Multitask, Accountability, and Institutional Design

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Motivation

Multiple executive tasks divided differently in different settings

- Unified authority: U.S. President
- Divided authority: U.S. States

This has implications for accountability and voter welfare

Institutional design questions

- Whether to divide tasks between multiple offices
- How to structure the benefits of office, given salience of assigned tasks

Some Related Literature

Political accountability with multiple tasks

- **Pure Moral Hazard:** Padro i Miguel & Hatfield (2006), Bueno de Mesquita (2007), Bueno de Mesquita & Landa (2011)
- **Learning and Cost Complementarity:** Ashworth (2005)

Unbundling political tasks

- Besley & Coate (2003), Berry & Gersen (2008)

Outline

Outline

Timeline

1. Period 1
   (i) Effort taken on two tasks
   (ii) Outputs observed by the Voter
   (iii) Election occurs
2. Period 2
   (i) Effort taken on two tasks
   (ii) Outputs observed by the Voter
3. Game ends

Production Function

Output on task j in period t is $s_j^t = a_j^t + \theta_j^t + \epsilon_j^t$

- a_j^t is the effort on job j in period t
- θ_j^t is the task-j-specific competence of the official on job j in period t
- ϵ_j^t is a standard Normal shock in period t

Uncertainty over competence is symmetric (all candidates are *ex ante* identical)

An official's competence has prior distribution

$$\begin{pmatrix} \theta_1 \\ \theta_2 \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right)$$

Voter Payoffs

Voter differentially weights each dimension of output

Period t payoff is:

$$\gamma s_1^t + (1-\gamma) s_2^t$$

No discounting

Officials' Payoffs

Bundled incumbent's expected utility

$$R - c(a_1^1) - c(a_2^1) + \Pr(\text{Reelect}|(a_1^1, a_2^1)) \left(R - c(a_1^2) - c(a_2^2)\right)$$

Task-j unbundled incumbents' expected utilities

$$R_j - c(a_j^1) + \Pr(\text{Reelect}|(a_j^1)) \left(R_j - c(a_j^2)\right)$$

Elected challenger has the analogous second period payoff

$$c'(a) = a^k, \text{ for some } k \geq 1$$

Outline

Institutional Design Questions

Bundle (1 elected official doing both tasks) or Unbundle (1 elected official per task)

If unbundle, division of rents from office

- Total rents R
- Divide optimally to maximize Voter welfare ($R_1 + R_2 = R$)

2 Aspects of Voter Welfare

First period Voter welfare is a function of:

- Incentives for effort
- Allocation of effort across tasks

Ex ante, expected, second period voter welfare is a function of:

- The same as above
- Selecting good types

Institutional Design Questions and Trade-Offs

How do voter preference weights and correlations affect:

- Optimality for first period voter welfare
- Optimality for second period voter welfare

When are there institutional design trade-offs and when is one institution dominant for both periods?

Outline

Expected Second Period Payoffs under Bundling

Voter's expected second period payoff from politician P:

$$\gamma \mathbb{E}[\theta_1^P | (s_1, s_2)] + (1 - \gamma)\mathbb{E}[\theta_2^P | (s_1, s_2)]$$

For Challenger, these expectations are zero

Voter's posterior beliefs about Incumbent

$$\begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \frac{1 - \rho^2}{(2 - \rho^2)^2 - \rho^2} \begin{pmatrix} 2 - \rho^2 & \rho \\ \rho & 2 - \rho^2 \end{pmatrix} \begin{pmatrix} s_1 - a_1^b \\ s_2 - a_2^b \end{pmatrix}$$

Multitask through Learning

Increasing performance on task i affects Voter's posteriors about task-i and task-j competence

The marginal effect of task i outcome on task j beliefs is increasing in correlation

- Increased informativeness

The marginal effect of task i outcome on task i beliefs is decreasing in correlation AcBa06

- Works like decreasing the variance of the prior

Election under Bundling

Reelect iff

$$\gamma \mathbb{E}[\theta_1^P | (s_1, s_2)] + (1-\gamma)\mathbb{E}[\theta_2^P | (s_1, s_2)] > 0$$

$$\begin{pmatrix} \gamma & 1-\gamma \end{pmatrix} \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} \geq 0$$

Translate this from beliefs to outcomes.

