

NBA門票選擇權

102061235 陳庭昱 102071021 包蕙綺

102071028 李昀峰 102071029 洪穎真



主題發想動機

- 到美國旅遊時想看球賽，但球票難買
- 在網路上購買球票任黃牛宰割
- 改善現有票價制度（浮動票價）

門票選擇權考量因子

- 熱門對戰組合 **(EX: 騎士VS勇士)**
- 球隊所在城市大小
- 球隊戰績**[近況]**
- 比賽日期**[是否為假日]**
- 雙方是否有超級球星
- 球星是否受傷

→ 固定”奧克拉荷馬雷霆隊”主場，一個特定區域座位之選擇權

變動因子

- 用 **BINOMIAL TREE** 跑不同勝率下的選擇權價格
- 設定有總勝場數影響的價格變動
- 根據歷史資料，週間與週末價格有差異
- 若球員發生重大意外，對價格之影響

| | | | MARQUEE | | PREMIUM | | CLASSIC | | VALUE | | PRESEASON | |
|----------------|----------------|------------------|--------------------|---------|--------------------|-------|--------------------|-------|--------------------|-------|--------------------|-------|
| Location | STH Avg/ Gm | STH Pkg Price | STH \$ Per Game | Gate | STH \$ Per Game | Gate | STH \$ Per Game | Gate | STH \$ Per Game | Gate | STH \$ Per Game | Gate |
| Floor A | \$650 | \$27,950 | \$930 | \$1,168 | \$740 | \$904 | \$650 | \$800 | \$585 | \$699 | \$385 | \$640 |
| Floor B | \$325 | \$13,975 | \$470 | \$650 | \$385 | \$510 | \$325 | \$450 | \$290 | \$395 | \$165 | \$360 |
| Floor C | \$270 | \$11,610 | \$380 | \$505 | \$310 | \$395 | \$270 | \$350 | \$245 | \$305 | \$150 | \$280 |
| Club A | \$147 | \$6,321 | \$215 | \$265 | \$175 | \$205 | \$147 | \$173 | \$129 | \$147 | \$85 | \$132 |
| Club B | \$130 | \$5,590 | \$196 | \$265 | \$150 | \$205 | \$130 | \$173 | \$114 | \$147 | \$76 | \$132 |
| Club C | \$100 | \$4,300 | \$143 | \$265 | \$122 | \$205 | \$100 | \$173 | \$87 | \$147 | \$63 | \$132 |
| Supersuite | \$130 | \$5,590 | \$196 | \$247 | \$150 | \$190 | \$130 | \$168 | \$114 | \$143 | \$76 | \$124 |
| Lower Corner A | \$63 | \$2,709 | \$110 | \$146 | \$77 | \$88 | \$63 | \$73 | \$50 | \$61 | \$38 | \$32 |
| Lower Corner B | \$58 | \$2,494 | \$101 | \$146 | \$74 | \$88 | \$58 | \$73 | \$46 | \$61 | \$28 | \$32 |
| Lower Corner C | \$47 | \$2,021 | \$84 | \$146 | \$59 | \$88 | \$47 | \$73 | \$37 | \$61 | \$23 | \$32 |
| Lower End A | \$50 | \$2,150 | \$92 | \$125 | \$62 | \$76 | \$50 | \$63 | \$40 | \$52 | \$16 | \$23 |
| Lower End B | \$45 | \$1,935 | \$85 | \$125 | \$57 | \$76 | \$45 | \$63 | \$35 | \$52 | \$15 | \$23 |
| Lower End C | \$33 | \$1,419 | \$58 | \$125 | \$43 | \$76 | \$33 | \$63 | \$26 | \$52 | \$14 | \$23 |
| Balcony A | \$43 | \$1,849 | \$76 | \$109 | \$51 | \$66 | \$43 | \$55 | \$35 | \$44 | \$21 | \$33 |
| Balcony B | \$28 | \$1,204 | \$47 | \$69 | \$34 | \$42 | \$28 | \$35 | \$23 | \$28 | \$15 | \$22 |
| Balcony Corner | \$19 | \$817 | \$32 | \$46 | \$25 | \$30 | \$19 | \$25 | \$15 | \$18 | \$10 | \$14 |
| Balcony End | \$13 | \$559 | \$24 | \$31 | \$17 | \$19 | \$13 | \$15 | \$10 | \$11 | \$5 | \$9 |

