Bonus Question:
How Does Incentive Pay Affect Wage Rigidity?

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Motivation

- ▶ **Wage rigidity** is central to macro and labor (Keynes 1936)
  - ▶ Wage rigidity $=$ sluggishly adjusting or fixed wages
  - ▶ Affects unemployment dynamics (Hall 2005, Gertler & Trigari 2009)
  - ▶ Affects inflation dynamics (Christiano et al 2005, 2016)

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- Recent evidence: estimates of wage rigidity depend on measure (Grigsby, Hurst & Yildirmaz 2021)
    - Base wages are rigid in nominal and real terms (2.5% of workers receive annual nominal base cut)
    - ... But bonuses are flexible (17.5% of workers receive annual base + bonus cut)

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- ▶ *What is the relevant notion of wage rigidity when there is flexible bonus pay?*

- ▶ This paper: models bonuses as incentive pay
    - ▶ 30-50% of US workers get incentive pay (Lemieux, McLeod and Parent, 2009; Makridis & Gittelman 2021)
    - ▶ Including 25-30% of low wage workers
    - ▶ Incentive pay = piece-rates, bonuses, commissions, stock options or profit sharing
    - ▶ Longer term incentives (e.g. promotions) are also common

Wage Flexibility from Incentives is Irrelevant for Unemployment Dynamics

This paper: embeds dynamic model of incentive pay into standard macro models

- ▶ Incentive pay = contract with moral hazard (Holmstrom 1979; Sannikov 2008)
- ▶ Unemployment = standard labor search model (Mortensen & Pissarides 1994)

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- ▶ Unemployment = standard labor search model (Mortensen & Pissarides 1994)
- ▶ Allows flexible incentive pay consistent with microdata + long term contracts (Barro 1977)
- ... But contracts are complex

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Unemployment dynamics: first order equivalent in two economies ("DICE Theorem")
1. Economy #1: labor search model with flexible incentive pay
2. Economy #2: labor search model with rigid wages as in Hall (2005)

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Intuition: incentive effects matter
1. Direct productivity effect: negative shock to value added in Economies #1 and #2
2. Marginal cost effect: fall in wages in Economy #1 dampens fall in profits
3. Incentive effect: fall in effort in Economy #1 amplifies fall in profits
   Optimal contract: incentives offset marginal cost changes

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Extension: introduce bargaining into incentive pay model
- ▶ **Analytical result**: bargaining wage flexibility allocative for unemployment dynamics
  - → But incentive wage flexibility irrelevant
- ▶ **Calibration w/ micro moments**: separately measure bargaining vs. incentive wage flexibility
- ▶ **Numerical result**: large unemployment fluctuations even if wages are flexible
  - → Similar unemployment dynamics to Hall (2005) rigid wage model
  - → XX%-XX% of wage flexibility in the data is due to incentives

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Takeaways:

▶ Wage flexibility due to complex and flexible incentive pay is *irrelevant* for unemployment dynamics

▶ Unemployment dynamics behave as if a simple model with wage rigidity

▶ Empirical work should measure *allocative* wage flexibility **due to bargaining not incentives**

Outline

1. **Static labor search model + static incentive contract**
   - ▶ Intuition for DICE and role of incentive effects

2. **DMP model + general dynamic incentive contract**
   - ▶ Derive DICE theorem for **wide class of contracts** (e.g. unrestricted utility function, persistent shocks)
   - ▶ Due to **envelope and aggregation theorems** we develop

3. **Wage Bargaining**
   - ▶ Result: wage flexibility from bargaining is allocative, flexibility from incentives irrelevant
   - ▶ Calibrate model: disentangle wage flexibility from bargaining vs. incentives

4. **Extension to inflation dynamics:** DICE for Phillips Curve