Supporting information for "Persistent Unilateral Action"

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A Formal proofs

Proof of Proposition 1. We know by Assumption 6 that $p_1^\circ(\Delta_1^\circ) < 0$. Consider the first case, in which we also have $c_1^\circ(\Delta_1^\circ) \leq -d$. This expression can be rearranged as $\Delta_1^\circ < -c-d$. The policy that C is willing to pass is now to the left of $-d$, so C passes it and P_1 signs.

Consider the second case, in which we also have $p_1^\circ(\Delta_1^\circ) \leq -d \leq c_1^\circ(\Delta_1^\circ)$. This expression can be rearranged as $-c-d \leq \Delta_1^\circ \leq -p_1 - d$. It is clear that the best feasible policy for P_1 to implement unilaterally is $-d$, and that C is unwilling to pass legislation that P_1 would prefer more.

Finally, consider the third case, in which we also have $-d \leq p_1^\circ(\Delta_1^\circ)$. This latter expression can be rearranged as $-p_1 - d \leq \Delta_1^\circ$. It is clear that P_1 does best by implementing $p_1^\circ(\Delta_1^\circ)$ unilaterally. □

Proof of Proposition 2. For legislation to have occurred, we must have had

$$\begin{aligned} x_1^* = c_1^\circ(\Delta_1^\circ) < -d \iff \\ c + \Delta_1^\circ < -d \iff \\ \Delta_1^\circ < -c - d. \end{aligned} \tag{A.1}$$

Then remembering that $\Delta_1^\circ = \alpha^R - \alpha^L$, we conclude that L's initial strength (α^L) must have been large relative to that of R (α^R). Consequently, equilibrium policy in Stage 2 as a function of that in Stage 1 is

$$\begin{aligned} x_2^* &= c_2^\circ(\Delta_2^\circ) \\ &= \underbrace{c + \Delta_1^\circ}_{=x_1^*} + \underbrace{\beta\left(F^R\big(c + \Delta_1^\circ\big) - F^L\big(c + \Delta_1^\circ\big)\right)}_{<0}. \end{aligned}$$

Algebraically, Expression A.1 then implies that $x_2^* < x_1^*$. □

Proof of Proposition 3. For unilateral action to persist, it must have occurred in Stage 1. Consider first the case in which $-c-d \leq \Delta_1^\circ \leq -p_1 - d$. Then we have

$$x_1^* = -d \tag{A.2}$$

implemented unilaterally. Following this, policy at the end of Stage 2 is

$$x_2^* = c_2^\circ\big(\Delta_2^\circ\big) = c + \Delta_1^\circ + \beta\left(F^R(-d) - F^L(-d)\right). \tag{A.3}$$

Substituting $\beta = 0$ into Expression A.3 yields $c + \Delta_1^\circ$, which is greater than Expression A.2 by the inequality defining this case. Finally, because Assumption 1 states that $d > 0$, and because $F^L(0) = F^R(0) = 0$, F^L is strictly decreasing, and F^R is strictly increasing, we must have $F^R(-d) - F^L(-d) < 0$, so that it is possible to choose β arbitrarily large to make x_2^* arbitrarily small.

Consider next the case in which $-p_1 - d \leq \Delta_1^\circ$. Then we have

$$x_1^* = p_1^\circ(\Delta_1^\circ) = p_1 + \Delta_1^\circ \tag{A.4}$$

implemented unilaterally. Following this, policy at the end of Stage 2 is

$$x_2^* = c_2^\circ\big(\Delta_2^\circ\big) = c + \Delta_1^\circ + \beta\big(F^R\big(p_1 + \Delta_1^\circ\big) - F^L\big(p_1 + \Delta_1^\circ\big)\big). \tag{A.5}$$

