Banks without Parachutes – Competitive Effects of Government Bail-out Policies

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Banking, Financial Stability, and the Business Cycle
Sveriges Riksbank Stockholm, August 28, 2004

1. Motivation

Example of Japan

- Thin interest rate margins for private banks
- Reason: Strong competition from government financial institutions
- Postal savings system
- **Risk taking affected?**
  - at private (competitor) banks?
  - at protected banks?
- Comparable situation at
  - public banks?
  - banks that are "too big to fail"?

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Literature on risk taking of **competitor banks**

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Literature on risk taking of **protected banks**

1. Protected banks anticipate they will be saved
   → choose risky projects

   - Merton (JBF, 1977)
   - Boyd and Gertler (Fed Minneapolis 1994)
   - Schnabel (2003, 2004)

2. Competition and stability literature
   → protection as a subsidy
   → raises charter value
   → reduces risk taking

   - Keeley (AER, 1990)
   - Matutes and Vives (EER, 2000)
   - Cordella and Yeyati (EER, 2002)
   - **Allen and Gale** (JMCB, 2004)

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Results

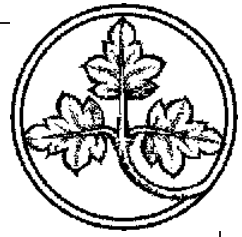
- Competitor banks always suffer from protection, take on more risk
- Effects of protection on protected bank depend on transparency
- Welfare increase possible in opaque markets

Outline of the Presentation

1. Motivation ✓
2. The Model
   - 2.1. Opaque Banks
   - 2.2. Transparent Banks
3. Conclusion

2. The Model

- n banks take deposits, invest in risky projects
- risky project: returns y with probability $p(y)$
- exogenous bail-out probability β_i for bank i
- Cournot competition on deposit market, $R = R(D)$
- continuum of risk neutral depositors
  $\rightarrow$ depositors demand default premia ρ_i



Notation

d_i	volume of deposits collected by bank i
D	aggregate volume of deposits, $D = \sum d_i$
$R(D)$	expected return for deposits ($\sim$ interest rate)
y_i	target return of bank i's investment
$p(y_i)$	probability of success
β_i	bail-out probability for bank i
ρ_i	default premium factor

$\longrightarrow$ Expected profit of a bank (index omitted)

$$\Pi = p(y) \cdot d \cdot [y - \rho\, R(D)]$$

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2.1. Opaque Banks

Time structure (index omitted)

- government fixes bail-out probabilities β
- depositors set default premium ρ
- banks choose d (influencing $R(D)$)
- banks choose y, invest
- projects mature, return y with prob. $p(y)$
  banks pay out $\rho\, R(D)$ (if possible)
  else, government pays $\rho\, R(D)$ with prob. β

Assumption: $R''(D)$ and $p''(y)$ not too large, supply elasticity of deposits not too small

2.1.1. Monopoly

- Backward solution:

$$\begin{aligned}
\Pi &= p(y)\, d\, [y - \rho\, R(D)] \\
\partial\Pi/\partial y &= d\left[p(y) + [y - \rho\, R(d)]\, p'(y)\right] = 0, \\
y_d &= \frac{\rho\, p'(y)\, R'(d)}{2\, p'(y) + [y - \rho\, R(d)]\, p''(y)} > 0, \\
y_\rho &= \frac{p'(y)\, R(d)}{2\, p'(y) + [y - \rho\, R(d)]\, p''(y)} > 0,
\end{aligned}$$

  $\Pi(y, d, \rho) \rightarrow \Pi(d, \rho)$

- Next step: solve for d and ρ, in equilibrium,
  - d optimal for given ρ: $\dfrac{\partial\Pi}{\partial d} = 0$
  - ρ fair for given d: $\rho = \dfrac{1}{p(y) + \beta\,(1 - p(y))}$

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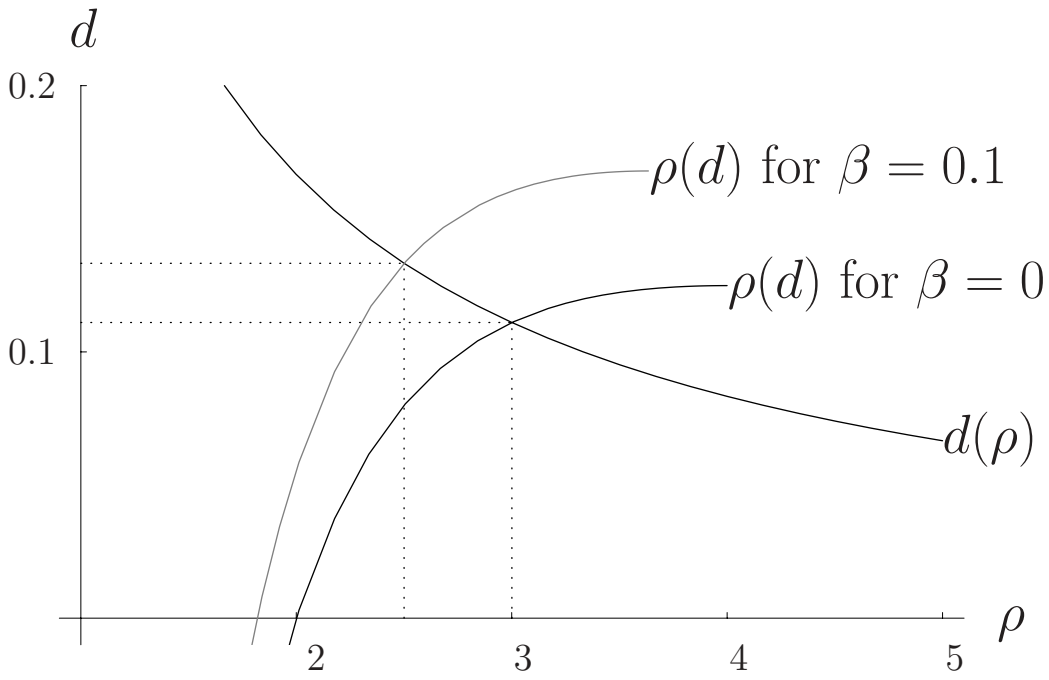

