

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

三人一組參與交易實驗，每組代表一家工廠，分屬兩個不同市場副本(每個市場副本有二十家工廠)。每回合各組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」代表您減少一噸碳排放所需花費的減碳成本(元)。因此如果你拿到黑桃九, 你的減碳成本是 $9 \times 10 + 1 = 91$ 元。請將牌面花色數字保密。Form groups of 3 to act as factories in 1 of 2 markets (20 groups each). In each round, each group will receive a card (A=1, J=11, Q=12, K=13, but Small Joker = 14, Big Joker = 15). The number of your card **multiplied by 10 “and plus 1”** is your cost for reducing one ton of carbon emission: 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, 請仔細聽每回合說明。政府發放執照時會附贈工研院開發的特殊減碳技術, 使得直接從政府取得執照的廠商減碳成本減少二, 使得他們的減碳成本為牌面數字乘以十「再減去一」。因此如果你拿到紅心九, 你的減碳成本是 $9 \times 10 - 1 = 89$ 元。The experimenter acts as the government and issues tradable 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 from the government gain special technology to **lowers the cost by \$2**, so the pollution reduction cost becomes the number of your card **multiplied by 10 “and minus 1”**: If your card is 9, the cost is $9 \times 10 - 1 = 89$.

執照發放後, 實驗者會開放碳排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 distributing permits, firms can buy or sell permits on the tradable permit market with the following rules:

自由談判(Free Form Bargaining): 你們有十分鐘的時間自由個別談判, 談判時不能強迫、不能給對方看你的牌面數字, 申報之後亦不能反悔。如果兩組達成協議, 請一起到前面來跟實驗者申報交易。You have ten minutes to bargain. Bargaining is voluntary, but you cannot (1) Coerce, (2) Show your card, or (3) Reverse a trade once reported. If you reach a deal, please come to the front together to report the trade.

看得見的手(The Visible Hand): 實驗者擔任交易專員聽取買賣雙方舉手喊價(「X元買進」或「Y元賣出」)紀錄在黑板上。如果有買家或賣家願意接受另一方的最新喊價, 則喊「成交」。成交後會取消剩下喊價, 再重新開始新一輪喊價。The experimenter acts as specialist taking orders (raise your hand and call, “buy \$X” or “sell \$Y.”) and recording them on the blackboard. To accept the other side’s standing order, simply shout, “Take.” Then, remaining orders are cancelled and a new round of bidding will begin.

成交雙方請帶著撲克牌和紀錄表到前面來申報交易; 實驗者會在黑板上記錄交易價格。Please **come to the front with your record sheet and card** to report the trade; transactions are recorded on the blackboard.

碳排放市場休市後, 沒有持有執照的工廠必須負擔減少一噸碳排放的減碳成本(牌面數字乘以十「再加上/減去一」), 擁有執照的工廠則不必付出減碳成本。因此, 獲政府發放執照的工廠可以選擇把執照留下來自己使用(不負擔減碳成本), 或把執照出售牟利、自己另外付出減碳成本。其他廠商則必須在購買執照與負擔減碳成本之間抉擇。After the market closes, factories with permits can emit one ton of carbon at no cost, the other factories pay the pollution reduction cost (**your number multiplied by 10 “and plus/minus 1”**). Hence, factories starting with permits can either keep them (pay no reduction cost), or sell their permits for a profit (pay the cost). The other firms choose to buy permits or pay the cost.

利潤記錄與結算: 如果您最後沒有成交或放棄交易, 請到前面繳回撲克牌。請在記錄表上填入牌面數字, 並計算減碳成本。您該回合的利潤是起始資金 150 元減去減碳成本(如果未持有執照), 有成交的話, 要再減去購買執照所付出的價格(或加上賣出執照所獲得的價金)。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: If you eventually did not trade (or want to give up), please come to the front and return your card. Please record your number and calculate the reduction cost. Your profit is your endowment (=150) minus pollution reduction cost (if hold no permit), and, if trade, minus/add the price you paid/earned. Total profit divided by 100 will be your grade for this experiment.

特別規則：當不同工廠合併為一家公司時，對應的各組將一起組成董事會做決定，但公司轄下每間工廠的減碳成本仍取決於各組牌面數字。如果執照不敷使用，董事會必須決定哪些工廠使用排放執照，哪些工廠負擔減碳成本，但是公司獲利/成本由各組平均分攤。**Special rule:** When factories merge into a large firm, corresponding groups merge to form the Board of Directors and make decisions collectively. Each factory has a pollution reduction cost as before, and the Board decides which factory should use the permits and which pay the reduction cost. Total profit is evenly shared across all groups.

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 | 起始 資金 Endow- ment | 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 | 150 | | | | | |
| 2 | 隨機發放(看得見的手) Random Distribution | 150 | | | | | |
| 3 | 隨機發放(看得見的手) Random Distribution | 150 | | | | | (有必要才進行) (Optional) |
| 4 | 通通有獎：工廠有 碳排放的權利 Buy-back: Factories Have Pollution Rights | 150 | | | | | |
| 5 | 政府拍賣：人民有不 受污染的權利 Auction - Residents Have Pollution Rights | 150 | | | | | |
| 6 | 政府拍賣：所有工廠 併為兩家公司 Auction - Factories form two large firms | 150 | | | | | (有時間才進行) (Optional) |
| 7 | 政府拍賣：所有工廠 併為一家公司 Auction - Factories form one large firm | 150 | | | | | (有時間才進行) (Optional) |

Answer the following questions 回答下列問題：

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