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# 2023 Taiwanese Economics Olympiad

Preliminary – Round 2: Application of Economics and Finance

## Question Booklet

**Time** Saturday, March 4, 2023, 13:00 to 16:00 (180 minutes)

**Location** Taipei Fuhsing Private School, **Taipei**  
Mingdao High School, **Taichung**  
Kaohsiung Station No. 1 Venue, **Kaohsiung**

### Instructions

- Fill in your contestant number in the boxes at the top.
- Use only a blue or black pen or pencil.
- **Choose at least one problem from each section. Solve no more than 4 problems out of 6.**
- Do all rough work in the question booklet.

### Information

- This is an individual-based round.
- If you provide solutions for 5 or 6 problems, all of them will be graded, but only 4 will add to your result. If you do not specify which to grade, only the lowest 4 grades will be included in the result.
- If not stated otherwise, consider all goods, services, and assets infinitely divisible.
- Numbers of firms and people may be only integers.
- Convey your ideas clearly. Do not skip important logical transitions in your reasoning.
- Take care of handwriting. If you strike something out, it will not be graded.
- You may leave the examination venue more than 60 minutes after this round begins.

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## SECTION 1

### Problem 1    Corporatization of the Taiwan Railways Administration

The corporatization of the Taiwan Railways Administration (TRA) has been considered a reform aimed at improving the efficiency and safety of the 135-year-old railway operator, particularly in the wake of a series of major accidents in recent years.

However, resistance from the labor union emerged as corporatization became an option for the central government to introduce reforms. Among employees, concerns over job sustainability and remuneration have arisen—doubts about potential cuts in salaries and benefits come under the spotlight when the government railway administration turns a corporation. Some experts rather believe that both effective supervision over safety and reversing the brain drain, rather than immediate corporatization, are key to the TRA's successful reform.

In April 2022, the Taiwan Railway Labor Union initiated a protest named “No Work on Labor Day” due to discontentment with the proposed corporatization plan. Through “legal absence” (refusal to work overtime or on holidays) and collective strikes, almost all trains in Taiwan were not in operation on Labor Day. In December, the union expressed that it had not reached a consensus with the government on how corporatization subsidiary regulations should be introduced and once again threatened to go on strike during the upcoming Lunar New Year. As a result of the “lesson” learned from the Labor Day strike in 2022, discussions have emerged in the government regarding whether “strike notice periods” should be included in law.

#### Questions

- (a) (10 pts) Discuss impacts on social inequality in the wake of the corporatization of the TRA.
- (b) (10 pts) Discuss impacts on the labor market and the service market of the railway industry respectively if the government enacts “strike notice periods” in law.
- (c) (10 pts) Discuss whether corporatization is a solution to safety problems of railway operations in Taiwan.



## Problem 2    Housing systems in Taiwan and Singapore

In Taiwan, most housing is constructed by private developers who purchase land and build homes. After construction is completed, land and houses are sold to people, who then receive ownership guaranteed by the government. These houses can be permanently lived in and usually involve only a few restrictions on further market actions. Moreover, it is relatively easy to obtain a housing loan from banks since banks hold the creditor rights.

In Singapore, the government body of the Housing and Development Board (HDB) is responsible for planning, constructing, pricing, selling, and managing “HDB flats,” i.e., public housing in Singapore. Only Singaporean citizens who meet certain requirements are allowed to purchase new HDB flats—married couples are given priority for HDB flats, and singles over the age of 35 are eligible to buy them. For non-citizens but permanent residents, they can only purchase secondhand resale flats on the market, which are typically more expensive and older. HDB flats are only available for a 99-year lease. At the end of a lease, HDB flats are returned to the government. Furthermore, HDB flat owners are required to have real residence for at least five years before selling their homes.

### Questions

- (a) (10 pts) Compare the differences in the housing systems of the two countries in terms of prices and quality of housing on the market.
- (b) (10 pts) Discuss possible impacts on the housing market if the Taiwanese government aims to achieve housing justice and thus imposes taxes on the resale of secondhand houses.
- (c) (10 pts) Analyze the feasibility of implementing Singapore’s housing system in Taiwan.



## SECTION 2

### Problem 3 Involution among Chinese students

The term “involution” (內卷 or 内卷) has become popular in China in recent years. Although originally a specialized term in multiple disciplines, the term also applies to schoolers who invest too much time and energy in academic pursuits. For individuals, after pushing to a limit, learning efficiency and results decrease like marginal utility. For a group, in the case of limited quality education resources, vicious competition ensnares students, leaving only endless stalemates, where learning effectiveness or resources acquisition shows no real improvement.