Results: With rising β,

- Default premium ρ falls
- Volume d rises $\longrightarrow$ expansion
- Risk y falls

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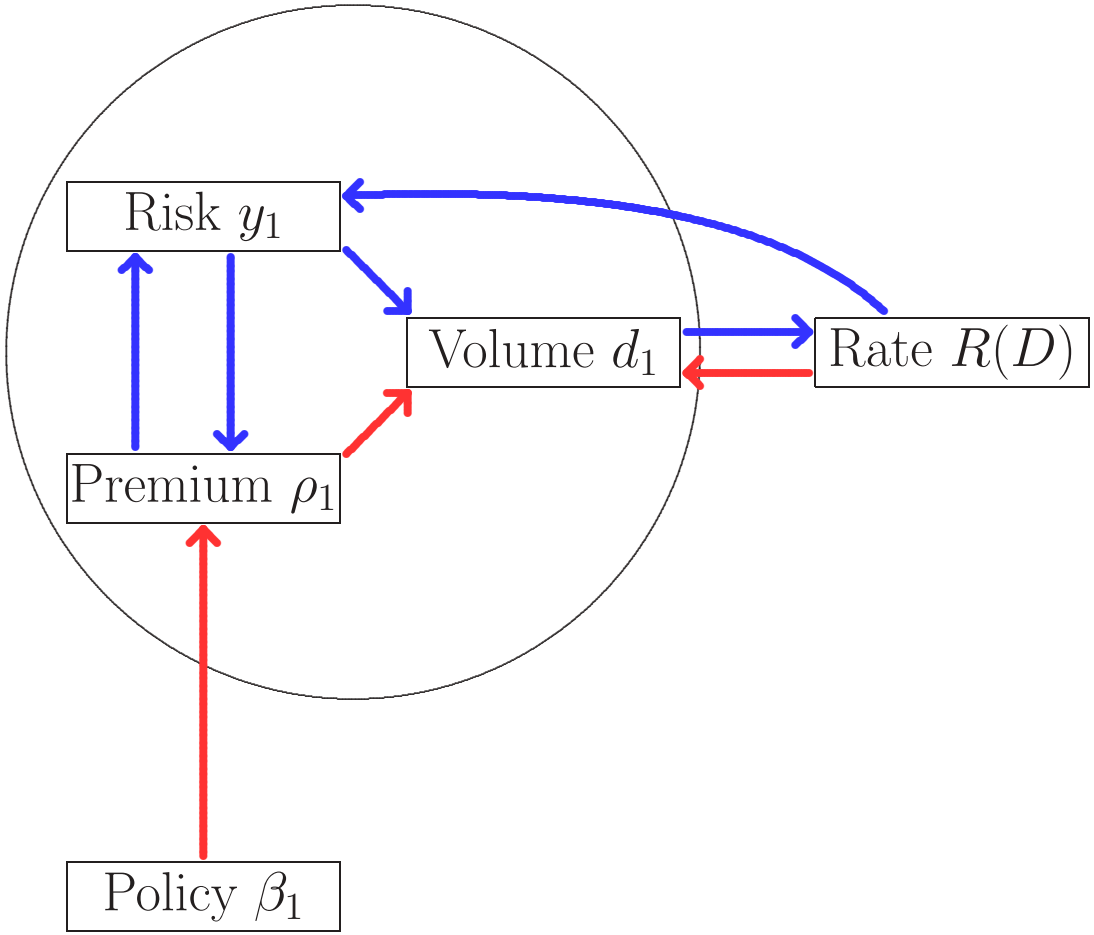

$$\Pi = p(y) \cdot d \cdot [y - \rho\, R(D)]$$

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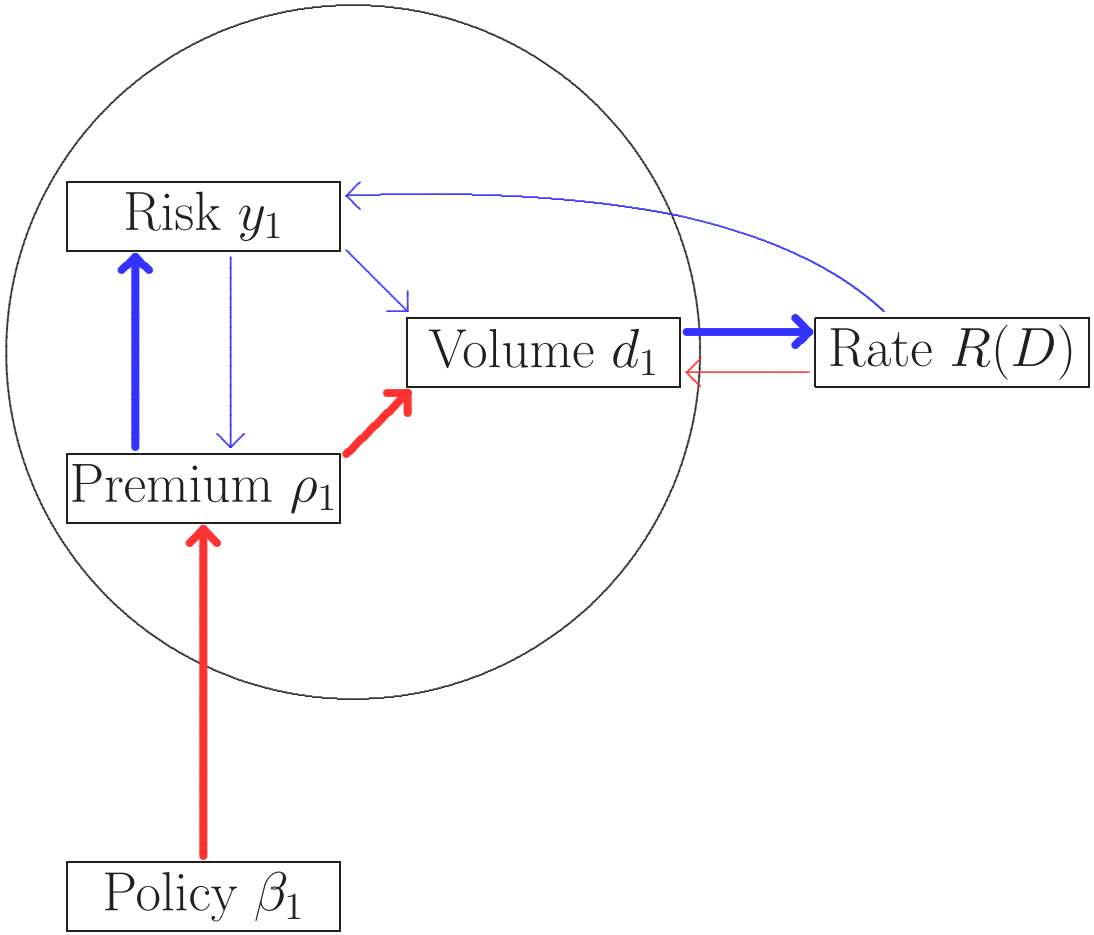

