

實驗經濟學專題

勞動經濟學實驗

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四人一組，可跟之前的組員不同。

# 勞動經濟學

- 研究子領域包括但不限於：

勞動供給：包括了婚姻市場、家戶分工、犯罪、教育投資

勞動需求：包括了勞動力流動、薪資設定、分租模式

- 今天集中講「誘因如何影響勞動供給」

# 薪資制度如何影響勞動力供給？

- 研究問題：如果一個廠商將員工的薪資從「時薪制」改為「論件計酬」，勞動供給會如何變化？這是一個比較好的制度嗎？
  - 為什麼這個研究問題是重要的？

# 薪資制度如何影響勞動力供給？

- 實證上：比較各公司不同薪資制度下的勞動力供給、或是看一公司從時薪制度改為論件報酬後，勞動力供給有何改變。
  - 這樣做有什麼缺點？
  - 有什麼樣的實驗可以做？請說明「確切場域」和「實驗設計」

# 一篇探討金錢誘因的田野實驗

實驗：制度的改變是「外生」且是「隨機」的。

**Shearer, B.S., 2004. Piece rates, fixed wages and incentives: evidence from a field experiment. Review of Economic Studies 71, 513–534.**

樣本：120個樣本數量。樣本數來自 9位隨機挑選的男性，在同一區域兩機制下的種樹量，每一機制至少有兩日資料。

結果：piece rate 比 fixed rate 多了 20%的數量。

TABLE 1

*Summary statistics: daily productivity, earnings and unit costs: experimental sample*

	Observations	Trees Mean	S.D.	Earnings Mean	Unit costs Mean
Full sample	120	1146.67	278.54	223.78	0.20
Piece rate	60	1256	325.27	230.85	0.186
Fixed wages	60	1037.33	162.38	216.70	0.214

這篇論文能說服你嗎？有哪些缺點？

- 樣本數目不足（甚至有一個人中途退出）
- 每一區域的 **piece rate** 都不太一樣
- 工作表現有可能會影響下期得到工作的機會
- 該公司原本是採用「**piece rate**」，但突然改成「**fixed**」，有些員工可能會覺得有點怪，因而影響他們的工作表現



田野實驗的問題：受限於場域和公司規模，研究方法和研究人數都有限制。我們在實驗室還可以怎麼做？

# 實驗室實驗

- **Real effort** : 用血汗用「勞力」來賺錢，可以自行休息
- **Chosen effort** : 給一個選單，選單中有不同 **effort level** 各自的「成本」，請受試者點選「**effort level**」

Table 1  
Effort (work) levels and related direct costs

Work level (%)	0	10	20	30	40	50	60	70	80	90	100
Costs (ECU)	0	0	1	2	4	6	8	10	12	15	18

# 有哪些REAL-EFFORT GAME?

Table 19.1 A typography of common real-effort tasks (1997–2016)

