**Platforms, Portfolios**

**Policy : How Audience Costs Affect Social Welfare Policy in Multiparty Cabinets**

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**Code for Section A of the online Appendix**

```
Clear[bf, xm, xf, x0, am, af, cm, cf]
```

**1. utility functions of the minister**

```
q1 = -(bf - xm)^2 - am (bf - xm)^2
```

$$-(-2+bf)^2$$

```
q2 = -(x0 - xm)^2 - cm
```

$$-cm-(x0-xm)^2$$

**2. finding the acceptable policy proposal by finance minister**

```
Reduce[q1 > q2, bf]
```

$$(x0 \mid xm \mid bf) \in \text{Reals} \&\&$$

$$\left(\left(am < -1 \&\& \left(\left(cm < -x0^2 + 2\,x0\,xm - xm^2 \&\& \left(bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}} \;||\right.\right.\right.\right.$$

$$\left.\left.\left.\left. bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}}\right)\right) || \left(cm == -x0^2 + 2\,x0\,xm - xm^2 \&\&\right.\right.\right.$$

$$\left.\left.\left.\left(bf < xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}}\right)\right) ||\right.\right.$$

$$\left.\left.cm > -x0^2 + 2\,x0\,xm - xm^2\right)\right) || \left(am == -1 \&\& cm > -x0^2 + 2\,x0\,xm - xm^2\right) ||$$

$$\left(am > -1 \&\& cm > -x0^2 + 2\,x0\,xm - xm^2 \&\& xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}} < \right.$$

$$\left. bf < xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}}\right)$$

```
bfs = xm - Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)]
```

$$xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1+am}}$$

**3. Showing that the acceptable region is a function of a.**

```
g[am_] = xm - Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)]
```

$$xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}}$$

```
g'[am]
```

$$\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{2\,(1 + am)^2\,\sqrt{\frac{cm+x0^2-2\,x0\,xm+xm^2}{1+am}}}$$

```
Simplify[(cm + x0^2 - 2 x0 xm + xm^2)/(2 (1 + am)^2 Sqrt[(cm+x0^2-2 x0 xm+xm^2)/(1+am)])]
```

$$\frac{\sqrt{\frac{cm+(x0-xm)^2}{1+am}}}{2\,(1 + am)}$$

**4. Finance' s utility function**

```
z1 = -(bf - xf)^2 - af (bf - xf)^2
```

$$-(bf - xf)^2 - af\,(bf - xf)^2$$

```
z2 = -(x0 - xf)^2 - af (bf - xf) - cf
```

$$-cf - af\,(bf - xf) - (x0 - xf)^2$$

**5. Graphing minister' s acceptance region when the two ministers' policy preferences are symmetric around 0.**

```
u12 = If[bf < xm - Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)] || bf > xm + Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)], z2, z1]
```

```
If[bf < 0 || bf > 4, z2, z1]
```

**The next section calculates the possible equilirium policies based on different parameters for ministers' cost of office and strenght of pledge. These simulations are reported in the eight cells of Table 1 A of the online Appendix. Below we estimate the minister' s region of acceptance. The only acceptable policy to finance is the lowest acceptable value for the minister.**

**6. When cost of losing office is zero for both ministers,**
**cm = cf = 0 (Column 2 of Table 1 A)**
**6.1 (Estimating the optimal policy response, when neither minister has made a pledge, am = af = 0, as reported in Row 2, Column 2 (bf = 0))**

```
xm = 2
x0 = 0
xf = -2
cm = 0
cf = 0
am = 0
af = 0
```

```
2
```

```
0
```

```
-2
```

```
0
```

```
0
```

```
0
```

```
0
```

$$\text{u12} = \text{If}\left[\text{bf} < \text{xm} - \sqrt{\frac{\text{cm} + \text{x0}^2 - 2\,\text{x0}\,\text{xm} + \text{xm}^2}{1 + \text{am}}} \;||\; \text{bf} > \text{xm} + \sqrt{\frac{\text{cm} + \text{x0}^2 - 2\,\text{x0}\,\text{xm} + \text{xm}^2}{1 + \text{am}}}\;,\; \text{z2},\; \text{z1}\right]$$

```
If[bf < 0 || bf > 4, z2, z1]
```