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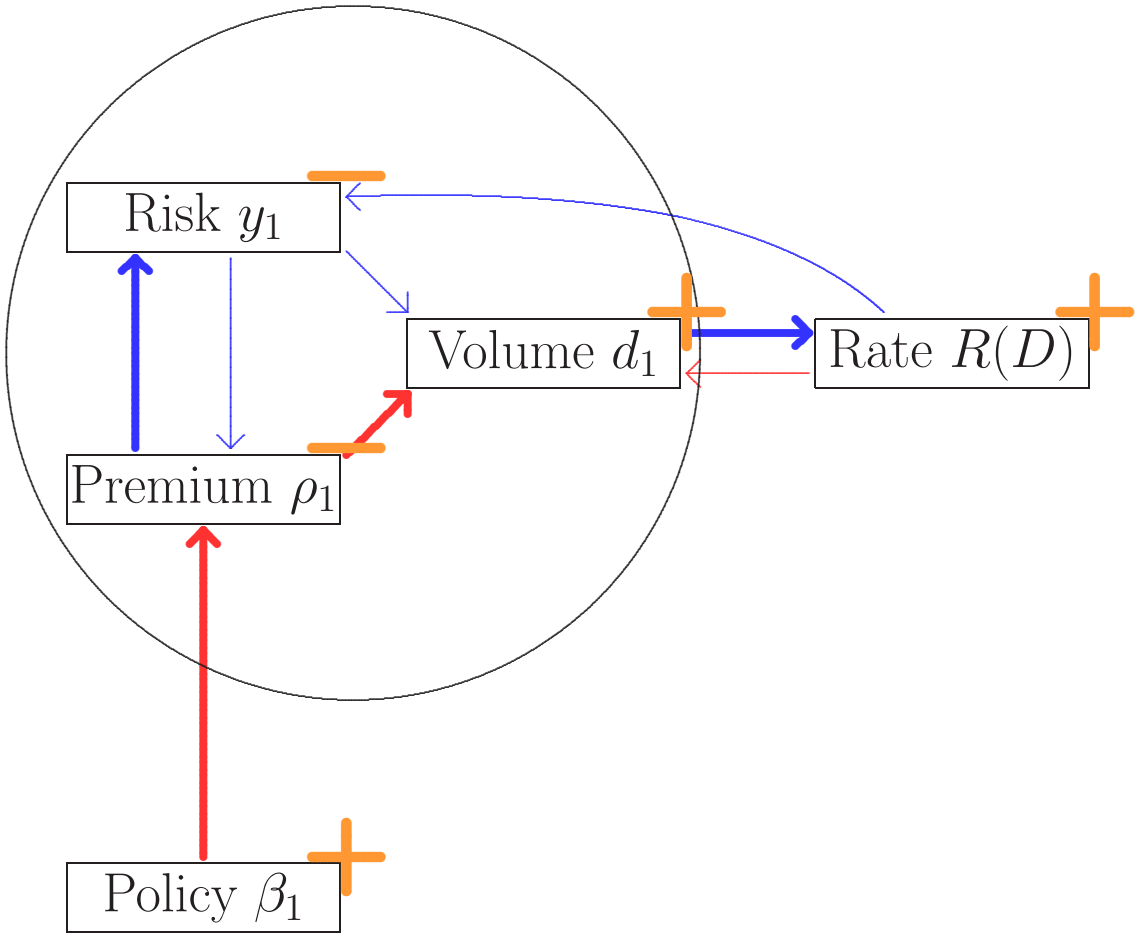

$$\Pi = p(y) \cdot d \cdot [y - \rho\, R(D)]$$

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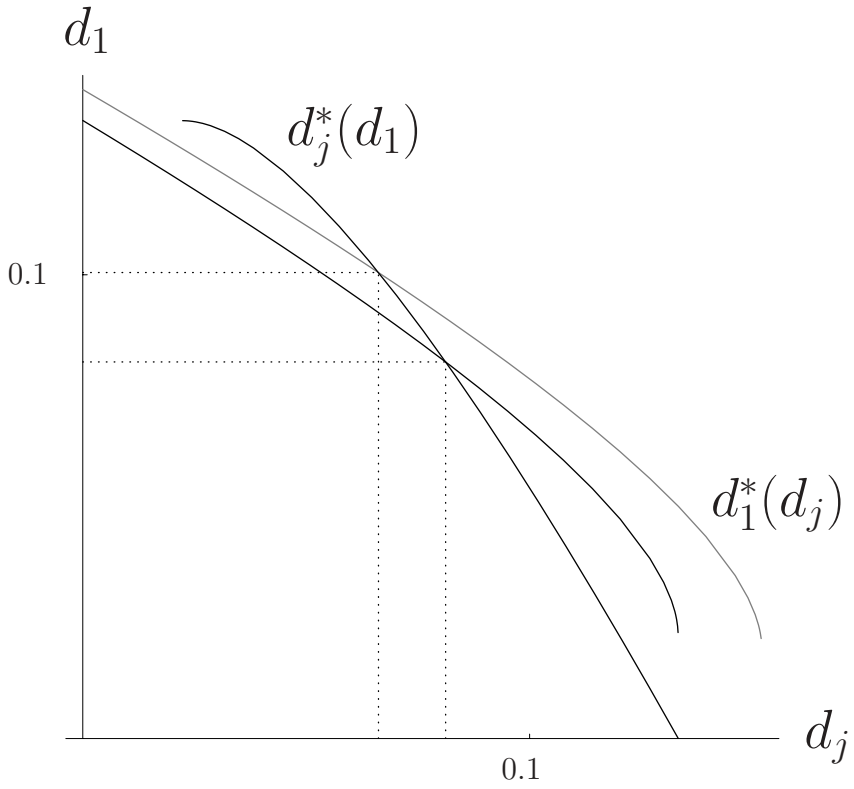
2.1.2. Oligopoly