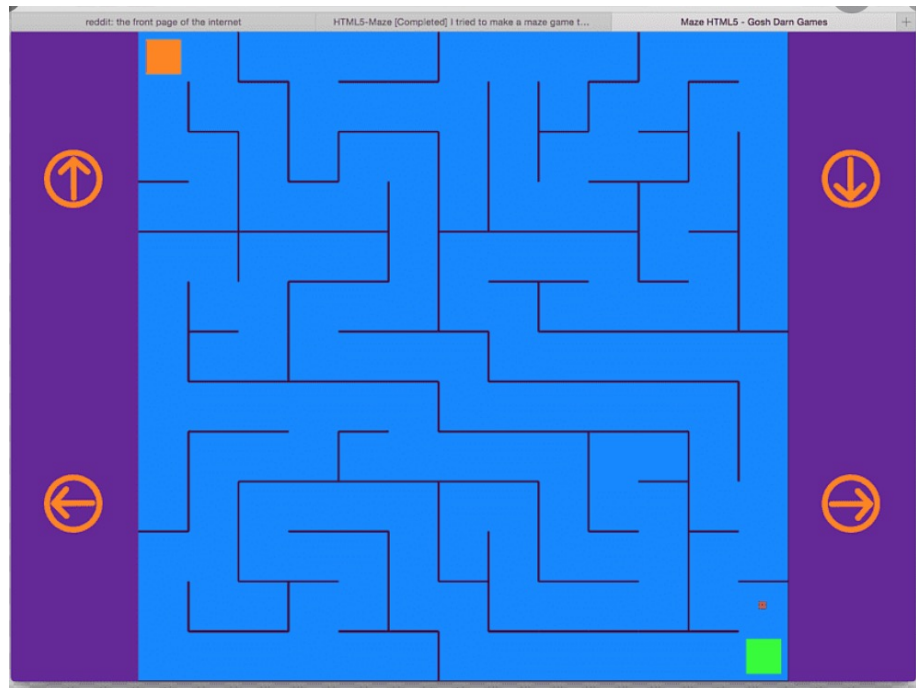
(1) Task	(2) Canonical Example	(3) Frequency in Our Sample (Overall)	(4) Frequency (1997–2012)	(5) Frequency (2013–16)	(6) Is Production Typically Useful?	(7) Is Production Intrinsically Interesting?
Arithmetic	Niederle and Vesterlund (2007)	19 (21%)	23%	20%	No	No
Clerical	Linardi and McConnell (2011)	14 (15%)	15%	15%	Yes	Yes
Computer	Gill and Prowse (2012)	12 (13%)	7%	18%	No	No
Counting	Abeler et al. (2011)	10 (11%)	3%	18%	No	No
Decoding	Sillamaa (1999a)	10 (11%)	8%	14%	No	No
Puzzle	Charness and Villeval (2009)	18 (19%)	31%	10%	No	Yes
Typing	Greiner, Ockenfels and Werner (2011)	6 (7%)	12%	2%	No	No
Other	Fahr and Irlenbusch (2000)	3 (3%)	3%	3%	No	Depends

*Note:* List of the 92 studies included in the table: Abeler et al. (2011); Alm and Cherry (2012); Ariely (2008); Augenblick, Niederle and Sprenger, 2015; Azar (2015); Barr, Miller and Ubeda (2016); Bartling et al. (2009); Belot and Schröder (2013); Berger and Pope (2011); Bhui (2018); Blumkin et al. (2012); Bruggen and Strobel (2007); Cadsby, Servátka and Song (2013); Calsamiglia, Franke and Rey-Biel (2013); Carpenter and Gong (2016); Carpenter, Matthews and Schirm (2010); Cason, Masters and Sheremata (2010); Charness and Villeval (2009); Charness, Masclet and Villeval (2013); Charness et al. (2016); Chaudhry and Klinowski (2016); Corgnet (2012); Corgnet, Hernán-González and Rassenti (2011, 2015); Corgnet Hernán-González and Schniter (2015); Dasgupta and Mani (2015); Dasgupta et al. (2015); DellaVigna et al. (2016); Dickinson (1999); Dickinson and Villeval (2012); Dohmen and Falk (2011); Douoguih (2011); Dutcher (2012); Dutcher, Salmon and Saral (2016); Ellis et al. (2016); Eriksson, Poulsen and Villeval (2009); Erkal, Gangadharan and Nikiforakis (2011); Fahr and Irlenbusch (2000); Falk and Ichino (2006); Fan and Gómez-Miñambres (2016); Fehr (2018); Gaechter, Huang and Sefton (2016); Gerhards and Gravert (2015); Gill and Prowse (2012); Gneezy and Rustichini (2000); Gneezy, Niederle and Rustichini (2003); Goldstein and Hogarth (1997); Greiner et al. (2011); Gupta, Poulsen and Villeval (2013); Hargreaves Heap, Ramalingam and Arjona (2016); Healy and Pate (2011); Hennig-Schmidt, Rockenbach and Sadrieh (2010); Heyman and Ariely (2004); Hogarth and Villeval (2014); Huang and Murad (2016); Imas (2014); Ivanova-Sterzel and Kübler (2011); Jones and Linardi (2014); Kessler and Norton (2016); Kidd, Nicholas and Rai (2013); Koch and Nafziger (2016); Konow (2000); Kraut et al. (2011); Kuhn and Villeval (2013); Lefgren, Sims and Stoddard (2016); Linardi and McConnell (2011); Niederle and Vesterlund (2007); Noussair and Stoop (2014); Petrie and Segal (2015); Pikulina, Renneboog and Tobler (2014, 2018); Ravid, Malul and Zultan (2017); Rosaz, Slonim and Villeval (2016); Rubín, Samek and Sheremeta (2016); Rutström and Williams (2000); Shurchkov (2012); Sillamaa (1999a, 1999b); Takahashi, Shen and Ogawa (2016); Van Dijk et al. (2001); Weber and Schram (2016); Woziak, Harbaugh and Mayr (2014).