Substituting $\beta = 0$ into Expression A.5 yields $c + \Delta_1^\circ$, which is strictly greater than Expression A.4 by Assumption 2. Finally, because Assumption 6 implies that $p_1^\circ(\Delta_1^\circ) < 0$, and because $F^L(0) = F^R(0) = 0$, F^L is strictly decreasing, and F^R is strictly increasing, we must have $F^R\big(p_1 + \Delta_1^\circ\big) - F^L\big(p_1 + \Delta_1^\circ\big) < 0$, so that it is possible to choose β arbitrarily large to make x_2^* arbitrarily small. □

B Forward-looking player extension

I now allow P_1, C, L, and R to look forward to Stage 2 as of Stage 1. Redefine $U_1^L(x_1)$ and $U_1^R(x_1)$ as follows:

$$U_1^L(x_1) = -(x_1 - \ell)^2 + \delta\left(-(x_2 - \ell)^2\right),$$
$$U_1^R(x_1) = -(x_1 - r)^2 + \delta\left(-(x_2 - r)^2\right),$$

with $\delta \in (0, 1)$ being the discount factor. Notice that as long as analogous assumptions continue to hold for L and R, especially a version of Assumption 5, they continue to exhaust their budgets in each stage as before.

Next, I change the definitions of $U_1^C(x_1)$ and $U_1^{P_1}(x_1)$ as follows:

$$U_1^C(x_1) = -\big(x_1 - \big(c + k_1^R - k_1^L\big)\big)^2 + \delta\Big(-\big(x_2 - \big(c + k_1^R - k_1^L\big)\big)^2\Big),$$
$$U_1^{P_1}(x_1) = -\big(x_1 - \big(p_1 + k_1^R - k_1^L\big)\big)^2 + \delta\Big(-\big(x_2 - \big(p_1 + k_1^R - k_1^L\big)\big)^2\Big).$$

That is to say, C and P_1 evaluate policy now and in the future given the influence exerted on V as of now (Stage 1). In other words, they evaluate potential future policy outcomes in light of their current preferences.

For tractability, I additionally impose the following:

$$F^L(x_{t-1}) = -x_{t-1},$$
$$F^R(x_{t-1}) = x_{t-1}.$$

Now we must distinguish c's effective ideal point in Stage 1 from that in Stage 2. In

particular, we have

$$c_1^\circ(\Delta_1) = \frac{c + \Delta_1}{1 + \delta\, 4\beta^2},$$
$$c_2^\circ(\Delta_2) = c + \Delta_2.$$

Let a modified version of Assumption 2 apply to both of these quantities.

Now an analogue to Proposition 1 holds with different thresholds. We have the following:

Proposition B.1 (Policy outcome and mode in Stage 1)**.** *The policy outcome in Stage 1 is*

$$x_1^*(\Delta_1^\circ) = \begin{cases} c_1^\circ(\Delta_1^\circ) \text{ (enacted legislatively)} & \Delta_1^\circ < -c - d + \delta\, 4d\,\beta^2, \\ -d \text{ (enacted unilaterally)} & -c - d + \delta\, 4d\,\beta^2 \leq \Delta_1^\circ \leq -p_1 - d + \delta\, 4d\,\beta^2, \\ p_1^\circ(\Delta_1^\circ) \text{ (enacted unilaterally)} & -p_1 - d + \delta\, 4d\,\beta^2 \leq \Delta_1^\circ. \end{cases}$$

Proof. Analogous to that of Proposition 1. □

As before, the condition for legislation to occur slackens as α^L increases and α^R decreases. Then we continue to conclude that when L is initially strong, it achieves legislation, whereas when L is initially weak, it must rely on unilateral action.