- Reactions only on the market for deposits
- Bank 1 is protected → look at increasing β_1



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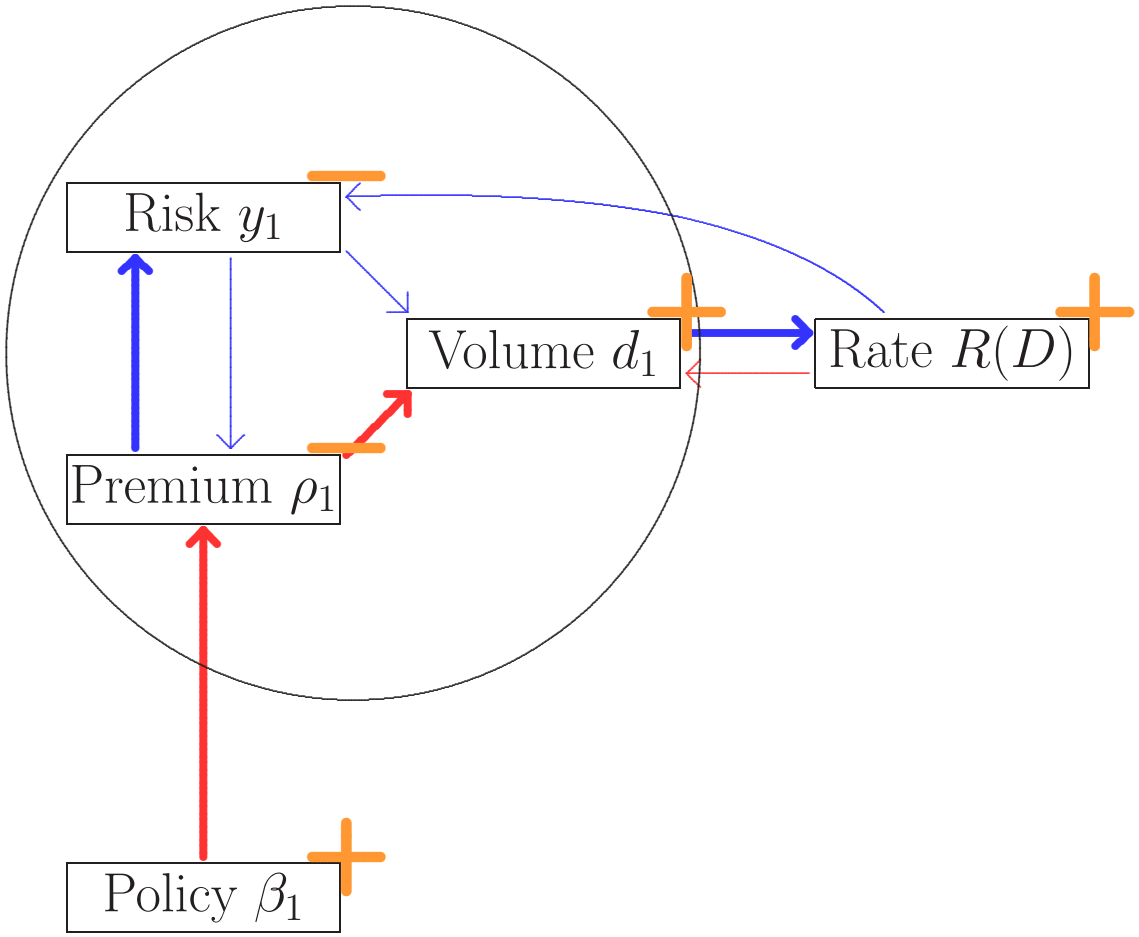