# SLIDER TASKS

The screenshot shows a digital task interface for a slider-based puzzle. At the top left, it says "Runde 1 von 1" (Round 1 of 1). At the top right, it shows "Verbleibende Zeit [sec]: 54" (Remaining time [sec]: 54). The main instruction reads: "Die aktuelle Anzahl korrekt positionierter Schieberegler beträgt: 24" (The current number of correctly positioned sliders is: 24). The task area contains a 10x3 grid of sliders. Each slider has a numerical value displayed to its right. The values are: Row 1: 50, 50, 0; Row 2: 50, 50, 0; Row 3: 50, 50, 0; Row 4: 50, 50, 0; Row 5: 50, 50, 0; Row 6: 50, 50, 0; Row 7: 50, 0, 0; Row 8: 50, 0, 0; Row 9: 50, 0, 0; Row 10: 50, 0, 0. A red "Fertig" (Done) button is located at the bottom right of the grid. At the bottom center, there is a red "AUSZEIT" (Time Out) button.

# MAZES



# DECODING

範例對照表：

●	✓	×	φ	※
2	9	C	1	B

範例題目：

φ ✓ ✓ φ ● ✓ ✓ ※ \*

您的回答 \_\_\_\_\_

對照上方代碼表，應在「您的回答」處依序填上：1991299B  
答案需完全正確，才能獲得分數；答錯一格以上，便不予計分

# 怎麼選？

測驗表現跟受試者「特質」或「受試者能力」無關

→ 但其實只要隨機分布，應該就沒關係

# REAL-EFFORT OR CHOSEN EFFORT?

有差嗎？

其實很難比較，因為我們根本不知道 **real-effort game** 的 **cost function**



# 一篇研究金錢誘因的論文

- 能改變行為的方式很多（如：金錢誘因、時間偏好、厭惡損失）
- 由於不同論文使用不同衡量方式、樣本也來自不同來源，使這些方式的相對效力難以比較
- DellaVigna, S., & Pope, D. (2018). What motivates effort? Evidence and expert forecasts. *The Review of Economic Studies*, 85(2), 1029-1069.
- 這篇論文使用簡單的「衡量方式」，比較各種**treatment**差異。
- 今天集中介紹金錢誘因。

# 樣本來源

- 以學生為主的實驗室實驗，「人數」也會有限制。這篇論文進行「網路實驗」

amazonmturk Requester [Create](#) [Manage](#) [Developer](#) Josie | [My Account](#) | [Sign Out](#) | [Help](#)

[New Project](#) [New Batch with an Existing Project](#)

Select a customizable template to start a new project

- Survey
- Survey Link**
- Survey
- Vision
  - Image Classification
  - Bounding Box
  - Semantic Segmentation
  - Instance Segmentation
  - Polygon
  - Keypoint
  - Image Contains
  - Video Classification
  - Moderation of an Image
  - Image Tagging
  - Image Summarization
- Language
  - Sentiment Analysis
  - Intent Detection
  - Collect Utterance
  - Emotion Detection
  - Semantic Similarity
  - Audio Transcription
  - Conversation Relevance
  - Document Classification

**Survey Link Instructions** (Click to expand)

**Survey link:**

**Provide the survey code here:**

You must ACCEPT the HIT before you can submit the results.