Suppose voter believes incumbent chose (a_1^b, a_2^b). Reelect iff

$$\lambda_1(s_1 - a_1^b) + \lambda_2(s_2 - a_2^b) \geq 0$$

Incentive (Dis-)Alignment

$$\lambda_1 = \left(\frac{1-\rho^2}{(2-\rho^2)^2 - \rho^2} \right) \left(\gamma(2-\rho^2) + (1-\gamma)\rho \right)$$

$$\lambda_2 = \left(\frac{1-\rho^2}{(2-\rho^2)^2 - \rho^2} \right) \left(\gamma\rho + (1-\gamma)(2-\rho^2) \right)$$

Voter's preferences put weight γ on task 1

Equilibrium retention rule puts weight λ_1, which includes γ's and ρ

Because Voter is forward looking, cannot perfectly align her preferences and the incumbent's incentives

First Period Effort

$$\lambda_1(s_1 - a_1^b) + \lambda_2(s_2 - a_2^b) \geq 0$$

If choose (a_1, a_2), LHS is normal with mean

$$\lambda_1(a_1 - a_1^b) + \lambda_2(a_2 - a_2^b)$$

and variance

$$\sigma_b^2 = 2\lambda_1^2 + 2\lambda_2^2 + 2\lambda_1\lambda_2\rho$$

First Period Effort (cont.)

Incumbent's expected payoff if she chooses a_1 and a_2:

$$R\left[1-\Phi\left(\frac{0-\lambda_1(a_1-a_1^b)-\lambda_2(a_2-a_2^b)}{\sigma_b}\right)\right]-c(a_1)-c(a_2)$$

Equilibrium:

$$\frac{\lambda_1 R}{\sigma_b}\phi(0)=c'(a_1^*) \quad \text{and} \quad \frac{\lambda_2 R}{\sigma_b}\phi(0)=c'(a_2^*)$$

Outline

Expected Second Period Payoffs under Unbundling

Voter's expected second-period payoff from having politician P on task 1 and politician P' on task 2:

$$\gamma \mathbb{E}[\theta_1^P | s_1] + (1-\gamma)\mathbb{E}[\theta_2^{P'} | s_2]$$

For Challenger, these expectations are zero

Voter's posterior beliefs about task-j incumbent:

$$\lambda_u(s_j - a_j^u)$$

Election under Unbundling

Reelect iff

$$\lambda_u(s_j - a_j^u) \geq 0$$

First Period Effort

$$\lambda_u(s_j - a_j^u) \geq 0$$

If choose a_j, LHS is normal with mean:

$$\lambda_u(a_j - a_j^u)$$

and variance

$$\sigma_u^2 = 2\lambda_u^2$$

First Period Effort (cont.)

Task-j incumbent's expected payoff from a_j:

$$R_j \left[1 - \Phi \left(\frac{0 - \lambda_u (a_j - a_j^u)}{\sqrt{2\lambda_u^2}} \right) \right] - c(a_j)$$

Equilibrium:

$$\frac{R_j}{\sqrt{2}} \phi(0) = c'(a_j^u)$$

Optimal Division of Rewards

Let $R_1 \equiv \eta R$

Lemma 4.1 The Voter's second period welfare is independent of η

- First period effort doesn't affect quality of information

Optimal η satisfies

$$\max_{\eta} \gamma a_1^u(\eta) + (1-\gamma) a_2^u(\eta)$$

Lemma 4.2 The Voter welfare maximizing η is given by:

$$\eta^*(\gamma) = \frac{1}{1 + \left(\frac{1-\gamma}{\gamma}\right)^{\frac{k}{k-1}}}.$$

Outline

Either Institution Can Be Optimal

Proposition 5.1
There exist parameter values for which bundling is the optimal institution with respect to first-period Voter welfare and there exist parameter values for which unbundling is the optimal institution with respect to first-period Voter welfare. In particular:

1. If $\gamma \in \{0, 1\}$, then unbundling is preferred for all $\rho \neq 0$.
2. If $\gamma = \frac{1}{2}$, then bundling is preferred to unbundling for all ρ.