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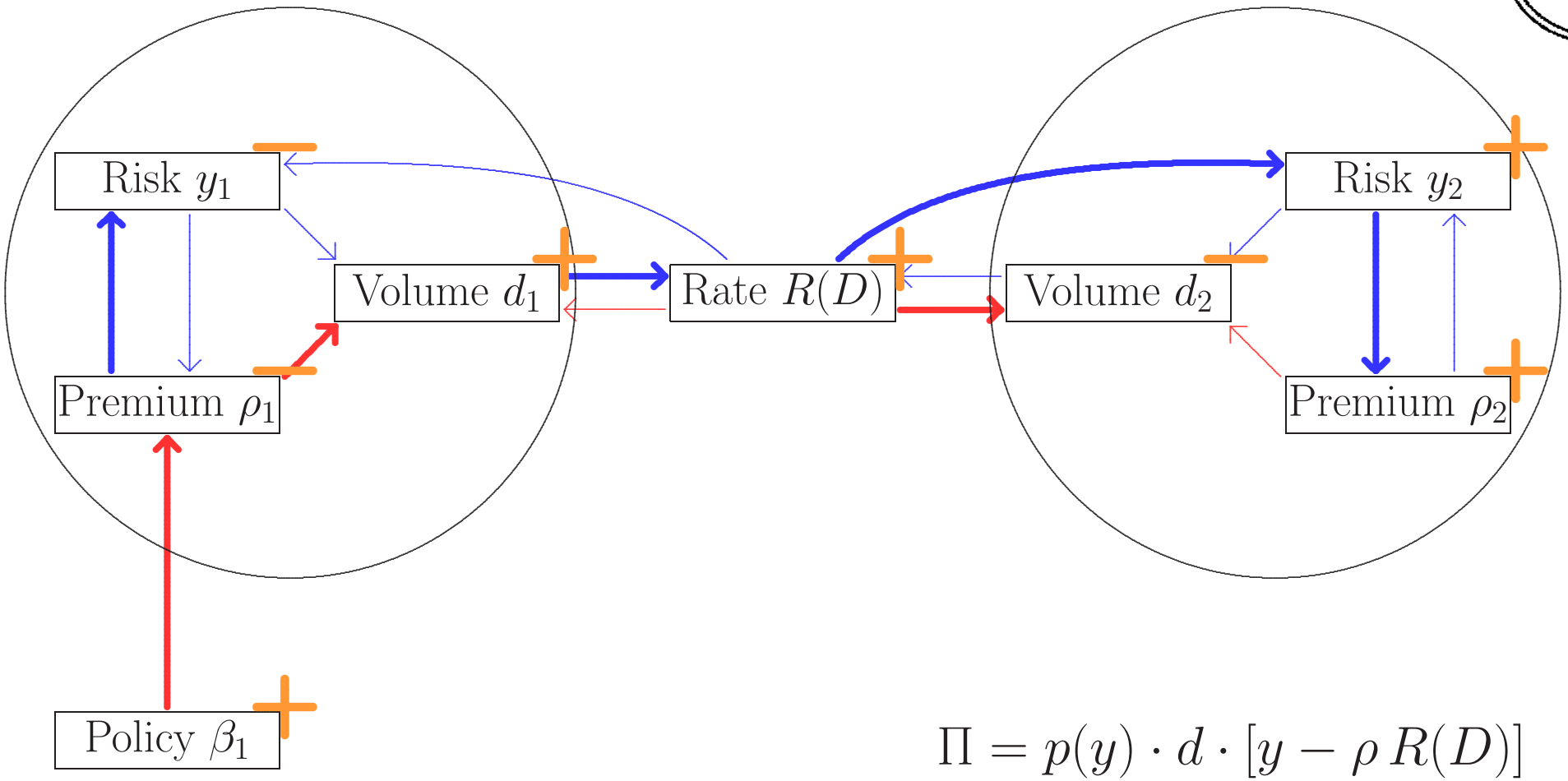

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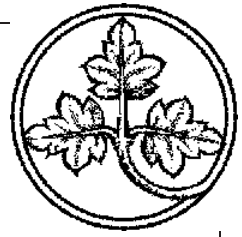

Proposition 1 (Competitive effects of protection)
Increase in bail-out probability $\beta_1 \implies$

1. *expansion of deposits at bank 1*	$\partial d_1/\partial\beta_1 > 0$
contraction of competitors' deposits	$\partial d_j/\partial\beta_1 < 0$
expansion of aggregate deposits	$\partial D/\partial\beta_1 > 0$
2. *reduction in risk at bank 1*	$\partial y_1/\partial\beta_1 < 0$
lower default premium	$\partial \rho_1/\partial\beta_1 < 0$
3. *increase in risk at the competitors*	$\partial y_j/\partial\beta_1 > 0$
higher default premia	$\partial \rho_j/\partial\beta_1 > 0$

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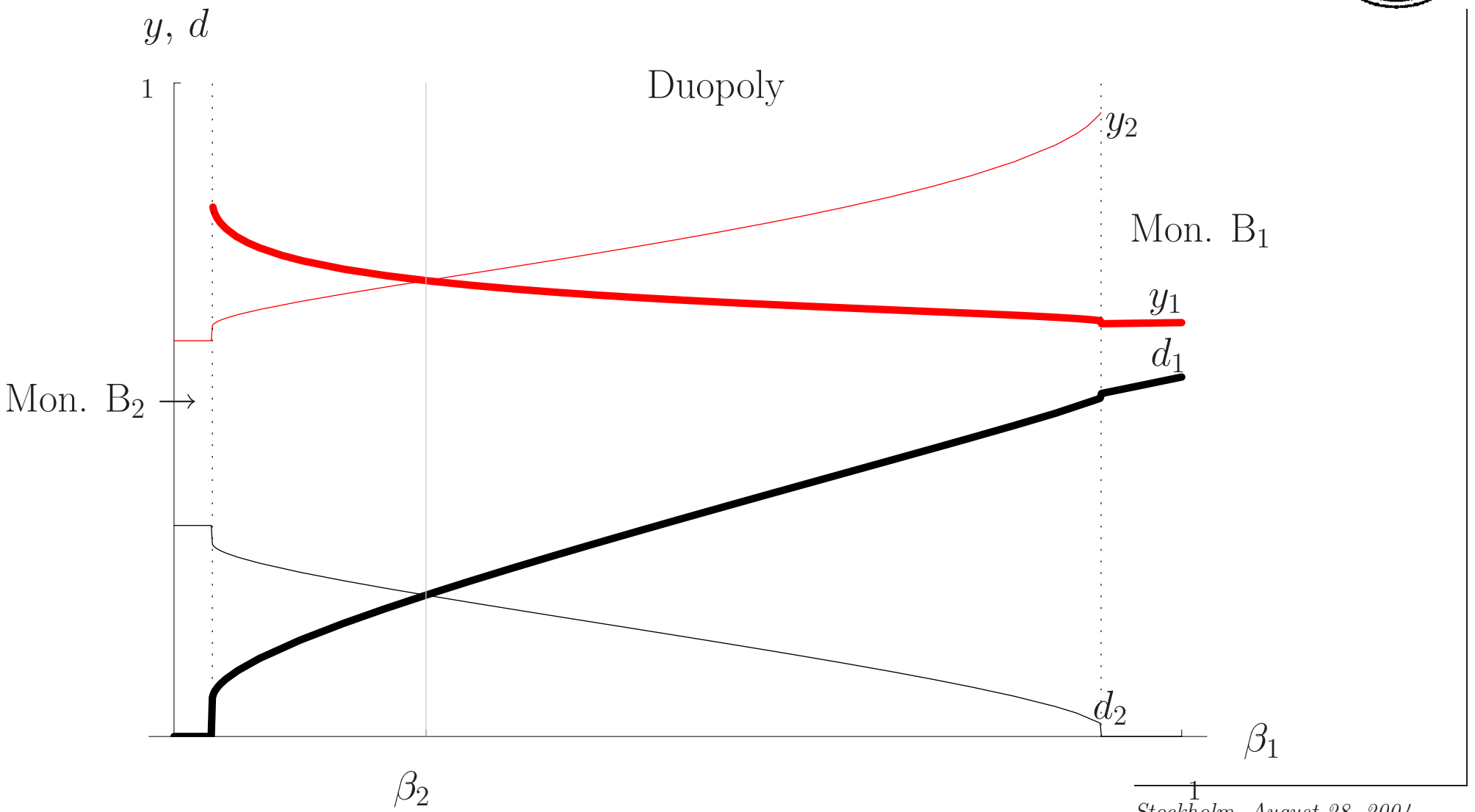