[Create Project](#)

**Project Name:**

This name is not displayed to Workers.

## Describe your survey to Workers

**Title**

Describe the survey to Workers. Be as specific as possible, e.g. "answer a survey about movies", instead of "short survey", so Workers know what to expect.

**Description**

Give more detail about this survey. This gives Workers a bit more information before they decide to view your survey.

**Keywords**

Provide keywords that will help Workers search for your tasks.

## Setting up your survey

**Reward per response**

This is how much a Worker will be paid for completing your survey. Consider how long it will take a Worker to complete your survey.

**Number of respondents**

How many unique Workers do you want to complete your survey?

**Time allotted per Worker**

Maximum time a Worker has to complete the survey. Be generous so that Workers are not rushed.

**Survey expires in**

Maximum time your survey will be available to Workers on Mechanical Turk.

**Auto-approve and pay Workers in**

This is the amount of time you have to reject a Worker's assignment after they submit the assignment.

## Worker requirements

**Require that Workers be Masters to do your tasks** ([Who are Mechanical Turk Masters?](#))

Yes  No

**Specify any additional qualifications Workers must meet to work on your tasks:**

-- Select --



Remove

**(+) Add another criterion**

(up to 4 more)

(Premium Qualifications incur additional fees, see [Pricing Details](#) to learn more)

**Project contains adult content** ([See details](#))

This project may contain potentially explicit or offensive content, for example, nudity.

HIT Approval Rate (%) for all Requesters' HITS

Location

Number of HITS Approved

Premium Qualifications

Age 18-25

Age 25-30

Age 30-35

Age 35-45

Age 45-55

Age 55 or older

Blogger

Borrower - Auto Loans

Borrower - Business Loan

Borrower - Credit Cards

Borrower - Home Mortgage

Borrower - Personal Loan

Borrower - Student Loan

Car Owner

Current Residence - Owned

Current Residence - Rented

Daily Internet Usage - 1 to 4 hours

Daily Internet Usage - 5 to 7 hours

Daily Internet Usage - 7+ hours

Employment Industry - Banking & Financial Services

Employment Industry - Education

Employment Industry - Food & Beverage

Employment Industry - Government & Non-Profit

Employment Industry - Healthcare

Employment Industry - Manufacturing

Employment Industry - Media & Entertainment

Employment Industry - Retail, Wholesale & Distribution

Employment Industry - Software & IT Services

Employment Sector - Non-Profit

Employment Status - Full time (35+ hours per week)

Employment Status - Part time (1-34 hours per week)

Employment Status - Unemployed

Exercise - Every Day

Exercise - Four Plus Times a Week

Exercise - Not at All

Exercise - Once a Week

Online Purchase - Automotive Products

Online Purchase - Baby & Kids

Online Purchase - Books

Online Purchase - Clothing & Shoes

Online Purchase - Electronics & Computers

Online Purchase - Groceries & Food

Online Purchase - Handmade Products

Online Purchase - Health & Beauty

Online Purchase - Home & Garden

Online Purchase - Jewelry

Online Purchase - Movies

Online Purchase - Music

Online Purchase - Sports & Outdoor Equipment

Online Purchase - Toys

Online Purchase - Videogames

Parenthood Status

Pinterest Account Holder

Primary Internet Device - Desktop

Primary Internet Device - Laptop

Primary Internet Device - Smartphone or Tablet

Primary Mobile Device - Android

Primary Mobile Device - iPhone

Primary News Source - Online News (News Websites, News Apps)

Primary News Source - Podcasts

Primary News Source - Print (Newspapers & Periodicals)

Primary News Source - Radio (AM/FM, Internet, Satellite)

Primary News Source - Social Media

Primary News Source - TV (Late Night Comedy, Other)

Primary News Source - TV (Local/Cable News Broadcast)

