

經濟學原理一課堂實驗(六)：污染排放權市場(Tradable Permit Market)

Principles of Economics I - Classroom Experiment (6): Tradable Permit Market

2-3 人一組參與交易實驗，每組同學代表一家工廠，分屬兩個不同市場副本，每個市場有二十家工廠。每組同學會拿到一張有數字的撲克牌(J=11, Q=12, K=13, 但 A=1, 而大鬼=15, 小鬼=14), 牌面數字 **乘以十再加上一** 代表您減少一單位碳排放所需花費的減碳成本(元)。請收好這張牌使得別人都沒辦法看到牌上的花色數字。Form groups of 2-3, each representing a factory, to participate in two markets of 20 groups. In each round, each group will receive a card (J=11, Q=12, K=13, A=1, but Red Joker = 15, Black Joker = 14). The number of your card **multiplied by 10 and plus 1** is your cost for reducing one ton of carbon emission. For example, if your card is 9, your cost is $9 \times 10 + 1 = 91$. Please keep your card as a secret.

實驗者扮演政府的角色，發放碳排放的污染排放權執照。發放方式有隨機發放、通通有獎、政府拍賣等等，請仔細聽每回合的說明。在發放過程取得執照的廠商會附贈工研院開發的特殊減碳技術，使得您的減碳成本 **減少二**，因此，獲得政府發放的廠商，其減碳成本為牌面數字 **乘以十再減去一**。

The experimenter represents the government to issue permits for carbon emission. Permits are distributed either randomly, to all, or through an auction (announced at the beginning of each round). Those who receive permits initially gain special technology that **lowers your cost by \$2**, so their pollution reduction cost becomes the number of your card **multiplied by 10 and minus 1**: If your card is 9, your cost is $9 \times 10 - 1 = 89$.

發放完成後，實驗者會開放污染權市場讓各工廠有機會買賣污染排放權執照。交易方式如下：After receiving the permits, firms can trade their permits using the following rules:

自由談判(Free Form Bargaining)：你們有五分鐘的時間自由個別談判，談判時不能強迫，申報之後亦不能反悔。如果兩組達成協議，就請帶著撲克牌和紀錄表到前面來申報交易。實驗者會在黑板上寫下並宣告交易價格。You have five minutes to bargain with each other. Bargaining is voluntary, but you cannot reverse a trade once it is reported. After reaching a deal, please come to the front with your record sheet and card to report your trade. All prices will be announced and recorded on the blackboard.

看得見的手(The Visible Hand)：實驗者充當交易專員，聽取買賣雙方舉手喊價：「X元買進」或「Y元賣出」，並紀錄在黑板上。如果有買家或賣家願意接受另一方的喊價，則喊「成交」。成交雙方則帶著撲克牌和紀錄表到前面來申報交易。每次成交後再重新開始下一單位的喊價。The experimenter acts as the specialist taking orders from both sides (“buy \$X” or “sell \$Y”) and recording them on the blackboard. If you want to accept the other side’s standing offer, simply shout “take” and come to the front with your record sheet and card to report your trade.

交易結束後，最後擁有執照的工廠可以排放一單位的廢水，其他工廠則必須付出防治一單位廢水的減廢成本(牌面數字 **乘以十再加上或減去一**)。因此，在發放過程中得到執照的工廠可以選擇把執照留下來自己使用(不負擔減廢成本)，或者是把執照出售牟利，自己另外付出減廢成本。其他廠商則必須在買下執照與付出減廢成本之間抉擇。After the market closes, factories with permits are allowed to emit pollution (no cost), other factories pay the pollution reduction cost (**your number multiplied by 10 and plus/minus 1**). Hence, factories with permits can keep their permits (and save the reduction cost), or sell their permits for profit (and pay the reduction cost). Other firms choose to buy permits or pay the cost.

特別規則：當工廠合併為一家公司時，同一家公司的同學必須組成董事會做出共同決定，但該公司轄下每間工廠的減碳成本仍如每位同學牌面數字所述。董事會必須決定哪些工廠使用排放執照，哪些工廠付出減碳成本，但是公司的總或付出由每位同學平均分攤。**Special rule**: When several factories form a large firm, students from all factories jointly form the Board of Directors to make decisions collectively. Each factory has the same pollution reduction cost as before, and the Board decides which factory should use the permits and which pay the reduction cost. However, total profit of the firm is evenly shared by all factories.

利潤記錄與結算：每回合結束後，請至前面由實驗者核對並繳回撲克牌。請在記錄表上填入牌面數字、減碳成本和交易價格(如果有成交)，並加上實驗者致贈的 130 元，就是您該回合的利潤。最後的

總利潤除以 100 則是您所獲得的分數。分數越高，成績越高。Profit Calculation: After each round, please record your number, reduction cost and transaction price. Your profit for this round is 130 minus your pollution reduction cost. Total profit divided by 100 will be your grade for this experiment.

污染排放權市場實驗紀錄表 Record Sheet for “Tradable Permit Market”

Name

Major/Year

Student ID

姓名：_____ 系級：_____ 學號：_____

回合 Round	執照發放方式 Distribution of Permits	牌面 數字 Number on Card	我的減廢 成本 Reduction Cost	買賣執照 的價格 Price of Permit	本回合 利潤 Profit of Round	備註 Memo
1	隨機發放(自由談判) Random Distribution					實驗者致贈 130 元 \$130 is given
2	隨機發放(自由談判) Random Distribution					實驗者致贈 130 元 \$130 is given
3	隨機發放(看得見的手) Random Distribution					實驗者致贈 130 元 \$130 is given
4	通通有獎：工廠有排 放廢水的權利 Factories Have Pollution Rights					實驗者致贈 130 元 \$130 is given
5	政府拍賣：人民有不 受污染的權利 Auction - Residents have Pollution Rights					實驗者致贈 130 元 \$130 is given
6	政府拍賣：所有工廠 併為兩家公司 Auction - Factories form two large firms					實驗者致贈 130 元 \$130 is given
7	政府拍賣：所有工廠 併為一家公司 Auction - Factories form one large firm					實驗者致贈 130 元 \$130 is given

Answer the following questions 回答下列問題：

1. How does allocation of property rights affect bidding and equilibrium prices? 產權歸屬如何影響喊價情形與價格？
2. How does mergers affect bidding and equilibrium prices? What about mergers? 廠商合併如何影響喊價情形與價格？