To ease pressure on students and prevent them from being bogged down in an endless cycle of stress and competition, the Chinese government introduced the “double reduction policy” in July 2021. This policy aims to reduce the excessive burden of homework and off-campus training, limit extracurricular tutoring for students below the secondary school level, and require all private education training companies to transform into non-profit organizations. Furthermore, it strictly prohibits off-campus training institutions from going public and seeking financing.

In December 2021, the Chinese Ministry of Education held a press conference on the effect of double reduction, stating that after its implementation, students’ homework workload had been controlled. Both the numbers of offline and online off-campus training institutions plunged by around 85%. Some remaining training institutions have turned non-profit and followed government-guided pricing. As of January 2022, the average fee for off-campus training institutions in China dropped by 40%.

#### Questions

- (a) (10 pts) Explain involution among students in China with game theory.
- (b) (10 pts) Indicate and explain one positive and one negative impact of the double reduction policy on China’s tutoring industry market.
- (c) (10 pts) Discuss the effectiveness of China’s double reduction policy.



## Problem 4    Unconditional basic income

Unconditional Basic Income (UBI)—a social welfare payment given regularly to members of a society without qualification requirements—has gained increasing attention in public in recent years. The idea behind UBI is to provide basic financial support to everyone to ensure that they can meet their basic living conditions, including food, housing, education, healthcare, and public utilities.

The main difference between UBI and other forms of social welfare is that UBI does not require individuals to work or meet specific conditions to receive payment. This means that people who are unable to work or have difficulty finding employment, such as those with disabilities or caregivers, can also receive government funds. UBI also provides a sense of financial security and independence for individuals, enabling them to pursue other interests, such as education or entrepreneurial ventures that may not be financially feasible without the payment.

Despite the potential benefits of UBI, there are concerns about its implementation and feasibility. One of the main challenges of implementing UBI is its fiscal sources. Since UBI is a universal and regular payment, it requires a significant amount of funding, which may not be feasible for governments, particularly in developing countries. Another concern is that UBI may disincentivize individuals from working, which could have adverse effects on the economy.

### Questions

- (a) (10 pts) Discuss possible impacts of UBI on the inflation rate and the unemployment rate.
- (b) (10 pts) The main source of funding for UBI is taxation. Indicate ways to adjust the tax system for the funding of UBI.
- (c) (10 pts) Discuss and explain whether you agree to the introduction of UBI.



## SECTION 3

### Problem 5 Pricing the sun

Sunshine is the only supplier of solar panels in the town of Teo. The company has identified that the demand for solar panels for Teoish residents is  $D = 200 - p$ , and the production cost per unit of solar panels is \$20. In order to increase profits, the company has decided to outsource assistance in setting product prices; however, for each price set, it has to pay a consulting fee of \$1,500.

#### Questions

- (a) (5 pts) How should Sunshine set prices for solar panels if the company wants to adopt a single pricing strategy?
- (b) (10 pts) What are the two prices of solar panels if Sunshine wants to divide potential customers into two groups based on their willingness to pay and set different prices for each group?
- (c) (10 pts) What are the three prices of solar panels if Sunshine wants to divide potential customers into three groups based on their willingness to pay and set different prices for each group?
- (d) (5 pts) Why is first-degree price discrimination not very common in reality?



## Problem 6 Managing traffic

Suppose there are 1,000 residents in the city of Autopolis, each of whom has a car. For them:

- if the total number of vehicles on the roads is no more than 200, the utility of driving is 250;
- if the total number of cars is  $200 + n$ , the utility of driving is  $250 - \frac{n(n+1)}{200}$ ;
- the utility of taking public transportation is 50;
- when people receive (pay)  $\$p$ , their utility will increase (decrease) by  $p$ .

### Questions

- (a) (5 pts) If the government does not impose any restrictions on driving, how many people will drive when the equilibrium is reached?
- (b) (10 pts) If the government wants to maximize the total utility of all residents through vehicle control, how many people should the government allow to drive?
- (c) (10 pts) If the government wants to charge road usage fees to drivers and use all of the money to subsidize public transportation in order to achieve the same number of drivers as in question (b), what price should the road usage fee be set at?
- (d) (5 pts) Which of the two methods mentioned above is more likely to be followed by the people? Why?

**END OF QUESTIONS**