Primary News Source - Word of Mouth

Reddit Account Holder

Single Family Home Resident

Smoker

Tablet Owner

Tumblr Account Holder

Twitter Account Holder

US Bachelor's Degree

US Graduate Degree

US High School Graduate

US Political Affiliation - Conservative

Online Purchase - Music

Online Purchase - Sports & Outdoor Equipment

Online Purchase - Toys

Online Purchase - Videogames

Parenthood Status

Pinterest Account Holder

Primary Internet Device - Desktop

Primary Internet Device - Laptop

Primary Internet Device - Smartphone or Tablet

Primary Mobile Device - Android

Primary Mobile Device - iPhone

Primary News Source - Online News (News Websites, News Apps)

Primary News Source - Podcasts

Primary News Source - Print (Newspapers & Periodicals)

Primary News Source - Radio (AM/FM, Internet, Satellite)

Primary News Source - Social Media

Primary News Source - TV (Late Night Comedy, Other)

Primary News Source - TV (Local/Cable News Broadcast)

Primary News Source - Word of Mouth

Reddit Account Holder

Single Family Home Resident

Smoker

Tablet Owner

Tumblr Account Holder

Twitter Account Holder

US Bachelor's Degree

US Graduate Degree

US High School Graduate

US Political Affiliation - Conservative

US Political Affiliation - Liberal

Vacation Frequency - Every Few Years

Vacation Frequency - Every Month

Vacation Frequency - Every Quarter

Vacation Frequency - Every Year

Vacation Frequency - Never

Voted in 2012 US Presidential Election

Voted in 2016 US Presidential Election

YouTube Account Holder

Qualification Types you have created

microfinance

Survey Question 2020

# 遊戲設計

交替按鍵盤上的「a」及「b」，每按「a」再按「b」可得 1 分，共進行 10 分鐘。

- **real effort game**
- **effort -> 分數**
- 無意義的遊戲，但可比擬文書工作的重複性及疲勞性，且易於解釋給受試者

# 實驗設計

**Dependent Variable : effort ( 這裡用分數來衡量 )**

**Independent Variable : 不同 treatment 給予不同 condition 、 incentive**

**受試者描述 : 正當的受試者共 9861 位 ( 男女比、年紀比相當於美國網路用戶 ) 並平均分配至 18 個 treatment , 每個 treatment 皆約 550 人**

**-> 非正當 : 得到超過 4000 分、停止並重新開始實驗、未在 30 分鐘內完成實驗**

**報酬方式 : 所有參加者都有參加費 1 dollars , 並按照 treatment 給予額外報酬 if any**



# 實驗設計

共 18 個 treatment ( 包含金錢誘因、心理學誘導 及 行為因素 ) 且為 **between-subject experiment**

treatment 1 ( 控制組 ) : 「您的分數不會影響您的報酬」

treatment 2 : 「每得 100 分, 您將額外獲得 1 cent」

treatment 3 : 「每得 100 分, 您將額外獲得 10 cent」

treatment 4 : 「每得 100 分, 您將額外獲得 4 cent」

piece rate ( 按件計  
酬 )

