------|---|-------------------------------|---|
| Time: Demand | Short-: Demand               | Short-: Demand                          | Short-: Demand                | Short-: Demand                            |
| :            | : age                        | : age                                   | : age                         | : age                                     |
| 1985:        | 1615.8 : 150.8               | 152.13 : 13.82                          | 301.6 : 55.6                  | 64.9 : 5.9                                |
| 2000:        | 3142.1 : 1127.2              | 323.06 : 55.76                          | 678.5 : 105.1                 | 110.2 : 30.2                              |
| 2020:        | 5590.2 : 1829.7              | 575.2 : -41.47                          | 1277.8 : 51.3                 | 181.1 : 6.0                               |

MANAGEMENT AND DECISION MAKING OF ENTERPRISE  
UNDER NEW ECONOMIC CIRCUMSTANCE

The adjustment of national economy and difficulties of Shanghai's industry have more or less influenced individual enterprise, particularly these large or medium size engaging in manufacturing. These enterprises are backbone ones for city

economic construction and main source of government revenue. So the condition of these enterprises aggravates the difficulties of city's economy and finance: More attention should be paid to it and necessary measures must be adopted in order to avoid the situation worse.

In this study on enterprise's management and decision making, we select a medium size plant which is one of three major producers of relay equipment for power industry of the country as an example for modeling. Since 1986, economic returns of the plant has been declining greatly although the value of output was still in increase.

For example, the profits of 1986 and 1988 were less one million RMB yuan than the previous year, which was about 15%-20% of the total profit. The profit of 1988 was even less than that of 1984.

At the same time, the equipment and technology are ageing and need to be replaced and renewed. The depreciation charge of 1988 was more than twice of 1982. But because of state austerity policy, the funds is very tight and it's almost impossible to do such replacement for the time being. Main products are still those introduced from Soviet Union in 1950s. The backward equipment and old-fashioned products make the plant have no competitiveness in international market and meet stronger challenges in internal market.

A. Three main factors influencing the production development and economic returns.

#### 1. State investment in power industry

The state investment is the most important factor to influence the developing rate of production because it determines the market capacity for the products. It's expected that the state will increase the investment in power industry which now is unable to meet the needs of industry and whole nation economy.

#### 2. Shortage and price-rising of raw material

This is the factor which influences greatly the economic returns of the plant. During the period of 1985-1988, the price of raw material rose about 150% which resulted in declining of average profit from 32% to 12% and rising of cost and sales income ratio from 40% to 60%. It's expected that the price-rising trend of raw material will continue in a long period due to demand and supply situation all over the country.

#### 3. State financial policy

A large part of funds needed to maintain and expand production is from the Industrial and Commercial Bank as loan which is greatly reduced now because of state austerity policy. The plant lacks cash to buy necessary raw material and even sometime has

difficulties to pay for its staff. The plant is also in difficulty to get cash from selling its products because customers are in shortage of funds too. These badly influence the normal production and selling.

#### B. INTRODUCTION TO SYSTEM DYNAMICS MODEL OF MANAGEMENT AND DECISION MAKING OF ENTERPRISE (SDMMDE)

In order to overcome the present difficulties of the plant and, at the same time, to look forward to the long-term development, it's necessary to create a dynamic model of the plant which will be the base to design developing strategy and the laboratory to test its effects.

Figure 4 is the basic structure of the model. State investment in power industry, price-rising of raw material and financial policy of the state are dealt as external variables. Some of main feedback loops are:

1. positive feedback loop of production capacity;
2. positive feedback loop of marketing expenditures;
3. positive feedback loop of funds;
4. negative feedback loop of production capacity;
5. negative feedback loop of order;
6. negative feedback loop of fund.