Intuition: Extreme Preference Weights

Voter would like effort to be highly focused on one task

Achieves this under unbundling

Can't fully do so under bundling

- Correlation in task-specific competences means voter cannot shut down incentives on unimportant task

Unbundling preferred

Intuition: Equal Preference Weights

Total effort lower under unbundling because rewards to office divided

Incumbent effort on any given task more likely to swing election under unbundling

- Under bundling, presence of imperfectly correlated other task reduces voter responsiveness

First effect dominates, so bundling is preferred

Comparative Statics: Correlation

Proposition 5.2 The more highly correlated are the competences, the less likely bundling is to be optimal with respect to first-period Voter welfare.

- Under bundling, correlation drives a wedge between voter preferences and effort allocation across the dimensions
- Unbundling eliminates this distortion

With respect to first period welfare, similar tasks should be split apart

Comparative Statics: Preference Weights

How does first period voter welfare under unbundling vs. bundling change as the voter becomes more focused on one task?

Consider the limiting case of $k = 1$ to build some intuition

2 competing effects

Preference Weights: Effect 1

When $k = 1$, there is a corner solution under unbundling

- All rewards from office to more important task

As voter becomes more focused, preferences are moving in direction of alignment with unbundling behavior

This preference alignment effect tends to make unbundling become more attractive as voter puts more weight on one task

Preference Weights: Effect 2

As voter becomes more focused, bundled incumbent becomes more focused

As voter becomes more focused, unbundled incumbent does not change behavior (corner solution)

This incentive alignment effect tends to make bundling more attractive as voter puts more weight on one task