| G | Date | | | | | Opponent | | | Tm | Opp | W | L | Streak |
|----|-------------------|--|---------|--|--|------------------------|---|----|-----|-----|----|----|--------|
| 1 | Fri, Dec 9, 2016 | | | | | Houston Rockets | L | | 99 | 102 | 14 | 9 | L 1 |
| 2 | Fri, Feb 24, 2017 | | | | | Los Angeles Lakers | W | | 110 | 93 | 33 | 25 | W 2 |
| 3 | Fri, Feb 3, 2017 | | | | | Memphis Grizzlies | W | | 114 | 102 | 29 | 22 | W 1 |
| 4 | Fri, Mar 31, 2017 | | 24個五六日 | | | San Antonio Spurs | L | | 95 | 100 | 43 | 32 | L 1 |
| 5 | Fri, Nov 11, 2016 | | 17個一二三四 | | | Los Angeles Clippers | L | | 108 | 110 | 6 | 3 | L 2 |
| 6 | Fri, Nov 18, 2016 | | | | | Brooklyn Nets | W | | 124 | 105 | 8 | 5 | W 2 |
| 7 | Fri, Oct 28, 2016 | | | | | Phoenix Suns | W | OT | 113 | 110 | 2 | 0 | W 2 |
| 8 | Mon, Dec 19, 2016 | | | | | Atlanta Hawks | L | | 108 | 110 | 16 | 12 | L 1 |
| 9 | Mon, Mar 20, 2017 | | | | | Golden State Warriors | L | | 95 | 111 | 40 | 30 | L 1 |
| 10 | Mon, Nov 7, 2016 | | | | | Miami Heat | W | | 97 | 85 | 6 | 1 | W 2 |
| 11 | Sat, Dec 17, 2016 | | | | | Phoenix Suns | W | | 114 | 101 | 16 | 11 | W 1 |
| 12 | Sat, Dec 31, 2016 | | | | | Los Angeles Clippers | W | | 114 | 88 | 21 | 13 | W 1 |
| 13 | Sat, Feb 11, 2017 | | | | | Golden State Warriors | L | | 114 | 130 | 31 | 24 | L 1 |
| 14 | Sat, Jan 7, 2017 | | | | | Denver Nuggets | W | | 121 | 106 | 22 | 16 | W 1 |
| 15 | Sat, Mar 11, 2017 | | | | | Utah Jazz | W | | 112 | 104 | 37 | 29 | W 2 |
| 16 | Sat, Mar 18, 2017 | | | | | Sacramento Kings | W | | 110 | 94 | 40 | 29 | W 3 |
| 17 | Sat, Nov 26, 2016 | | | | | Detroit Pistons | W | | 106 | 88 | 10 | 8 | W 2 |
| 18 | Sat, Nov 5, 2016 | | | | | Minnesota Timberwolves | W | | 112 | 92 | 5 | 1 | W 1 |
| 19 | Sun, Apr 2, 2017 | | | | | Charlotte Hornets | L | | 101 | 113 | 43 | 33 | L 2 |
| 20 | Sun, Dec 11, 2016 | | | | | Boston Celtics | W | | 99 | 96 | 15 | 9 | W 1 |
| 21 | Sun, Dec 25, 2016 | | | | | Minnesota Timberwolves | W | | 112 | 100 | 19 | 12 | W 3 |
| 22 | Sun, Dec 4, 2016 | | | | | New Orleans Pelicans | W | | 101 | 92 | 13 | 8 | W 5 |
| 23 | Sun, Feb 26, 2017 | | | | | New Orleans Pelicans | W | | 118 | 110 | 34 | 25 | W 3 |
| 24 | Sun, Feb 5, 2017 | | | | | Portland Trail Blazers | W | | 105 | 99 | 30 | 22 | W 2 |
| 25 | Sun, Nov 13, 2016 | | | | | Orlando Magic | L | | 117 | 119 | 6 | 4 | L 3 |
| 26 | Sun, Nov 20, 2016 | | | | | Indiana Pacers | L | OT | 111 | 115 | 8 | 6 | L 1 |
| 27 | Sun, Oct 30, 2016 | | | | | Los Angeles Lakers | W | | 113 | 96 | 3 | 0 | W 3 |
| 28 | Thu, Feb 9, 2017 | | | | | Cleveland Cavaliers | W | | 118 | 109 | 31 | 23 | W 1 |
| 29 | Thu, Jan 26, 2017 | | | | | Dallas Mavericks | W | | 109 | 98 | 28 | 19 | W 3 |
| 30 | Thu, Mar 9, 2017 | | | | | San Antonio Spurs | W | | 102 | 92 | 36 | 29 | W 1 |
| 31 | Tue, Apr 4, 2017 | | | | | Milwaukee Bucks | W | | 110 | 79 | 44 | 33 | W 1 |
| 32 | Tue, Feb 28, 2017 | | | | | Utah Jazz | W | | 109 | 106 | 35 | 25 | W 4 |
| 33 | Tue, Mar 7, 2017 | | | | | Portland Trail Blazers | L | | 121 | 126 | 35 | 29 | L 4 |
| 34 | Wed, Apr 12, 2017 | | | | | Denver Nuggets | L | | 105 | 111 | 47 | 35 | L 1 |
| 35 | Wed, Feb 1, 2017 | | | | | Chicago Bulls | L | | 100 | 128 | 28 | 22 | L 3 |
| 36 | Wed, Feb 15, 2017 | | | | | New York Knicks | W | | 116 | 105 | 32 | 25 | W 1 |
| 37 | Wed, Jan 11, 2017 | | | | | Memphis Grizzlies | W | | 103 | 95 | 24 | 16 | W 3 |
| 38 | Wed, Mar 22, 2017 | | | | | Philadelphia 76ers | W | | 122 | 97 | 41 | 30 | W 1 |
| 39 | Wed, Nov 16, 2016 | | | | | Houston Rockets | W | | 105 | 103 | 7 | 5 | W 1 |
| 40 | Wed, Nov 30, 2016 | | | | | Washington Wizards | W | OT | 126 | 115 | 12 | 8 | W 4 |
| 41 | Wed, Nov 9, 2016 | | | | | Toronto Raptors | L | | 102 | 112 | 6 | 2 | L 1 |
| | | | | | | | | | | | | | |