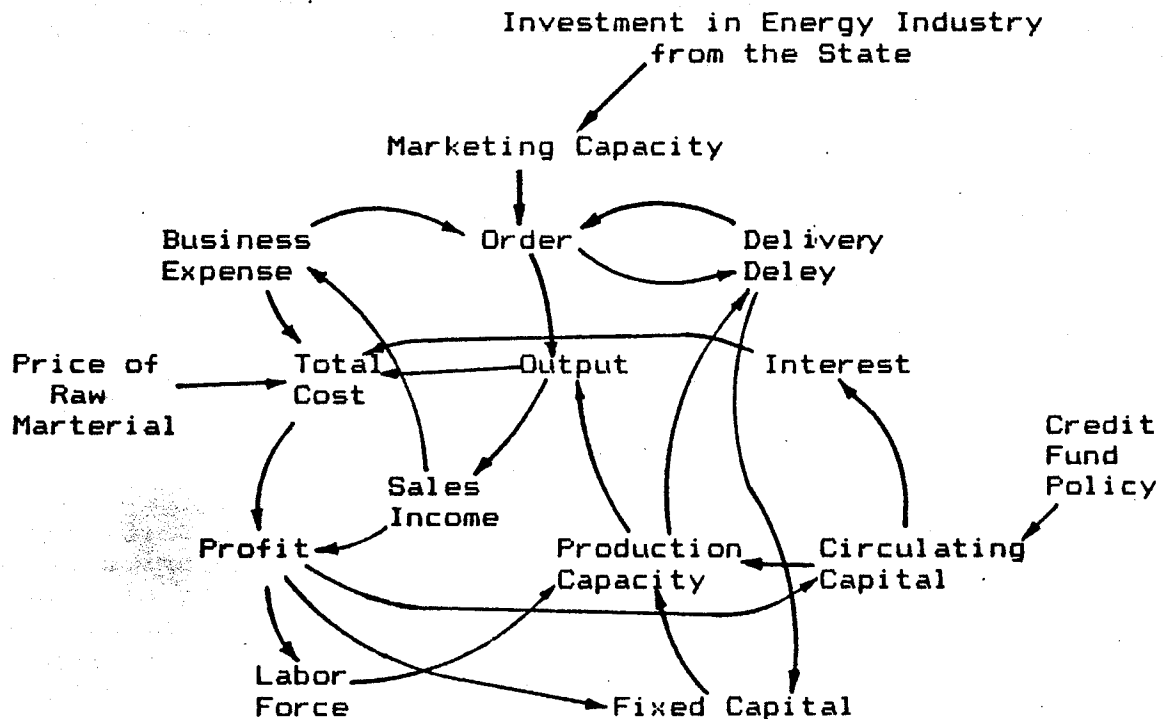


Figure 4. Main Feedback Loops of the Plant Model

In this dynamic model, studies on decision-making of the plant are to work out the development plans (long and short period) of the plant according to macro-economy changes.

C. SIMULATION AND POLICY ANALYSIS.

The emphasis of simulation is to analyze how the production and economic returns be affected when state adjusts the investment in power industry; raises the price of raw material and changes the financial policies, (1984 is selected as the base year)

1. Policy test 1. Figure 5 is the simulation results under the following condition: 7.2% increase each year of investment on power industry ; no changes of raw material price and financial policy. The simulation shows that because of increase of order, production capacity value of output and profit double in about ten years.

2. Policy Test 2 -- no increase of investment and no changes of financial policy: yearly 6% price-rising of raw material in first 3 years and 15% in rest 7 years. Figure 6 is the simulation results.

No big changes of value of output and profit in first 40 months shows the difficulties caused by yearly 6% price-rising can be overcome by the plant internal efforts. After that, the simulation result is worsening: The profit goes down to zero in 83th month, value of output begin to decline in 60th month and delivery delay prolongs continuously. All these show that the yearly 15% price-rising of raw material exceeds the limit the plant can undertake.