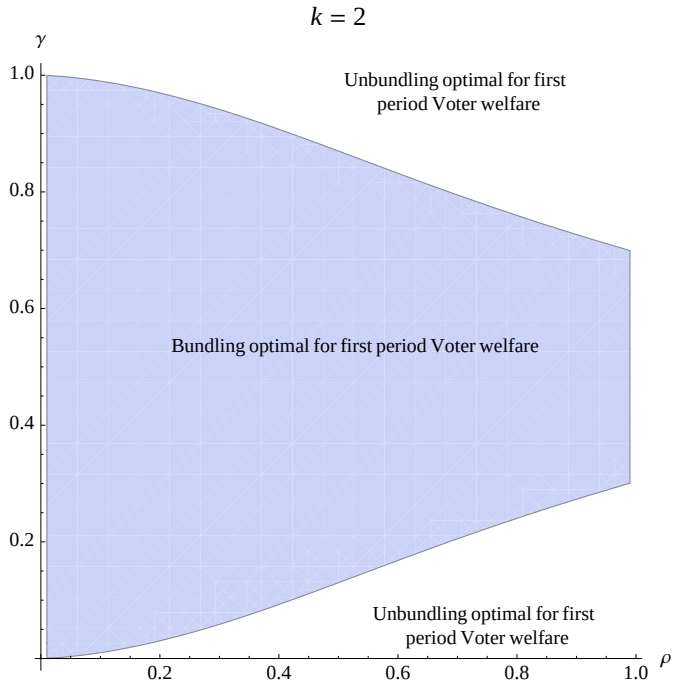
Comparative Statics: Preference Weights

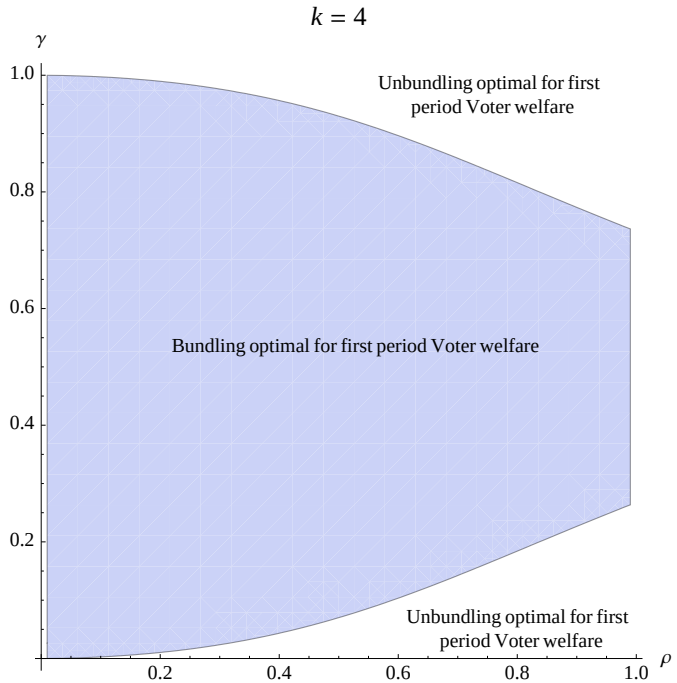
Competing effects, but can be signed when $k = 1$.

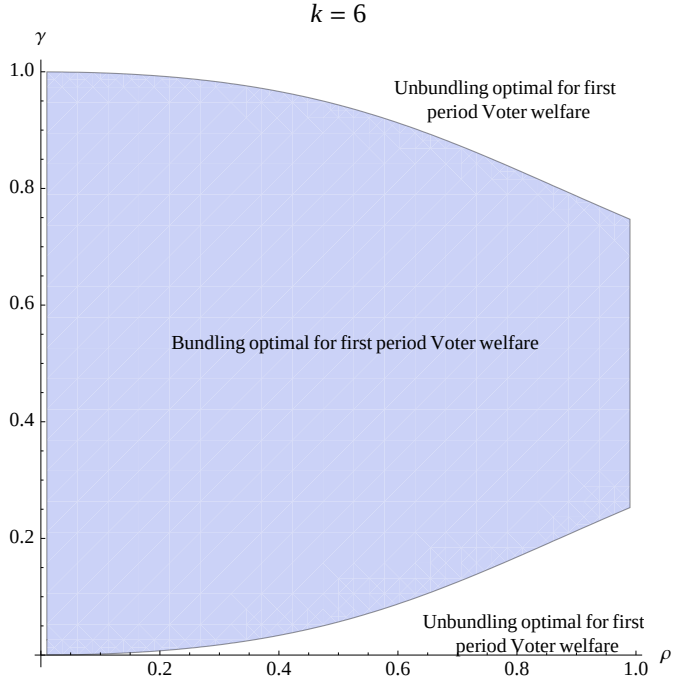
Proposition 5.3 Let $k = 1$. For any ρ, there exists a $\xi(\rho)$ such that bundling is optimal if and only if $\gamma \in (1/2 - \xi(\rho), 1/2 + \xi(\rho))$.

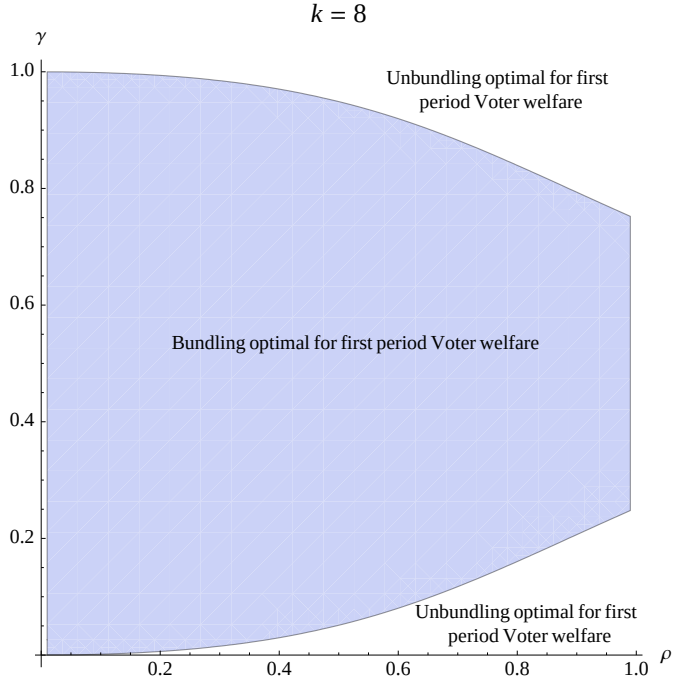
When $k \neq 1$ these competing effects are harder to sign and there are additional effects

