# Background

Hello everyone, welcome to this Macro and Micro economics Simulation Experiment System introduction. I am Cindy from Chengdu Jiecl Technology Co., Ltd.

This sharing is analyzed from two aspects, which are what is the background of the experiment and what Should we do?

First of all, let me introduce you the whole background of the course. This experiment simulates a small country with government, manufacturers and consumers. The manufacturers are played by the whole class, the government is elected by each group, and the consumers are played by the software. Depending on the actual class size, we can divide the class into 20 groups of 5 to 6 people each, and each group plays the role of steel manufacturer or automobile manufacturer or home appliance manufacturer, so what is the relationship between them?

The steel manufacturers buy raw materials from the iron ore company, produce steel and sell it to the home appliance and car manufacturers, and the home appliance and car manufacturers use the raw materials of steel to produce the corresponding products and sell them to the consumers, thus forming a closed country. And we simulate different market structures by setting the number of different manufacturers. For example, the ten home appliance manufacturers simulate monopolistic competition. Five auto manufactures and five steel manufacturers simulate an oligopolistic structure. One iron-ore compactor company simulates a monopolistic structure.

There are four market structures in economics. One is a perfectly competitive market, because the conditions of this market structure are too harsh, we simulate this market condition by an infinite supply of order in the first year.

**Team Roles**

General Manager - responsible for all company decisions (first in charge)

Production Director - responsible for operations and records

Finance Director - responsible for investment and financing arrangements and statement review (one cashier, one accountant)

Marketing Director - responsible for bidding and advertising business

Purchasing director - responsible for raw material procurement and negotiation (one to two assistants)

Human Resources Director - responsible for personnel recruitment and salary negotiation

# What Should We Do?

The second point, what should we do? First, before we run a company, let's understand its initial state

For appliance manufacturer and auto manufacturer

1 production line，Cash 17000 thousand dollars，10000 tons of finished steel，6000 thousand dollars for 1-year loan and 6000 thousand dollars for 2-year loan, both at 6% interest rate

For steel manufacturer

1 production line，Cash 7400 thousand dollars，42000 tons of finished steel，6000 thousand dollars for 1-year loan and 6000 thousand dollars for 2-year loan, both at 6% interest rate

Operating rules

Rules of macro-control、Rules of micro-operation

Simulation experiments will involve macro rules, micro rules

There is an electronic version of the participant manual（student handbook） in the “winning formula” in the system, so you can study the rules.

Introduction to the operation process.

The logical relationship is from macro to micro and then to macro. Macro: At the beginning of each year, each group needs to conduct a government election, and the group elected to the government needs to set macroeconomic goals for the year and enact corresponding government measures. Micro: The bidding of product market is conducted first, and then the bidding of micro factor market is conducted.

Next, let's look at the specific operation process in the competition software: for appliances and Automobiles the operation process will follow the one on the right. The sequence is: government campaign --economic forecast (non-government group) - order bidding - commercial loans - land bidding - labour bidding - production delivery. The steelmakers will follow the operating process on the left: government campaign - economic forecast (non-government group) - commercial loans - iron bidding - land bidding - labour bidding - production. Between them they will conduct economic actions such as steel trading, inter-group loans.

The stopping point and break-even point of companies in different market structures are different, so the business decisions of each manufacturer are also different. The operation process involves negotiation, gaming, and inter-group financing among the groups to meet their respective needs, which will eventually lead to automatic macroeconomic data for the whole country. The core of our experiment is that the groups need to apply the knowledge we have learned when negotiating and playing, so that the decisions are well integrated with the knowledge.

After explaining the operation rules and operation process, let's introduce the login and operation of the system.

Account Registration: Register an account at the login screen

Attention: The student who enters the group in the system first is the group leader and can submit decisions, other group members account can only view the data

# Registration, login and system page display

Student registration and login

Students can directly click on the homepage of the website to register and fill in the corresponding information to complete the registration, the system will automatically generate the practice account and password, at this time, click on the practice tournament website to log in.

Login Note: 1. The system defaults to the first account to enter a group, as the group leader account, and only the group leader account is available for each group to submit data decisions.

2. The group name is shown in red, indicating that the role of this group has been selected.

The login steps for group members are the same. Group members select a group to apply to join and need the group leader's permission to enter the system.