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2.1.3. Welfare

- First order effect: high β increases welfare
- Second order effect: asymmetric β increases welfare
- Contagion not considered $\rightarrow$ further welfare effects
- Redistribution wasteful $\rightarrow$ welfare loss

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2.2. Transparent Banks

Time structure (index omitted)

- government fixes bail-out probabilities β
- banks choose y, depositors observe y
- banks choose d (influencing $R(D)$)
- depositors set default premium ρ, banks invest
- projects mature, return y with prob. $p(y)$
  banks pay out $\rho\, R(D)$ (if possible)
  else, government pays $\rho\, R(D)$ with prob. β

Additional assumption: β not too large

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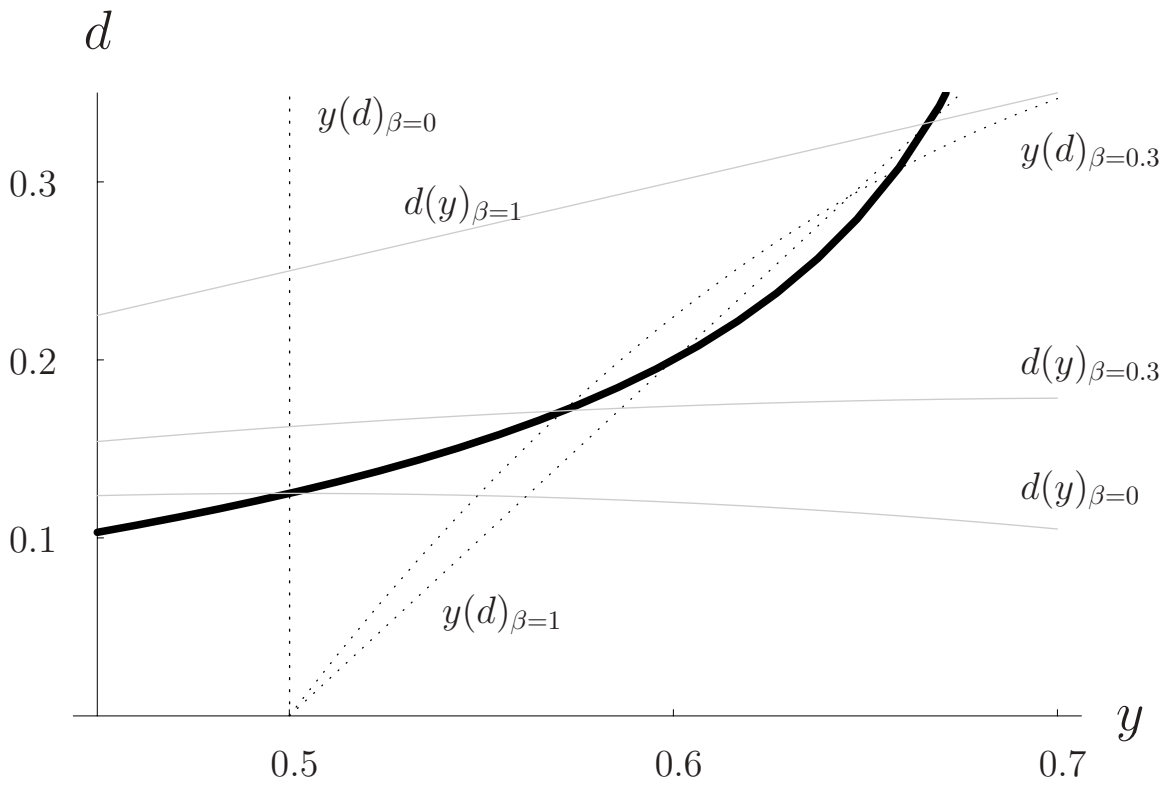
2.2.1. Monopoly

- for solution, first substitute $\rho = \dfrac{1}{p(y) + \beta\,(1 - p(y))}$, then solve for y and d



