Recap

- Last class (January 30, 2007)
  - Infinitely repeated games
    - Prisoner's dilemma
    - Friedman's Theorem
- Today (February 1, 2007)
  - Friedman's Theorem
  - Repeated Cournot game
  - Wage Setting

Example: Wage setting

- Stage game
  - One firm, one worker
  - The firm offers the worker a wage, w
  - Then the worker accepts or rejects the firm's offer
    - Reject: the worker becomes self-employed at wage w_0
    - Accept: Work (disutility e), or Shirk (disutility 0)
      - If the worker works (supplies effort): Output is high=y
      - If the worker shirks: Output is high with probability p, and low=0 with probability 1-p
  - The firm does not observe the worker's effort decision
  - The output of the worker is observed by both parties

Example: Wage setting (cont.)

- Payoffs (Firm,Worker)
  - Work (Supply effort)
    - High output: (y-w,w-e)
  - Shirk
    - High output: (y-w, w)
    - Low output: (-w, w)
  - We assume $y - e > w_0 > py$
- What is the subgame-perfect equilibrium in this stage game?
  - For any $w \geq w_0$, worker accepts employment and shirks
  - Firm offers w=0 (or any other $w<w_0$), and the worker chooses self-employment

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Example: Wage setting (cont.)

- Strategies
  - Firm: Offer w=w* in the first stage.
    In stage t,
    - offer w=w* if the history of play is *high-wage, high-output* (all previous offers have been w*, all previous offers have been accepted, and all previous outputs have been high)
    - otherwise, offer w=0
  - Worker:
    - If $w>w_0$, accept the firm's offer and supply effort if the history of play, including the current offer, is high-wage, high-output (shirk otherwise)
    - If $w<w_0$, choose self -employment

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Example: Wage setting (cont.)

- Suppose firm offers $w^* \geq w_0$
  - Worker accepts
  - Work (Supply effort)
    $V_e = (w^*-e) + \delta V_e \rightarrow V_e = (w^*-e)/(1-\delta)$
  - Shirk
    $V_s = w^* + \delta(pV_s + (1-p)\, w_0/(1-\delta)) \rightarrow$
    $V_s = [(1-\delta)w^* + \delta(1-p)\, w_0]/(1-\delta p)(1-\delta)$
  - Worker should supply effort if $V_e \geq V_s \rightarrow$
    $w^* \geq w_0 + e + e(1-\delta)/\delta(1-p)$

If $p=0$: $(w^*-e)/(1-\delta) \geq w^* + w_0\delta/(1-\delta)$

If p is close to 1?

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Example: Wage setting (cont.)

- Firm choices:
  - Pay w^*
  - Pay $w = 0$
- When is it the best response for the firm to offer w^*?
  - From worker's best response
    $w^* \geq w_0 + e + e(1-\delta)/\delta(1-p)$ (1)
  - We also need $y - w^* \geq 0$, or $y \geq w^*$

$\rightarrow y \geq w_0 + e + e(1-\delta)/\delta(1-p)$ (2)

The strategies induce a NE if (1) and (2) hold.

Is this a SPNE?

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Example: Wage setting (cont.)

- What are the subgames?
  - Subgames beginning after a high-wage, high-output history
  - Subgames beginning after all other histories

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