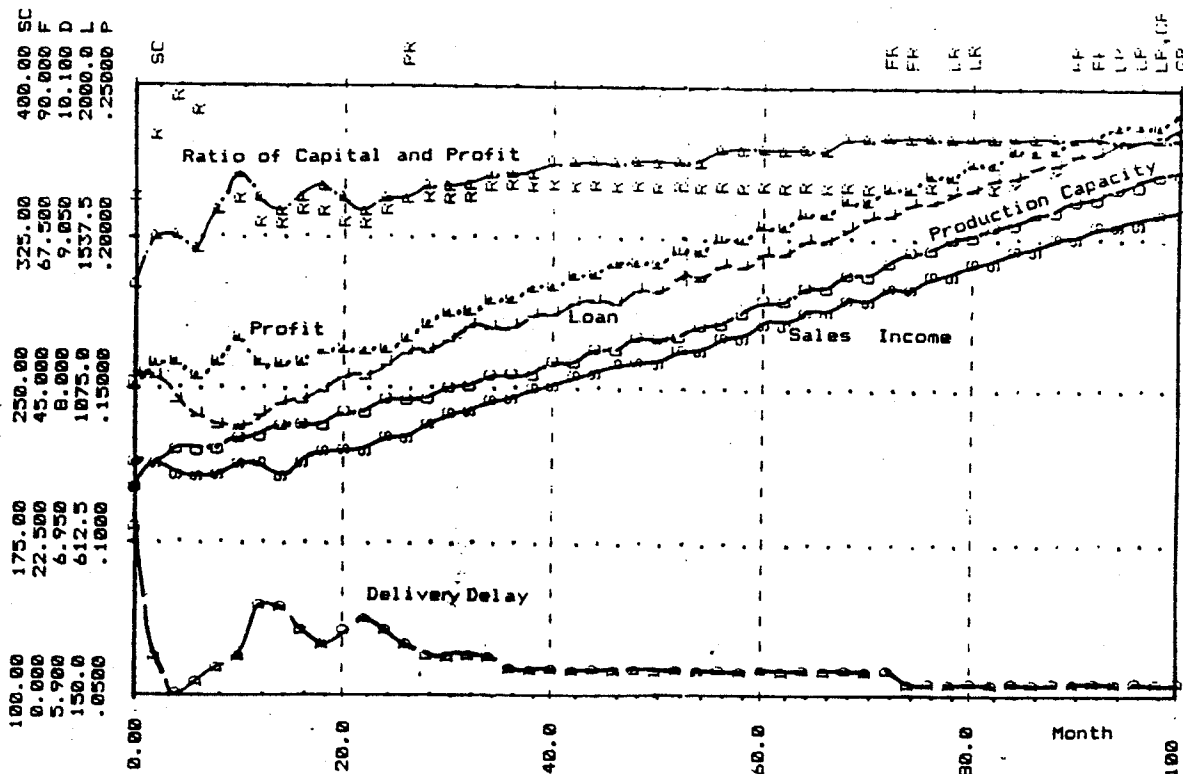


Figure 5. Simulation Results of Policy Test 1



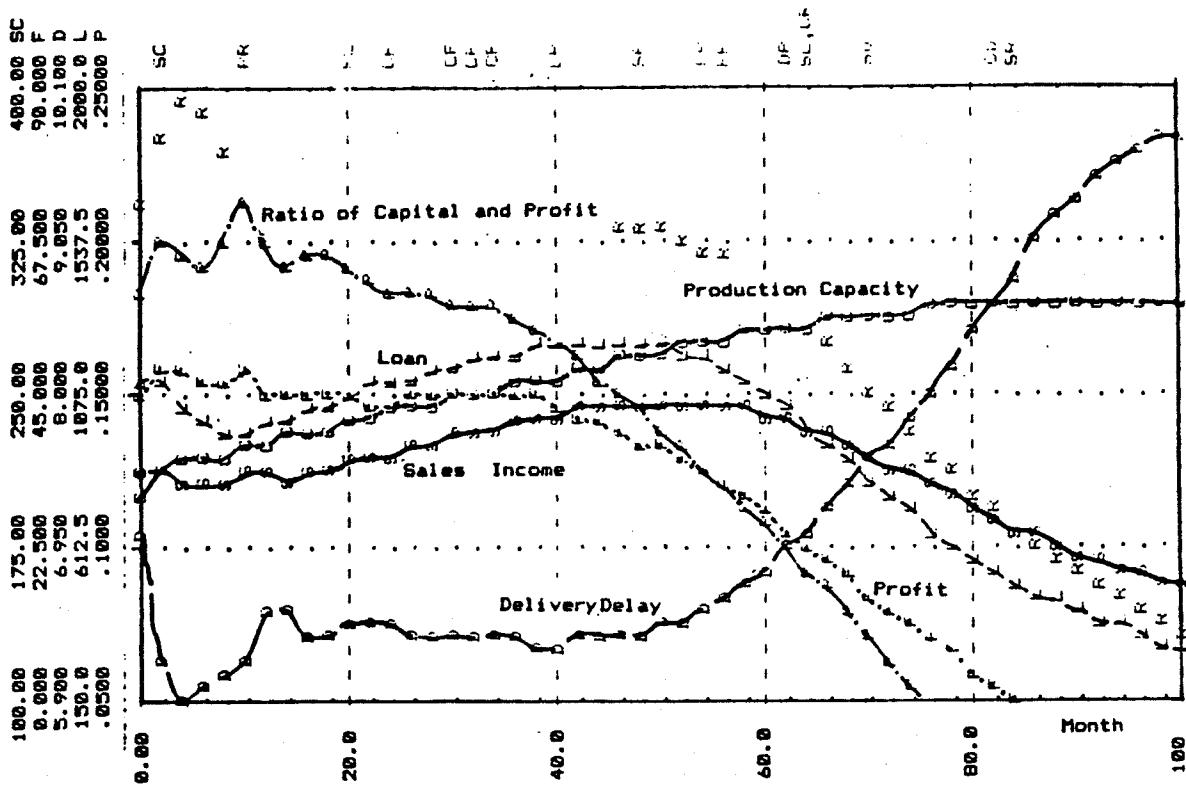


Figure 6. Simulation Results of Policy Test 2

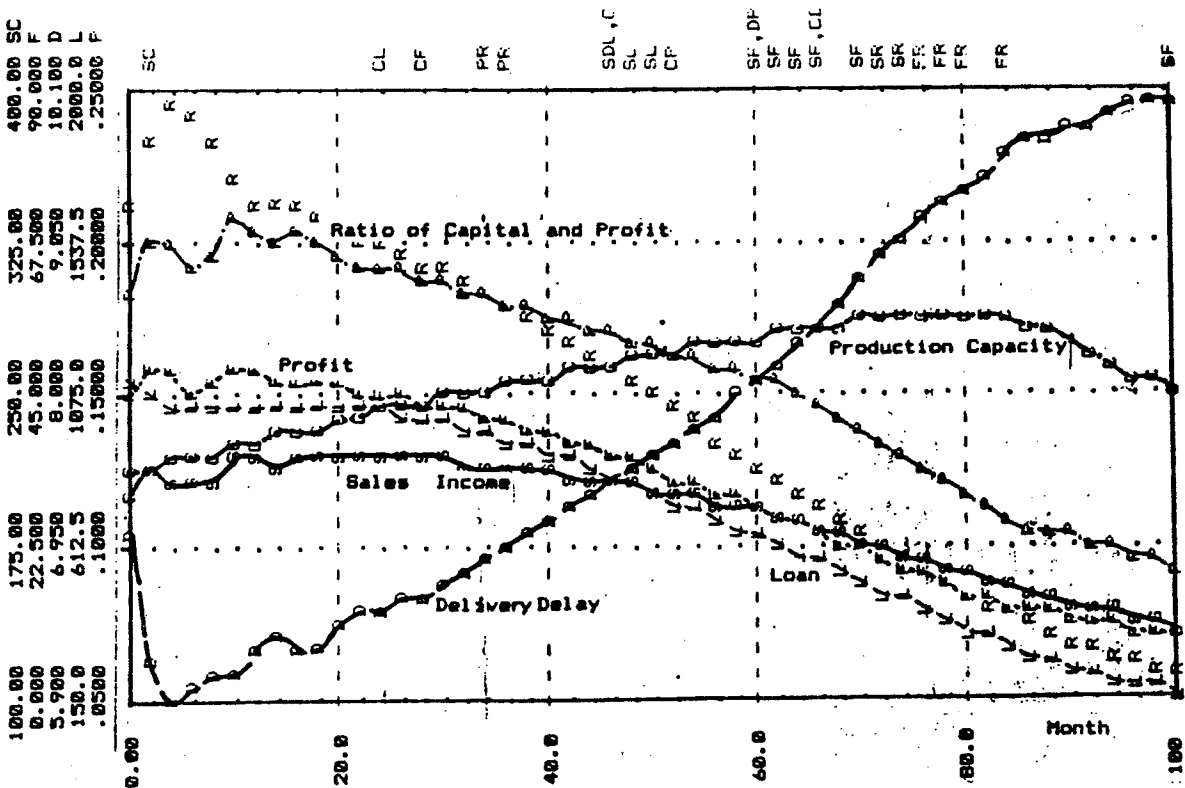


Figure 7. Simulation Results of Policy Test 3

3. Policy test 3. Figure 7 shows the result of yearly 7.2% increasing in investment, 6% rising of raw material price and austerity policy in finance. The production activities is greatly influenced because the plant is fail to get necessary loan. The value of output begins to decline from 40th month; the profit reduces dramatically, exceeding yearly 10%; the delivery delay climbs rapidly.

### CONCLUSION

Based on above simulation and analysis of macroeconomic environments, we think that the plant must prepare for facing worse situation in a long period. Only the way of overcoming there difficulties is to make correct long term development strategy and to improve management itself.

1. To accelerate technical innovation and to decline the consumption of raw material.
2. To broaden the sources of funds and to use limited funds more effectively.
3. To develop more new products and to enlarge market for its products.

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