Next, Proposition 2 continues to hold, taking into account C's new optimum. For legislation to have occurred, we must have had

$$x_1^* = c_1^\circ(\Delta_1^\circ) < -d \iff$$
$$\frac{c + \Delta_1^\circ}{1 + \delta\, 4\beta^2} < -d \iff$$
$$\Delta_1^\circ < -c - d + \delta\, 4d\,\beta^2. \tag{B.1}$$

Then remembering that $\Delta_1^\circ = \alpha^R - \alpha^L$, we conclude that L's initial strength (α^L) must have been large relative to that of R (α^R). Consequently, equilibrium policy in Stage 2 as a function of that in Stage 1 is

$$\begin{aligned} x_2^* &= c_2^\circ(\Delta_2^\circ) \\ &= c + \Delta_1^\circ + \beta\left(F^R\left(\frac{c+\Delta_1^\circ}{1+\delta\,4\beta^2}\right) - F^L\left(\frac{c+\Delta_1^\circ}{1+\delta\,4\beta^2}\right)\right) \\ &= \underbrace{c+\Delta_1^\circ}_{<x_1^*} + \underbrace{2\beta\,\underbrace{\frac{c+\Delta_1^\circ}{1+\delta\,4\beta^2}}_{<-d}}_{<0}. \end{aligned}$$

Algebraically, Expression B.1 then implies that $x_2^* < x_1^*$.

Finally, parts of Proposition 3 continue to hold. Letting $\beta = 0$ is in fact a special case of the model in the main text, as choices in Stage 1 do not affect outcomes in Stage 2, so unilateral action does not persist. Whether it is possible to select β sufficiently large to ensure persistent unilateral action is unclear. On one hand, L has a larger budget in Stage 2 holding fixed policy in Stage 1. On the other hand, P_1 may unilaterally implement a more moderate policy in Stage 1 in anticipation. However, if any unilateral action is persistent, it must be that β is strictly positive.

C Procedure to generate Figure 4

1. Download the Consumer Price Index for All Urban Consumers: All Items in U.S. City Average (CPIAUCSL).[1]
   (a) Navigate to https://fred.stlouisfed.org/series/CPIAUCSL.
   (b) Click "Download" and choose "Excel (data)".
2. Download the lobbying data. For each group listed below, follow these steps:
   (a) Navigate to https://www.opensecrets.org/federal-lobbying/.
   (b) In the search bar, type the name of the group and click the matching search suggestion (repeating these steps for each group).
   (c) Data are presented in the bar chart. It is possible either to hover over the figure or to export the data (by clicking the three horizontal bars at the upper right of the bar chart).
3. Aggregate lobbying expenditures by year and side of the issue (pro- or anti-legalization).
4. Deflate totals using the January observations from the CPIAUCSL series, renormalizing the value of the observation from January 2022 to 1.
5. Plot the deflated pro- and anti-legalization expenditure totals from 2021 to 2021.

List of groups

The following groups had lobbying expenditures between 2001 and 2021:

1. Note that this series is periodically revised; the version from May 14, 2024 is used and is included in the replication package.

Pro-legalization

- Acreage Holdings
- American Trade Assn for Cannabis & Hemp
- Americans for Safe Access
- Bluma Wellness
- California Cannabis Industry Assn
- Caliper Foods
- Cannabis Trade Federation
- Canndescent
- Canopy Growth Corp
- Charlotte's Web Inc
- Coalition for Cannabis Policy, Edu & Regulation
- Columbia Care
- Cronos Group
- Curaleaf Inc
- Drug Policy Alliance
- Ghost Management Group
- Global Alliance for Cannabis
- Marijuana Policy Project
- Medical Investor Holdings
- Medical Marijuana Industry Group
- Minority Cannabis Business Assn
- National Cannabis Industry Assn
- National Cannabis Roundtable
- New Federalism Fund
- Oregon Cannabis Assn
- PalliaTech Inc
- Parallel Brands
- Surterra Holdings
- Trulieve
- Tweed Inc
- US Cannabis Council
- Washington CannaBusiness Assn

Anti-legalization

- American Society of Addiction Medicine
- DARE America
- DARE New Jersey
- National Family Partnership
- Partnership for a Drug Free America
- Smart Approaches to Marijuana