Discussion of "The Factor Competition Channel of Interest Rate Transmission"

Discussion by Sungjune Pyun
Yonsei University

2024 USC PhD Alumni Conference

June 2024

Summary of the Paper

- Premise: interest cuts will increase firms' growth rate.
- This paper finds that with factor competition, this effect is weaker
  - Why? When interest rate decreases, firms' grow at a faster rate. This increase the demand for factors and the factor prices.
  - An increase in the factor prices will reduce firms' growth rate, all else equal.
- Additionally, this paper argues that the cash flow duration of the economy is important.
- When cash flow duration of the economy is high:
  - Real estate prices increase relatively more
  - But, the growth rate of other factors (labor) will be lower

Cash flow duration

- Duration measures the interest rate sensitivity of bonds
- For fixed income securities, a higher duration could either imply that they have
  - longer maturity
  - low coupon rate (or zero-coupon bonds)
- For firms defining duration is tricky because
  - there is no maturity
  - future cash flows uncertain

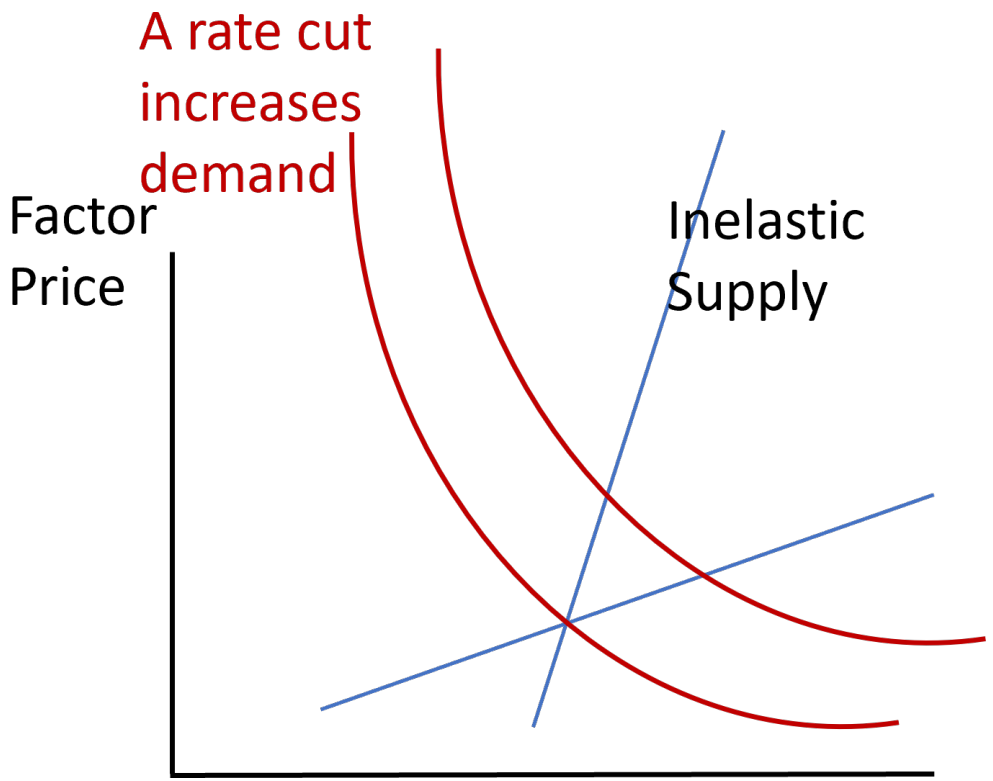
Cash flow duration

- Dechow, Sloan, and Soliman (2004) propose measuring equity duration using expected ROE and sales growth

$$\begin{aligned} CF_{t+s} &= E_{t+s} + (BV_{t+s} - BV_{t+s-1}) \\ &= BV_{t+s-1}\left(\frac{E_{t+s}}{BV_{t+s-1}} + \frac{BV_{t+s}}{BV_{t+s-1}} - 1\right) \end{aligned}$$