Computation always confirms the result


$k = 2$
γ
1.0
0.8
0.6
0.4
0.2
Unbundling optimal for first period Voter welfare
Bundling optimal for first period Voter welfare
Unbundling optimal for first period Voter welfare
0.2
0.4
0.6
0.8
1.0
ρ


$k = 4$
γ
1.0
0.8
0.6
0.4
0.2
Unbundling optimal for first period Voter welfare
Bundling optimal for first period Voter welfare
Unbundling optimal for first period Voter welfare
0.2
0.4
0.6
0.8
1.0
ρ


$k = 6$
γ
1.0
0.8
0.6
0.4
0.2
Unbundling optimal for first period Voter welfare
Bundling optimal for first period Voter welfare
Unbundling optimal for first period Voter welfare
0.2
0.4
0.6
0.8
1.0
ρ


$k = 8$
γ
1.0
0.8
0.6
0.4
0.2
Unbundling optimal for first period Voter welfare
Bundling optimal for first period Voter welfare
Unbundling optimal for first period Voter welfare
0.2
0.4
0.6
0.8
1.0
ρ

Interpretation

When one task is significantly more important than the other, create a hierarchy of offices

- Each specialized
- More important task gets significantly greater rewards to office

When tasks are of roughly equal importance, create a single office with multiple responsibilities

It is never optimal to create two offices with roughly equal rewards

Outline

Ex Ante Expected Second Period Welfare

Driven entirely by expectations about selecting good types

- How much information is available at election
- Voter's flexibility to act on that information

Either Institution Can Be Optimal

Proposition 6.1 There exist parameter values for which bundling is the optimal institution and there exist parameter values for which unbundling is the optimal institution, with respect to ex ante, expected second-period welfare. In particular:

1. If ρ is sufficiently small, then unbundling is preferred for all γ and strictly preferred if $\gamma \notin \{0, 1\}$.

2. If ρ is sufficiently large, then bundling is preferred for all γ.

Intuition

Under bundling, voter has only one vote to select on two dimensions

- Decreases voter's ability to flexibly select high quality politicians

Correlation means that voter has more information under bundling

When correlation is very low, first effect is only effect, so unbundling dominates

When correlation is very high, second effect more important, so bundling dominates