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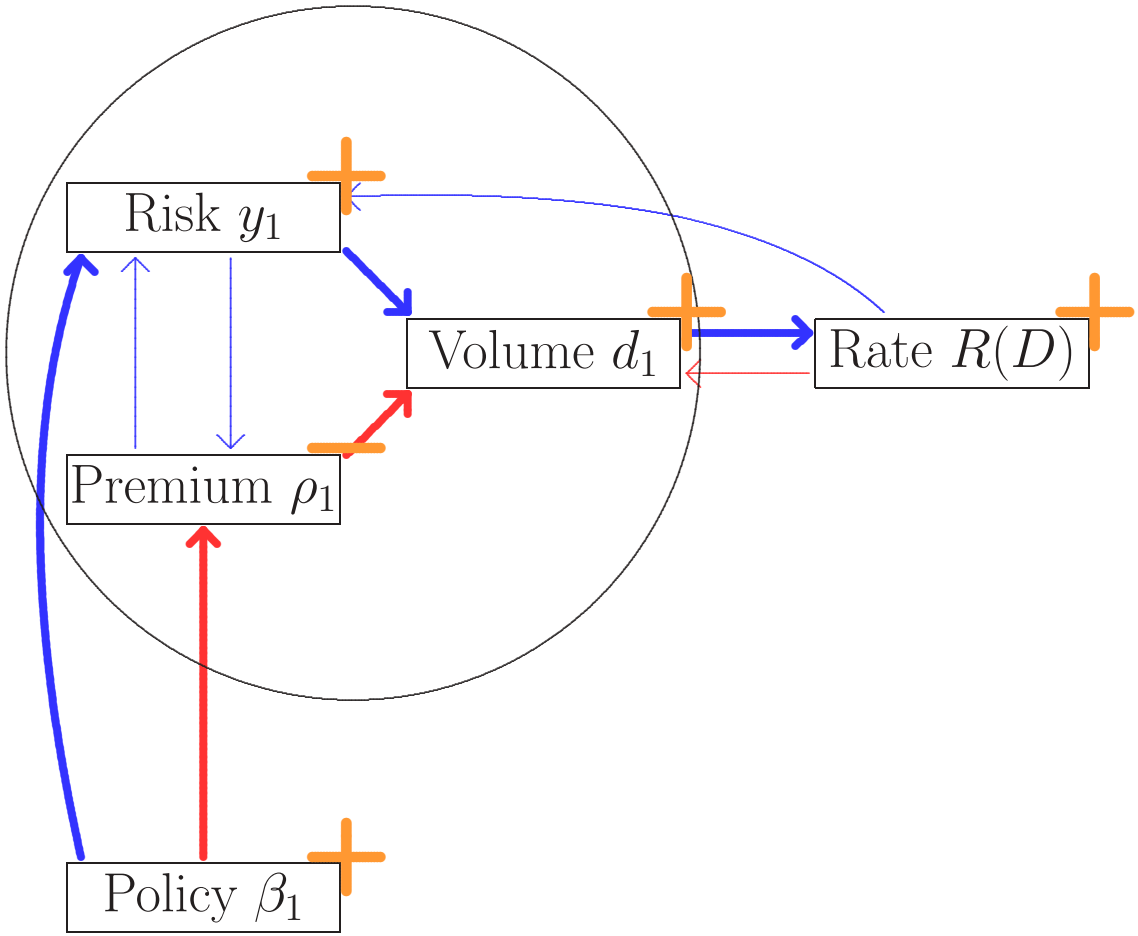

$$\Pi = p(y) \cdot d \cdot [y - \rho\, R(D)]$$

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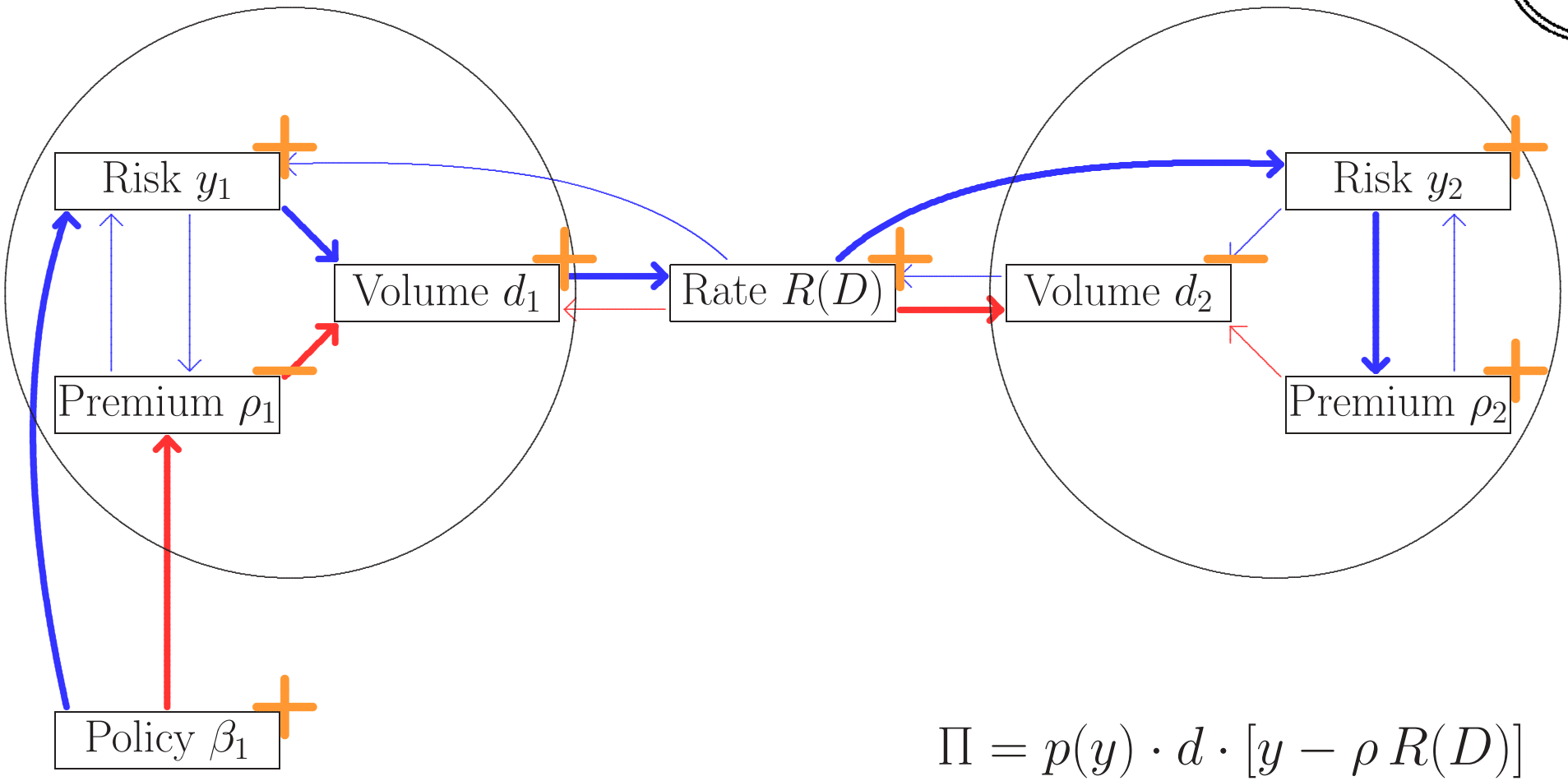

$$\Pi = p(y) \cdot d \cdot [y - \rho\, R(D)]$$

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2.2.2. Oligopoly

Reaction on the market for deposits as before (Cournot style)