西區

| 排名 | | 勝 | 負 | 勝率 | 勝差 | 分區 | 分組 | 主場 | 客場 | 近10場 | 近況 | 得分/場 | 平均失分 | 分差 |
|----|-------------|----|----|------|------|---------|--------|---------|---------|------|-----|-------|-------|------|
| 1 | w 金州 勇士 | 67 | 15 | 81.7 | 0.0 | 42 - 10 | 14 - 2 | 36 - 5 | 31 - 10 | 9-1 | 勝 1 | 115.9 | 104.3 | 11.6 |
| 2 | sw 聖安東尼奧 馬刺 | 61 | 21 | 74.4 | 6.0 | 36 - 16 | 11 - 5 | 31 - 10 | 30 - 11 | 5-5 | 負 3 | 105.3 | 98.1 | 7.2 |
| 3 | x 休士頓 火箭 | 55 | 27 | 67.1 | 12.0 | 36 - 16 | 10 - 6 | 30 - 11 | 25 - 16 | 5-5 | 勝 1 | 115.3 | 109.6 | 5.7 |
| 4 | x LA 快艇 | 51 | 31 | 62.2 | 16.0 | 31 - 21 | 10 - 6 | 29 - 12 | 22 - 19 | 8-2 | 勝 7 | 108.7 | 104.4 | 4.3 |
| 5 | nw 猶他 爵士 | 51 | 31 | 62.2 | 16.0 | 31 - 21 | 8 - 8 | 29 - 12 | 22 - 19 | 7-3 | 勝 2 | 100.7 | 96.8 | 3.9 |
| 6 | x 奧克拉荷馬城 雷霆 | 47 | 35 | 57.3 | 20.0 | 29 - 23 | 10 - 6 | 28 - 13 | 19 - 22 | 6-4 | 負 1 | 106.6 | 105.8 | 0.8 |
| 7 | x 曼菲斯 灰熊 | 43 | 39 | 52.4 | 24.0 | 28 - 24 | 8 - 8 | 24 - 17 | 19 - 22 | 3-7 | 負 2 | 100.5 | 100.0 | 0.5 |
| 8 | x 波特蘭 拓荒者 | 41 | 41 | 50.0 | 26.0 | 28 - 24 | 11 - 5 | 25 - 16 | 16 - 25 | 7-3 | 負 1 | 107.9 | 108.5 | -0.6 |
| 9 | o 丹佛 金塊 | 40 | 42 | 48.8 | 27.0 | 24 - 28 | 6 - 10 | 22 - 19 | 18 - 23 | 5-5 | 勝 2 | 111.7 | 111.2 | 0.5 |
| 10 | o 紐奧良 鵜鶘 | 34 | 48 | 41.5 | 33.0 | 20 - 32 | 6 - 10 | 21 - 20 | 13 - 28 | 4-6 | 勝 1 | 104.3 | 106.4 | -2.1 |
| 11 | o 達拉斯 小牛 | 33 | 49 | 40.2 | 34.0 | 19 - 33 | 5 - 11 | 21 - 20 | 12 - 29 | 2-8 | 勝 1 | 97.9 | 100.8 | -2.9 |
| 12 | o 沙加緬度 國王 | 32 | 50 | 39.0 | 35.0 | 21 - 31 | 7 - 9 | 17 - 24 | 15 - 26 | 5-5 | 負 1 | 102.8 | 106.7 | -3.9 |
| 13 | o 明尼蘇達 灰狼 | 31 | 51 | 37.8 | 36.0 | 18 - 34 | 5 - 11 | 20 - 21 | 11 - 30 | 3-7 | 負 6 | 105.6 | 106.7 | -1.1 |
| 14 | o 洛杉磯 湖人 | 26 | 56 | 31.7 | 41.0 | 16 - 36 | 6 - 10 | 17 - 24 | 9 - 32 | 5-5 | 負 1 | 104.6 | 111.5 | -6.9 |
| 15 | o 鳳凰城 太陽 | 24 | 58 | 29.3 | 43.0 | 11 - 41 | 3 - 13 | 15 - 26 | 9 - 32 | 2-8 | 負 1 | 107.7 | 113.3 | -5.6 |