Comparative Statics: Correlation

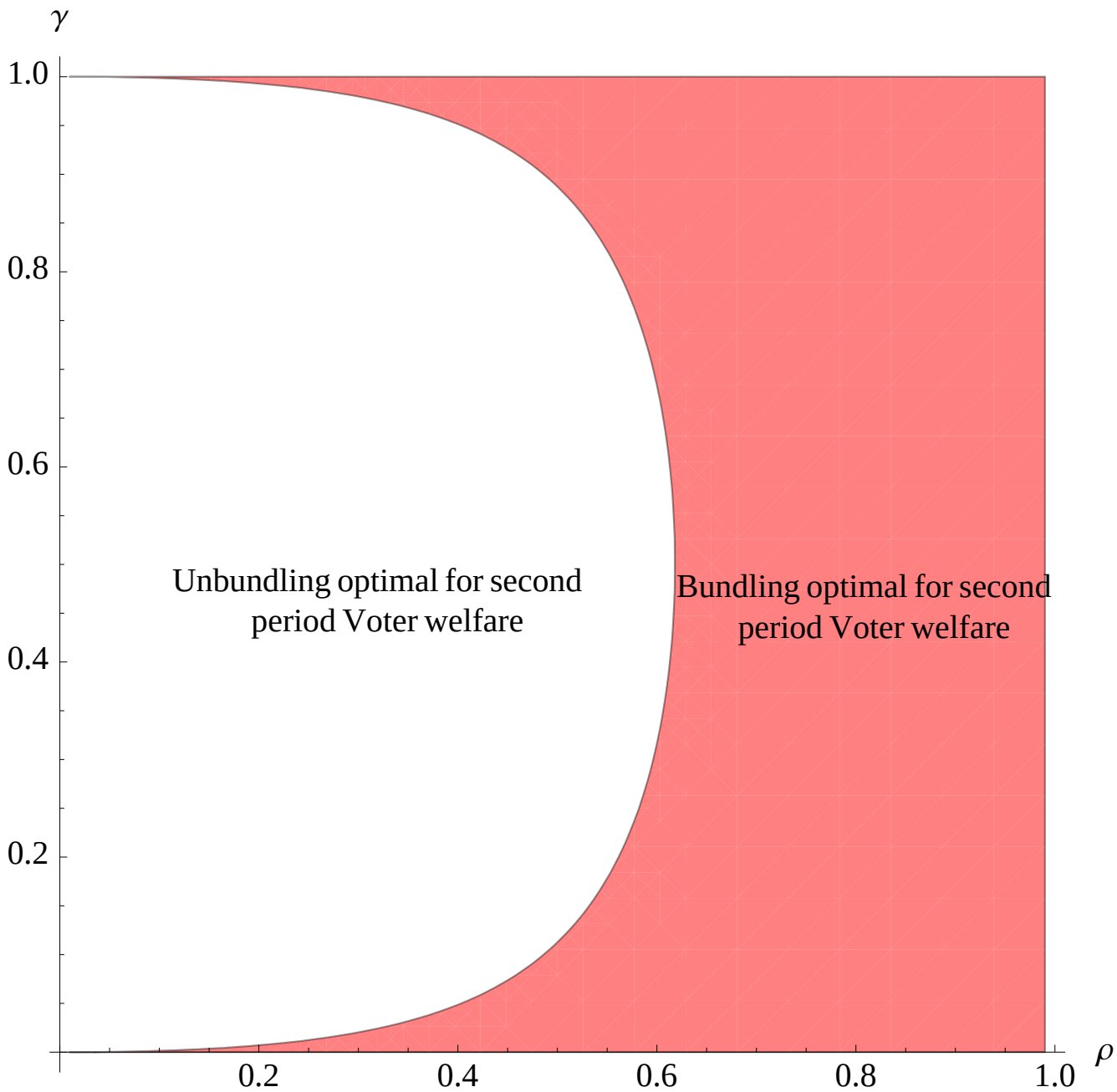
Proposition 6.2 The more highly correlated are the competences, the more likely bundling is to be optimal with respect to ex ante, expected second-period Voter welfare.

- Increased correlation increases informational benefits of bundling
- Increased correlation reduces the likelihood of an incumbent who is good on one dimension and bad on the other

Comparative Statics: Preference Weights

Proposition 6.3 The further from 1/2 are the Voter's preference weights, the more likely bundling is to be optimal with respect to ex ante, expected second-period Voter welfare.

- No affect on amount of information
- The more the voter cares about one dimension, the less of a trade-off he faces if incumbent is good on one dimension and bad on the other