After entering the system, we can see each operation unfolds in the form of a track map, and the previous operation must be completed before moving on to the next operation. On the left and right side are some buttons for common actions. Decision Record: Every step of operation in the operation will be shown here. Winning Tips: Includes the knowledge that will be covered in the operation as well as the trainee manual（student handbook）.Inventory: You can see the current capital status, amount of land, raw materials, labor, number of production lines. View Your Score: You can see the team ranking, team score, individual score and the composition of the score.

# Government elections and what goals are involved

4. Government elections and what goals are involved

We officially start our operation.

When we enter the system, we are in the second year, and the system has already completed the first year of operation and generated the relevant data.

Click on "Government" and go to "Government Campaign". We know that the government's goals are to maintain price stability, economic growth, full employment, and balance of payments. In our experiment, we simulate a closed country, so we use the growth rate of total personal income instead of the balance of payments. Each value has an interval.

After filling in the data, click "Submit" to complete the government campaign. If you don't want to participate in the government campaign, you don’t need to fill in the data. You can click "waive" to give up participating in the government election.

Campaign principles: the predicted CPI increase cannot exceed 5%, now it is 3%, so 2 points are scored; the minimum GDP increase is 5%, now it is 7%, so 2 points are scored; the unemployment rate cannot exceed 8%, now it is 4%, so 4 points are scored; the minimum growth rate of total personal income is 7%, now it is 9%, so 2 points are scored. The one with the highest total score is elected to the government. However, the system has set a threshold value to each indicator to prevent some vendors from pursuing high indicators in order to be elected to the government, and the campaign beyond the threshold value is invalid.

# Enactment of government measures Enactment of government measures

5. Enactment of government measures

When the government campaign is over, the elected government team can enact the government measures for the year. In this model, the government decisions will involve fiscal policy and monetary policy. Monetary policy includes annual minimum interest rates and money supply. Fiscal policy includes VAT rates, income tax rates, government subsidy rates, and government procurement. In addition to this, the elected government team can also regulate factor markets, including the minimum wage and the actual supply of land. So what kind of fiscal and monetary policy is the government going to adopt? Our government sets the goals for the year when it participates in the government campaign at the beginning of the year, and the government then needs to set policies to achieve these goals.

After all the policy items are filled in, click "Submit".

After the government enacts government measures, Non-Governmental Groups can make economic forecasts based on the measures. Before the economic forecast, let's analyze that the government is adopting an active fiscal policy this year, then the demand will be strong. If, following the logic on the left, manufacturers expand production, then GDP growth can be achieved this year. In order to expand production, more workers need to be recruited, and the unemployment rate decreases. In order to be able to recruit workers, firms will raise wages, and then growth in total personal income can be achieved. Although demand is strong, manufacturers are also willing to expand production, then the supply of products exceeds demand, and the CPI can remain at the desired range, and all four indicators can be achieved.

If a manufacturer adopts a high quotation strategy, then first of all, it will lead to an increase in prices and the CPI indicator will not reach the expected level. The high price will also lead to a decrease in orders, which will not reach the expected level, then the corresponding manufacturers will also reduce production, and the GDP indicator will not reach the expected level this year. As a result of the reduction in production, fewer workers will be recruited and the unemployment rate will not reach the expected level. In order to recruit fewer workers, they will reduce the level of workers' salaries, and then the total personal income will not be able to achieve growth. According to the logic on the right, all four indicators are lost. Next, we move on to the economic forecast. Enter the predict value and click "Submit" to complete the forecast. We do not recommend abandoning the stage of forecasting, once abandoned there is no macroeconomic score

# Order Bidding

Order Bidding

Having completed the macroeconomic forecast, we move on to the micro-operations. The first is the order bidding. Appliance makers and automakers need to bid for orders. where we need to fill in two parameters: the offer price and the advertising fee. The quotation range for the second-year appliances is between 1.37 and 1.6 thousand dollars, and the amount of advertising fee must be an integer multiple of 1 thousand dollars. We can first conduct a bidding simulation. The results of the order simulation are used to fill in the data for the order bid. Click "Submit" to generate the order bidding simulation data. We can simulate that when all home appliance manufacturers keep the advertising cost at 500 thousand dollars and other home appliance manufacturers offer 1.5 thousand dollars, appliance 1 offers 1.4 thousand dollars and will get 5,000 more orders than other home appliance manufacturers; when all home appliance manufacturers offer 1.5 thousand dollars and other home appliance manufacturers invest 500 thousand dollars in advertising, appliance 1 invests 100 thousand dollars in advertising and will get 2,000 more orders than other home appliance manufacturers.