浮動票價



賽季簡介

- **NBA** 共**30**支球隊，每支球隊都擁有自己的主場，分散於全美各城市。
- 比賽分為熱身賽、季賽以及季後賽。季賽須達到一定排名才能晉級季後賽。因此季賽門票為各隊主要收入來源。
- 季賽每隊要打**82**場，其中**41**場為主場，**各隊可自行決定主場門票價格**。

浮動票價源起

- 長久以來，球隊採固定票價，球場內某個座位每場比賽的票價不變。
- 然而，一整季**41場主場比賽**並不相同，有些比賽的門票需求較高，而需求決定了價值。
- 以雷霆隊為例，同一個座位在禮拜六對勇士隊時，價值會高於禮拜一對籃網隊。

浮動票價優、缺點

- 熱門比賽即使提高票價仍然銷售一空，**大幅增加門票收入**；冷門比賽門票較難銷售，**降低票價可增加球迷購票意願**。
- 以往採固定票價時，投機者將熱門的票轉賣到二手票網站，可賺取高額利潤。採浮動票價的話，球隊定價高，**轉賣利潤會縮小許多**

浮動票價優、缺點

- 浮動票價制度使球隊可以在熱門比賽時訂出天價，球迷為了進場看球，要比平時多花不少錢。
- 對球隊而言，若季中主力受傷，或戰績不佳，採用浮動票價**必須承擔季中球票價值下跌的風險**

程式相關設計

- 增加票價因素:
 - 1.總勝>20
 - 2.周末
- 降低票價因素:
 - 1.受傷球員
- 其他條件設定:
 - 1.Pu、Pd的設計
 - 2.u、d的設計

增加票價因素:

- 總勝>20
- For i = 0 To nstep
 - X2 = X
 - If i > 20 Then X2 = 1.1 * X
 - If i > 25 Then X2 = 1.2 * X
 - If i > 30 Then X2 = 1.3 * X
 - If i > 40 Then X2 = 1.4 * X
- 贏越多越有看頭!

增加票價因素:

- 周末
- For i = 0 To nstep
 - ddate(i) = 1
 - If 1 <= i <= 7 Then ddate(i) = 1.1
 - If 11 <= i <= 27 Then ddate(i) = 1.1
 - If i = 23 Then ddate(i) = 1.1
- Next i
- 周末大家想要看球賽，需求高價格跟著上漲。
- 根據上季歷史資料做出的假設

降低票價因素:

- 受傷球員

- For j = 0 To nstep

hurtcounter(j) = 0 '清

temp = 0

For i = 0 To 500

hurt(i) = Rnd()

hurt(i) = Application.NormSInv(hurt(i))

If hurt(i) >= 2.75 Or hurt(i) <= -2.75 Then

temp = temp + 1

End If

Next i

hurtcounter(j) = temp

Next j

- 王牌球員受傷不能打你還會想看嗎?

其他條件設定

- P_u 、 P_d 的設計
根據上個賽季勝率做出的預測(28勝13敗)
- u 、 d 的設計
根據歷史二手票價漲幅開 n 次根號

EXCEL

- 條件
- 選擇權價格
- 選擇權價格樹
- 票價樹