γ
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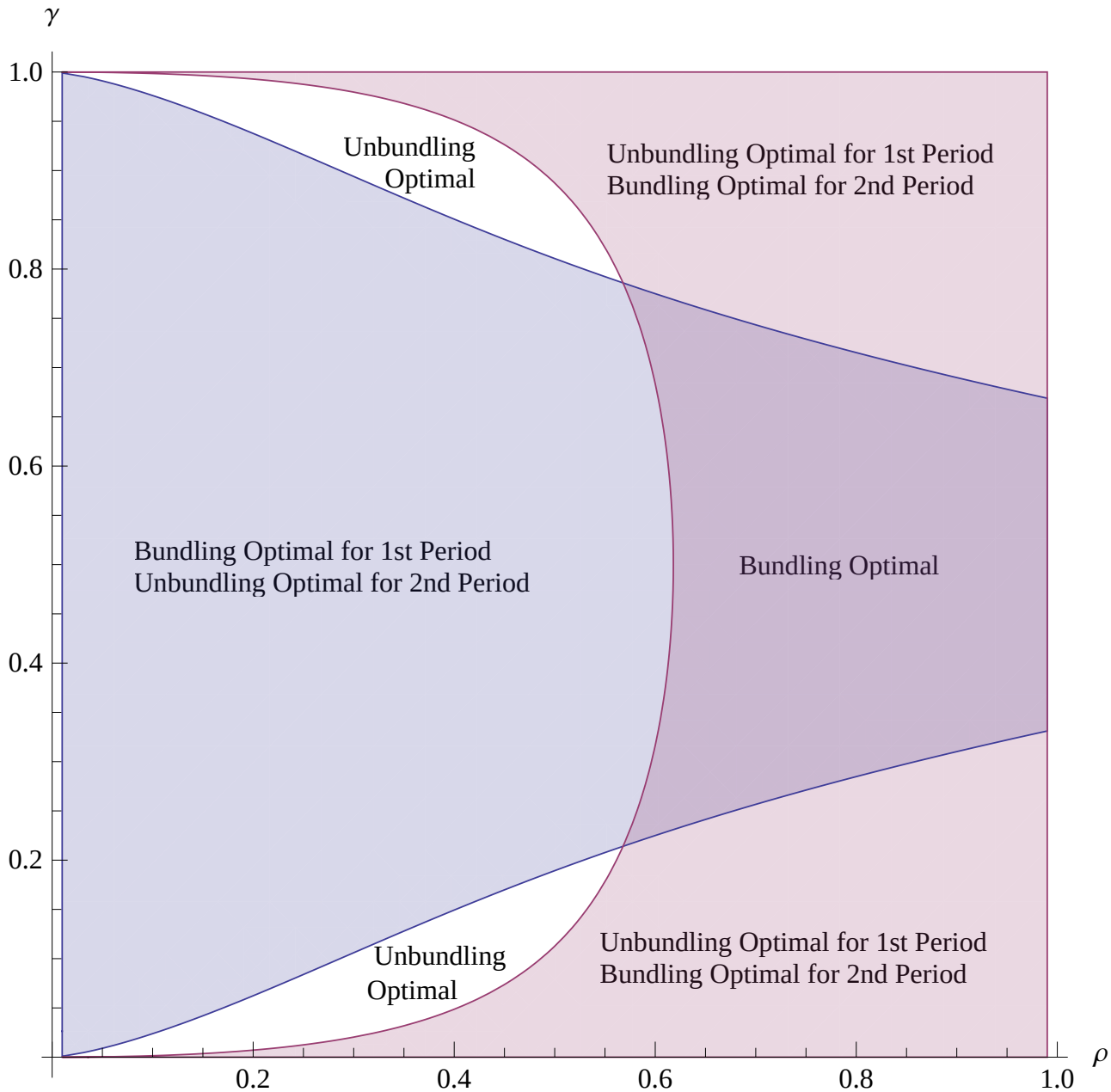
Unbundling optimal for second period Voter welfare
Bundling optimal for second period Voter welfare
0.2
0.4
0.6
0.8
1.0
ρ

Outline

Optimal Institution



Potential Applications

Organization of local government

Federalism

- γ as share of population in region 1
- Region 1 determines the winner under bundling
- More correlation may make centralization/bundling more attractive

Design of ministries in parliamentary system

Scope of authority for agencies

Future Work

Voter gets only aggregate signal of welfare

Endogenous information acquisition

Team production under unbundling