The results of the bidding will be visible only after all vendors submit their bid data.

# Inter group

When do I need to trade between groups，If a group is overloaded with orders this year

but has no plans to expand its land，he can use inter-group trading to get other groups to work for it。By placing the mouse over "Inter-group"，you can choose to trade with other groups for both order trading and booking products First, select the type of transaction -sell out or buy in fill in the unit price,quantity, and method of payment- click "Listing" and the listing will be completed。When the countdown for inter-group trading is over, you can see the results of inter-group trading。the order will be delivered after production is completed

# Steel procurement

8.Steel procurement

After the order bidding is completed, the teams can start sourcing steel. Steel procurement is divided into two channels: centralized trading, and reservation orders. The steel production period is very long, and in the simulation experiment, only last year's steel inventory can be sold in the current year, and the steel produced this year can only be used for next year's sales.

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So,how do you list steel for sale and buy steel for all manufacturers . First of all ,for domestic steel trading: to sell steel and buy steel, you need to determine the unit price of the steel , the minimum purchase quantity (just keep one decimal),the payment method (there are two ways: full payment and credit)

After filling in the appropriate data then click "Buying or selling",The listing can be withdrawn until it is filled. You can see all the listing transactions at the listing transactions .When the countdown for domestic steel transaction is over,you can see the results of the transaction

The second point is steel reservation. The steel reserved in the current year will arrive in the next year, and manufacturers who choose to make reservation orders need to fill in the transaction unit price, minimum purchase quantity, and prepaid rate .After filling in the appropriate data, the appliance and automobile manufacturers click on "Buying" and the steel manufacturers can click on "Selling" or "Buying".You can choose to withdraw until the transaction is completed. You can see all the listed transactions in the listing trading and see the results when the steel reservation countdown is over.

# 9. Iron bidding

Steel manufacturers need to calculate the steel demand of the whole country this year to determine the quantity of iron powder they need to purchase this year, which can be bid for iron powder. The iron powder bid requires a quotation for iron powder and a purchase quantity. The price range is from $200 to $800 per ton and the purchase quantity must be an integer.

We can perform a bid simulation by filling in the quotation and quantity for the simulation and clicking "Submit" to generate the simulation data. The bidding results will be visible only after all steel companies submit their bidding data for iron powder. The system will give priority to the highest bidder to meet the demand for iron powder.The system will give priority to the highest bidder to meet the demand for iron powder.We can simulate that when steel 1 offers 400 thousand dollars/ten thousand tons and their Quantity required is 64ten thousand tons.steel 2 offers 300 thousand dollars/ten thousand tons and and their Quantity required is 32ten thousand tons. After the simulation ,total supply is 88 ten thousand tons, and the market will first meet the demand of steel 1,steel 1 actual gets 64ten thousand tons.However steel 2 actually gets 24(88-64) ten thousand tons

# Loans

Loans

Total amount of loan-able funds this period is 60400 thousand dollars. And your current cash is 7400 thousand dollars

We have completed the order bidding and raw material bidding, next we will learn how to obtain the three major factors in the experiment, including capital, land, and labor. First, let's learn how each manufacturer obtains working capital . In the simulation, each vendor can raise funds in the form of a commercial loan or an inter-group loan. When you mouse over the "Loans" module, you can also click on "Outstanding Loans" to access the interface to see the status of outstanding loans.You have two outstanding loans, 6,000 to be repaid at the beginning of the third year and 6,000 at the beginning of the fourth year, both at an annual interest rate of 6%

Commercial Loans: Click on "Commercial Loans" to enter the screen where you can see the total amount of funds available this year,Total amount of loan-able funds this period is 60400 thousand dollars. And your current cash is 7400 thousand dollars

Each manufacturer calculates the amount of loan still needed for the current year based on the production plan and the available funds, and fills in the amount of loan to be applied for and the interest rate of the loan. There is a small line after the column of the amount of loan applied for, which indicates the maximum amount of loan for the current year. The maximum loan amount can be 32000 thousand dollars. It will be affected by the previous year's owner's equity as well as the total amount of existing business loans. For example ,now you need 5000 thousand dollar.Fill in the Application amount

Fills in the interest rate of the loan. The higher the loan interest rate, the higher the priority the system will give to the loan request. If the interest rates are the same, the system will give priority to the vendor who submits a bid first to meet the loan demand. Fill in interest rate (6%) the appropriate data and click "Submit" to complete the loan bid. After all teams have submitted their data, you will be able to view the results of your bid.