Proposition 2 (Competitive effects of protection)
Increase in the bail-out probability β_1 implies

1. *expansion of deposits at bank 1*	$\partial d_1/\partial\beta_1 > 0$
contraction of competitors' deposits	$\partial d_j/\partial\beta_1 < 0$
expansion of aggregate deposits	$\partial D/\partial\beta_1 > 0$
2. *increase in risk at bank 1*	$\partial y_1/\partial\beta_1 > 0$
a lower default premium	$\partial \rho_1/\partial\beta_1 < 0$
3. *increase in risk at the competitors*	$\partial y_j/\partial\beta_1 > 0$
higher default premia	$\partial \rho_j/\partial\beta_1 > 0$

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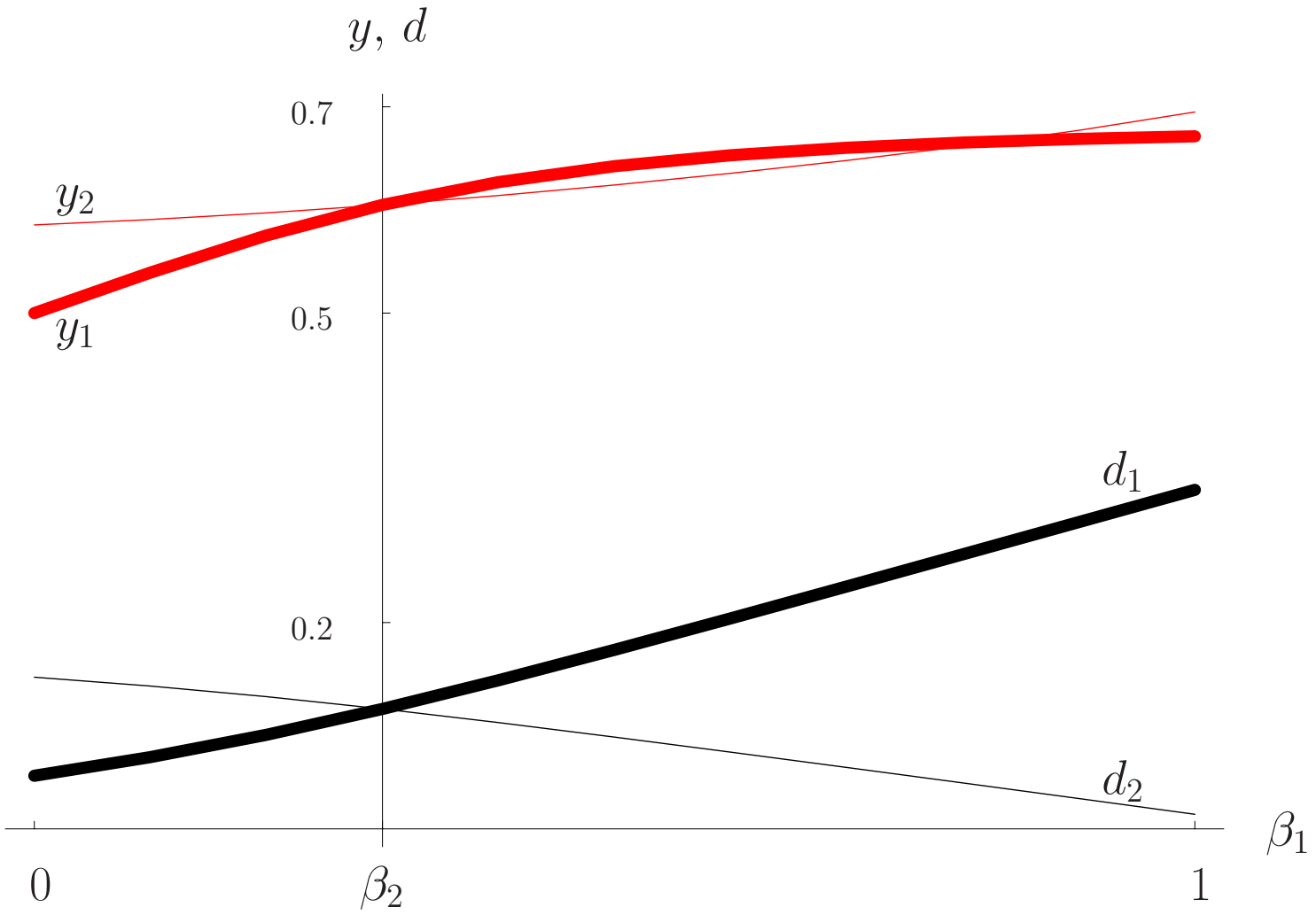

$\rightarrow$ Unclear which bank (protected, competitor) takes on more risk

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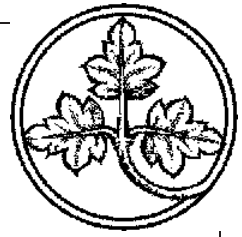
2.2.3. Welfare

- $\beta = 0$ implies that both y and d are chosen first best
- Increase in β unambiguously leads to welfare loss



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Implications

- Optimal bailout policy changes with market transparency
  - Basel II
  - developing economies
- Discussion on government protection misleading if it concentrates only on protected banks $\rightarrow$

Competitors matter

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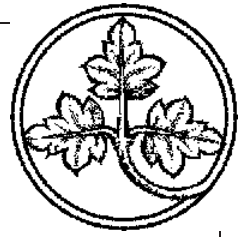
Extensions



- Endogenize β
  more compelling if large banks are protected ("too big to fail")
- Alternative types of markets
  - Salop circle
  - Competition for loans/investments
- Empirical confirmation $\longrightarrow$ current work

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Thanks for your attention and discussion!

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