treatment 5 : 「每得 1000 分, 您將額外獲得 1 cent」

pay enough or  
don't pay

treatment 6 : 「每得 100 分, 我們將會捐出 1 cent 給慈善機構」

treatment 7 : 「每得 100 分, 我們將會捐出 10 cent 給慈善機構」

慈善行為

treatment 8 : 「為了感謝你參與本實驗, 你將額外獲得 40 cent。您的分數不會影響您的報酬」

「禮物」

# 實驗設計

treatment 9 : 「每得 100 分，您將額外獲得 1 cent。這個額外報酬將在 2 週後發放」

treatment 10 : 「每得 100 分，您將額外獲得 1 cent。這個額外報酬將在 4 週後發放」

時間偏  
好

treatment 11 : 「如果您得到 2000 分以上，您將額外獲得 40 cent」

treatment 12 : 「您將額外獲得 40 cent；然而，除非您得到 2000 分以上，不然您將損失這個額外報酬」

treatment 13 : 「如果您得到 2000 分以上，您將額外獲得 80 cent」

厭惡損  
失

treatment 14 : 「您將有 1% 的機會，每得 100 分，獲得額外 1 dollar」

treatment 15 : 「您將有 50% 的機會，每得 100 分，獲得額外 2 cent」

probability weighting

treatment 16 : 「您的分數不會影響您的報酬。先前的實驗中，許多受試者皆得到 2000 分以上」

treatment 17 : 「您的分數不會影響您的報酬。實驗結束後，我們會公布您相對於先前受試者的表現」

treatment 18 : 「您的分數不會影響您的報酬。我們想了解一個人選擇按鍵盤的速度能多快，因此請盡您最大努力」

心理學誘導 ( 完全不牽涉金錢  
誘因 )

# 實驗流程

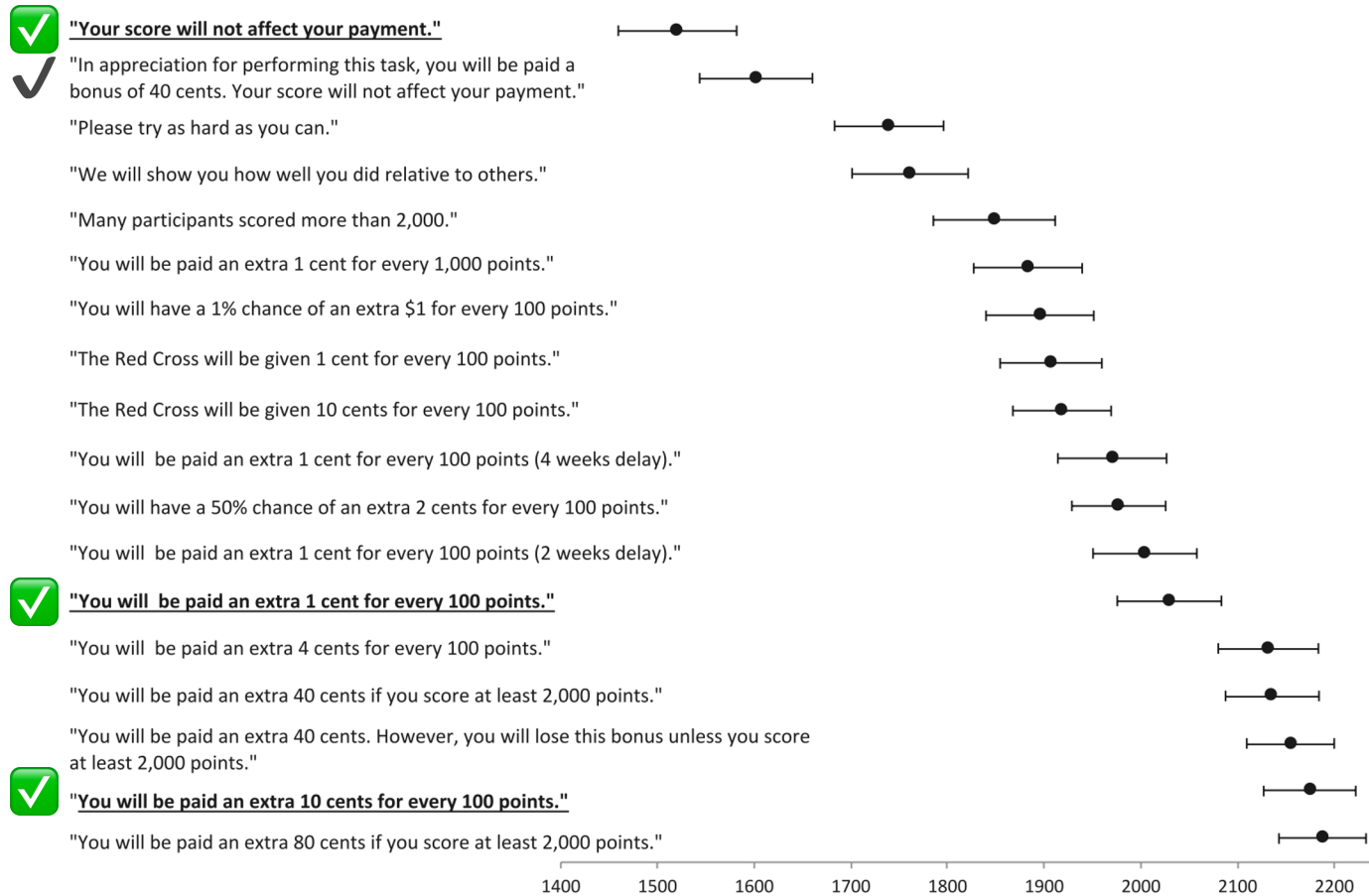
- simple task performance 的學術研究
- 可獲得 1 dollar 參加費

