

風險偏好與時間偏好

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個別決策實驗

- 研究個人的偏好
 - 風險厭惡(risk aversion)
 - 時間折現(time discounting)
 - 未知厭惡(ambiguity aversion)
- 可以用實驗來測量個人特質
- 這些特質是否跟受試者其他行為相關?

測量風險偏好

- 考慮以下的決策：
- 你有兩個選擇：選項A和選項B
 - 一個會給你新台幣一百萬元
 - 另一個會給你新台幣一千萬元
 - 但是不曉得哪一個是A，哪一個是B
- 如果「放棄」仍可獲得新台幣五百萬元，你會繼續賭下去、猜A,B選項當中的一個，還是比較保險地選擇「放棄」？
 - (出自“Who wants to be a millionaire?”)

測量風險偏好

- 如果兩個選項是：
- 選項A：○元或三千萬元，機率半一半
- 選項B：確定拿一千萬元
- 你會選擇哪一個選項？
- 為什麼會有人選B呢？
- $U(x) = x^{1-r} = x^{0.5}$ (for $r=0.5$)
 - 邊際效用遞減
- 假設性問題(hypothetical)還是真的選擇？

「桃色交易」中的假設性偏誤

- **John:** Suppose... I were to offer you one million dollars for one night with your wife.
- **David:** I'd assume you're kidding.
- **John:** Let's pretend I'm not. What would you say?
- **Diana:** He'd tell you to go to hell.
- **John:** I didn't hear him.
- **David:** I'd tell you to go to hell.
- **John:** That's a reflex answer because you view the question as hypothetical. But let's say that there was real money backing it up. I'm not kidding. A million dollars. The night would come and go but the money could last a lifetime. Think of it. A million dollars. A lifetime of security... for one night. Don't answer right away. Just consider it; seriously?

「桃色交易」中的假設性偏誤



- **John:** That's a reflex answer because you view the question as hypothetical. But let's say that there was real money backing it up. I'm not kidding. A million dollars. The night would come and go but the money could last a lifetime. Think of it. A million dollars. A lifetime of security... for one night. Don't answer right away. Just consider it; seriously?

測量風險偏好

- Holt and Laury (AER 2002)
 - (請看實驗說明裡面的十個問題)
- 你會選擇什麼？
 - 很抱歉我沒有美金可以付給你，不過...
- 實驗一：玩真的，獎金1倍 (基準實驗)
- 實驗二：假設性，獎金20倍(或 50倍, 90倍)
- 實驗三：玩真的，獎金20倍(或 50倍, 90倍)
- 實驗四：玩真的，獎金1倍 (基準實驗)

玩真的1倍vs.假設性很多倍(20x,...)

效用	$U(x) = x$		$U(x) = x^{0.5}$	
機率	安全 選項	風險 選項	安全 選項	風險 選項
0.3	34.40	24.50	5.86	3.62
0.4	35.20	32.00	5.92	4.36
0.5	36.00	39.50	5.99	5.09
0.6	36.80	47.00	6.06	5.83
0.7	37.60	54.50	6.12	6.57
0.8	38.40	62.00	6.19	7.30
0.9	39.20	69.50	6.26	8.04
1.0	40.00	77.00	6.32	8.77

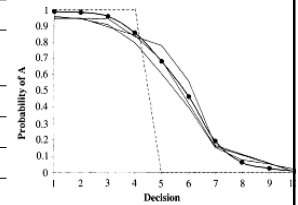


FIGURE 1. PROPORTION OF SAFE CHOICES IN EACH DECISION: DATA AVERAGES AND PREDICTIONS
Note: Data averages for low real payoffs (solid line with dots), 20x, 50x, and 90x hypothetical payoffs (thin lines) and risk-neutral prediction (dashed line).

玩真的1倍vs.玩真的很多倍(20x,...)