Next, this is about inter-group loans,enter the interface where we can fill in the amount of inter-group loan interest rate to credit or lend. When do we need an inter-group loan? When we have a funding gap and are unable to take out a commercial loan or when a commercial loan cannot meet our needs, we can enter into an inter-group loans. For example, we now need to credit 500thousand dollars, you need to click My listing, you need to select Trading Company, select one of the companies, such as Automobile 1, fill in the Amount 500, Interest rate 6%, click crediting, now you only need Automobile 1 to agree to get the inter-group loan.As for Automobile 1, if you want to take out a inter-group loan with steel 1, you still need to go to inter-group loans and click on listing trading and select closing to take out an inter-group loan. Otherwise, choose refusing.

# Land bidding

Land bidding depends on our capacity plan and order volume.For example, in the order bidding we can see that this year the appliance 1 company got 12,000 units of appliance orders, now there is a production line, so can this existing production line meet the order demand? We can use the capacity calculation module to simulate the maximum capacity of the existing production line. Place your mouse over the "Labor Bidding" section, click on "Capacity Calculation", select the appropriate company, the production line for the simulation, and fill in the labor input quantity and overtime rate. When Labor input is 400，Capacity after technical renovation is13000units.When Labor input is 350，Capacity after technical renovation is 12000units. We can find that our capacity is optimal when 350 labor is invested.

By filling in different labor input quantities and overtime rates, the maximum capacity of the production line can be simulated to see if a new production line is needed this year. According to the participant manual, the home appliance1 don’t need 100 acres of land for a new production line. But if it is necessary, In the land bidding screen, fill in the amount of land needed and the quote, and click "Submit" to complete the land bid. For example if you need a new production line,fill in Land quantity 100 acres and quotation 800.But if you don’t need, choosing waive .Once all teams have submitted their data, the bid results can be viewed. We also need to note that if the Actual supply of land ( acre ) is 0, then it means that there is no way to build the production line this year, the only possibility is to choose waive.

Teams that have won a bid for land can build new production lines in the "Production Line" module.

# Labor bidding

To carry out production, we also need workers. So now we can bid on the labor element. Clicking on the "Labor Bidding" module, we need to fill in the annual salary and the required number of laborers. The annual salary of a worker depends on the quantity of labor supplied and demanded. The supply of labor depends on the supply curve. In the software, we can simulate the labor supply with different salary and get the labor supply curve in the experiment. We can simulate that the total labor supply is 2250 when the average salary is 12 thousand dollars/person in that year, and 2690 when the average salary is 13 thousand dollars/person

The number of laborers required depends on the expected production for the year. The number of people required for the expected production of a single line multiplied by the number of lines gives the number of laborers required. We can calculate the labor demand by capacity calculation. According to order bidding, we can see the home appliance 1 gets an order of 12000 units. By calculating the production capacity, we can see that there are various ways to achieved this, such as putting in 350 people and no working overtime, or putting in 290 people and pay 8% overtime, so which way is less costly? It is up to you. Adding up the labor demand of all manufacturers, we get the labor demand for the whole market. Now that we know the labor supply curve and the labor demand for the whole market, we can infer the reasonable salary.

Assuming that the average demand for workers per manufacturer is 380 this year, the number of workers demanded in the whole market is 2800. On the labor supply curve, we can infer that the average annual wage is between 130,000 and 140,000 when the demand is 2800. Fill in the corresponding data and click "Submit" to complete the labor bidding. Once all teams have submitted their data, you can view the bid results.

# Production

Once we have the raw materials,land and labor, we can start the production.After clicking production, enter the labor, raw materials and overtime pay, click submit. The production will be completed.

# Check out

In the next year, you can click on performance to see the status of your operations for the previous year,such as the income statement and balance sheet.You can also view macro data by clicking on government and selecting view data, you can view peripheral data、macro data statistics production approach and income approach. Finally, you can click view your score, you can see group ranking, team grading, you can view your specific scores.