### 6.2 Estimating the optimal policy response, bf, when both ministers have made a pledge, am = af = 2, as reported in Row 3 Column 2 $\left(\text{bf} = 2 - \frac{2}{\sqrt{3}}\right)$

```
xm = 2
x0 = 0
xf = -2
cm = 0
cf = 0
am = 2
af = 2
```

```
2
```

```
0
```

```
-2
```

```
0
```

```
0
```

```
2
```

```
2
```

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\; z2,\; z1\right]$$

$$\text{If}\left[bf < 2 - \frac{2}{\sqrt{3}} \;||\; bf > 2 + \frac{2}{\sqrt{3}},\; z2,\; z1\right]$$

### 6.3 Estimating the optimal policy response, bf, when only Minister has made a pledge, am = 2, af = 0, as reported in Row 4 Column 2 $\left(bf = 2 - \frac{2}{\sqrt{3}}\right)$

$xm = 2$

$x0 = 0$

$xf = -2$

$cm = 0$

$cf = 0$

$am = 2$

$af = 0$

2

0

−2

0

0

2

0

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\; z2,\; z1\right]$$

$$\text{If}\left[bf < 2 - \frac{2}{\sqrt{3}} \;||\; bf > 2 + \frac{2}{\sqrt{3}},\; z2,\; z1\right]$$

### 6.4 Estimating the optimal policy response, bf, when only Finance has made a pledge, am = 0, af = 2, as reported in Row 5 Column 2 (bf = 0))

```
xm = 2
x0 = 0
xf = -2
cm = 0
cf = 0
am = 0
af = 2
```

2

0

-2

0

0

0

2

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\; z2,\; z1\right]$$

```
If[bf < 0 || bf > 4, z2, z1]
```

```
If[bf < 0 || bf > 4, z2, z1]
```

## 7. Numeric

### Simulations : When cost of losing office is high (cm = cf = 1 (Column 3 of Table 1 A))

### 7.1 (Estimating the optimal policy response, when neither minister has made a pledge, am = af = 0, as reported in Row 2, Column 3 $\left(bf = 2 - \sqrt{5}\right)$)

```
xm = 2
x0 = 0
xf = -2
cm = 1
cf = 1
am = 0
af = 0
```

2

0

-2

1

1

0

0

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\ z2,\ z1\right]$$

$$\text{If}\left[bf < 2 - \sqrt{5} \;||\; bf > 2 + \sqrt{5},\ z2,\ z1\right]$$

### 7.2 Estimating the optimal policy response, bf, when both ministers have made a pledge, am = af = 2, as reported in Row 3 Column 3 $\left(bf = 2 - \sqrt{\frac{5}{3}}\right)$

```
xm = 2
x0 = 0
xf = -2
cm = 1
cf = 1
am = 2
af = 2
```

2

0

-2

1

1

2

2

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\; z2,\; z1\right]$$

$$\text{If}\left[bf < 2 - \sqrt{\frac{5}{3}} \;||\; bf > 2 + \sqrt{\frac{5}{3}},\; z2,\; z1\right]$$

### 7.3 Estimating the optimal policy response, bf, when only Minister has made a pledge, am = 2, af = 0, as reported in Row 4 Column 3 $\left(bf = 2 - \sqrt{\frac{5}{3}}\right)$

```
xm = 2
x0 = 0
xf = -2
cm = 1
cf = 1
am = 2
af = 0
```

2

0

−2

1

1

2

0

$$u12 = \text{If}\left[bf < xm - \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}} \;||\; bf > xm + \sqrt{\frac{cm + x0^2 - 2\,x0\,xm + xm^2}{1 + am}},\; z2,\; z1\right]$$

$$\text{If}\left[bf < 2 - \sqrt{\frac{5}{3}} \;||\; bf > 2 + \sqrt{\frac{5}{3}},\; z2,\; z1\right]$$

### 7.4 Estimating the optimal policy response, bf, when only Finance has made a pledge, am = 0, af = 2, as reported in Row 5 Column 3 $\left(bf = 2 - \sqrt{5}\right)$

```
xm = 2
x0 = 0
xf = -2
cm = 1
cf = 1
am = 0
af = 2
```

2

0

-2

1

1

0

2

```
u12 = If[bf < xm - Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)] || bf > xm + Sqrt[(cm + x0^2 - 2 x0 xm + xm^2)/(1 + am)], z2, z1]
```

```
If[bf < 2 - Sqrt[5] || bf > 2 + Sqrt[5], z2, z1]
```

```
If[bf < 2 - Sqrt[5] || bf > 2 + Sqrt[5], z2, z1]
```