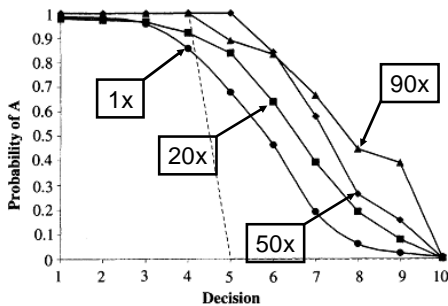


FIGURE 2. PROPORTION OF SAFE CHOICES IN EACH DECISION: DATA AVERAGES AND PREDICTIONS

高倍金額下的風險厭惡

樂透 A	樂透 B
\$200 if throw of die is 1-9	\$336.5 if throw of die is 1-9
\$160 if throw of die is 10	\$9 if throw of die is 10
選擇比例為38%	選擇比例為62%

- 即使樂透 B 的期望值高出美金\$100，還是有38%的受試者選擇樂透 A！

選擇「安全選項」的平均次數： 順序與誘因的影響

實驗根據	誘因	1x	10x	20x	50x	90x
Holt and Laury (2002) 208名受試者	玩真的	5.2	6.0	6.8	7.2	
	假設性問題	5.3	4.9	5.1	5.3	
Harrison et al. (2005) 178名受試者	玩真的	5.3	6.4			
	假設性問題		6.0			
Holt and Laury (2005) 168名受試者	玩真的	5.7	6.7			
	假設性問題	5.6	5.7			

「比較不同受試者」
between subject design

順序與誘因的影響：結論

- 受試者的確厭惡風險
- 風險厭惡程度會隨著玩真的倍數愈高上升
- 高倍數的假設性報酬沒意義(跟低倍數一樣)
- 人口特質如何影響風險偏好？
 - 高所得人士稍微比較厭惡風險
 - 女生厭惡風險的程度只有在1倍金額(基準實驗)的時候比男生高

後續研究

- Harrison, Johnson, McInnes, Rutstrom (AER05)
- Harrison, Lau and Rutstrom (SJE 2005)
 - 使用丹麥的代表性樣本 (金額大約為16倍)
 - 普通的丹麥人厭惡風險($r=0.67$)
 - 中年人和教育程度高的人比較不厭惡風險
- Dohmen, Falk, Huffman, Sunde, Schupp, Wagner (mimeo 2005)
 - 德國的大型問卷調查：男性、年輕、身高較高和教育程度較高的人比較不厭惡風險

展望理論

- 展望理論
 - 風險厭惡、損失厭惡
 - 過度杞人憂天(高估很小的機率)
- 單一參數的例子：(Prelec ECMA98):

$$U(x, p; y, q) = \begin{cases} v(y) + \pi(p)(v(x) - v(y)) & \text{if } xy > 0 \\ \pi(p)v(x) + \pi(q)v(y) & \text{if } xy < 0 \end{cases}$$

$$v(x) = \begin{cases} x^\alpha & \text{for } x > 0 \\ -\lambda(-x^\alpha) & \text{for } x < 0 \end{cases} \text{ and } \pi(p) = e^{-(\ln p)^\alpha}$$

展望理論實驗

- 請看實驗說明中的三組決策
- 取自：
 - Tanaka, Camerer and Nguyen (2009), "Risk and time preferences: Experimental and household data from Vietnam," *American Economic Review*, forthcoming.

時間偏好

- 將未來折現
 - 指數型折現(exponential)：可用動態規劃求解

$$U(c_1, \dots, c_n, \dots) = u(c_0) + \sum_{k=1}^{\infty} \delta^k \cdot u(c_k)$$

- 雙曲型折現(hyperbolic discounting)

$$U(c_1, \dots, c_n, \dots) = u(c_0) + \beta \sum_{k=1}^{\infty} \delta^k \cdot u(c_k)$$

偏好前後不一致

- 甲：你哪天準備要戒煙呀？
- 乙：明天！
 - 過了一天，
- 甲：你哪天準備要戒煙呀？
- 乙：明天！
- 甲：可是你昨天也是這麼說的呀...
- 明日復明日，明日何其多？

雙曲型折現(hyperbolic discounting)

- 有神經科學上的證據！
- McClure, Laibson, Loewenstein and Cohen (2004), "Separate Neural Systems Value Immediate and Delayed Monetary Rewards" *Science* 306, October 15 2004

雙曲型折現後續研究

- McClure, Ericson, Laibson, Loewenstein, and Cohen (2007) "Time Discounting for Primary Rewards." *Journal of Neuroscience*, 27: 5796–5804.
- 比較「現在」或者是10-30分鐘以後
- 在fMRI機器裡立即給予「果汁」
 - 實驗結果如何改變？
- 開放性問題：小孩子何時學會不再用雙曲型折現？