- 實驗說明
- 其所在 treatment 的說明
- 練習階段

- 正式實驗：
- 10 分鐘倒數計時
  - 當前分數
  - 當前報酬
  - 額外報酬獲得方式 if any

# 實驗結果

Button Presses by Treatment (From Least to Most Effective) and Confidence Intervals



# 結果：金錢誘因 (PIECE RATE) 非常有效

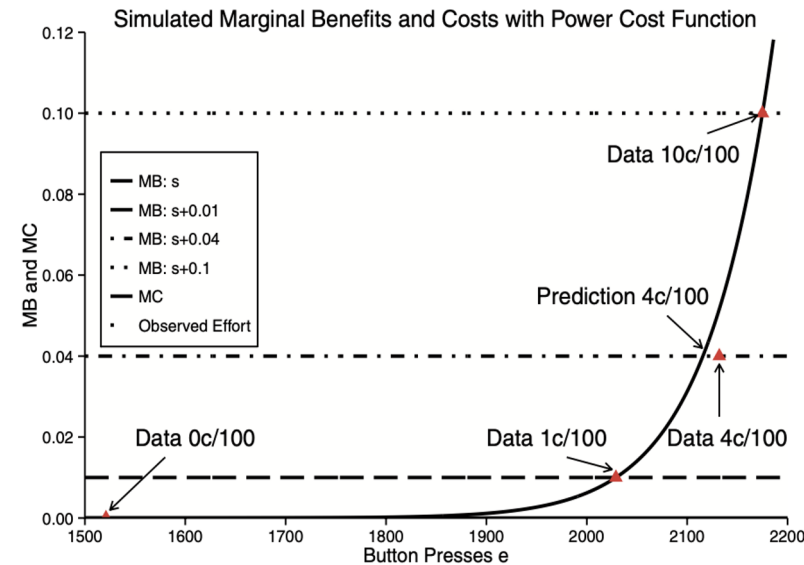
treatment 1 ( 控制組 ) : 「您的分數不會影響您的報酬」 -> 1521

treatment 5 : 「每得 1000 分，您將額外獲得 1 cent」 -> 1883

treatment 2 : 「每得 100 分，您將額外獲得 1 cent」 -> 2029

treatment 4 : 「每得 100 分，您將額外獲得 4 cent」 -> 2132

treatment 3 : 「每得 100 分，您將額外獲得 10 cent」 -> 2175



# 課堂遊戲回顧

- **Finding the max**
- 第一階段：固定報酬
- 第二階段：每一題有4分
- 第三階段：固定報酬/變動報酬 選擇

# 作業 W5

- 1. 請寫出你們小組課堂討論的答案。

為了回答「薪資制度如何影響勞動力供給」，實證上，若比較各公司不同薪資制度下的勞動力供給、或是看一公司從時薪制度改為論件報酬後，勞動力供給有何改變。

(1) 這樣做有什麼缺點？

(2) 有什麼樣的實驗可以做？請說明「確切場域」和「實驗設計」

- 2. 請使用 Josie 給的 raw data 檔案，以圖表為主，文字為輔，回答以下問題：

- (1) 比較第一階段和第二階段的資料，不同報酬模式下，大家的表現有何不同？是符合你的預期的嗎？

- (2) 「風險偏好」和「第三階段選擇固定報酬的轉換點」是否有關？是符合你的預期的嗎？

## 參考文獻

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