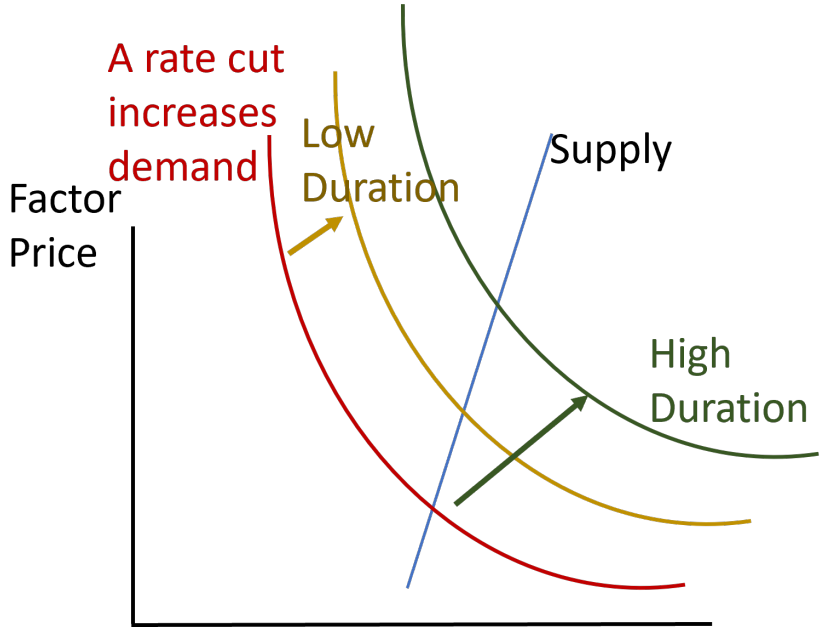
- Since high duration firms are expected to have cash flows realized at a later date, these firms will have
  - lower earnings-to-price ratio today
  - higher market-to-book (e.g., Weber 2018)
- Similar to bond duration, their firm value will be more interest rate sensitive.

The effect of a rate cut - most baseline case



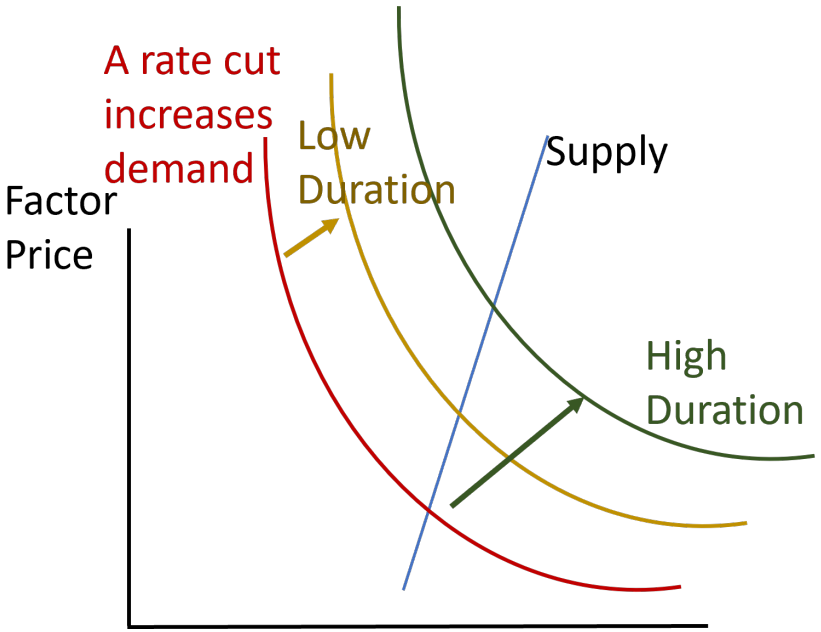
- Interest rate cut → increase in firm investment → increase in demand for input factors
- Factor price will increase more if factor is inelastic (i.e., land compared to employment)

Cash flow duration



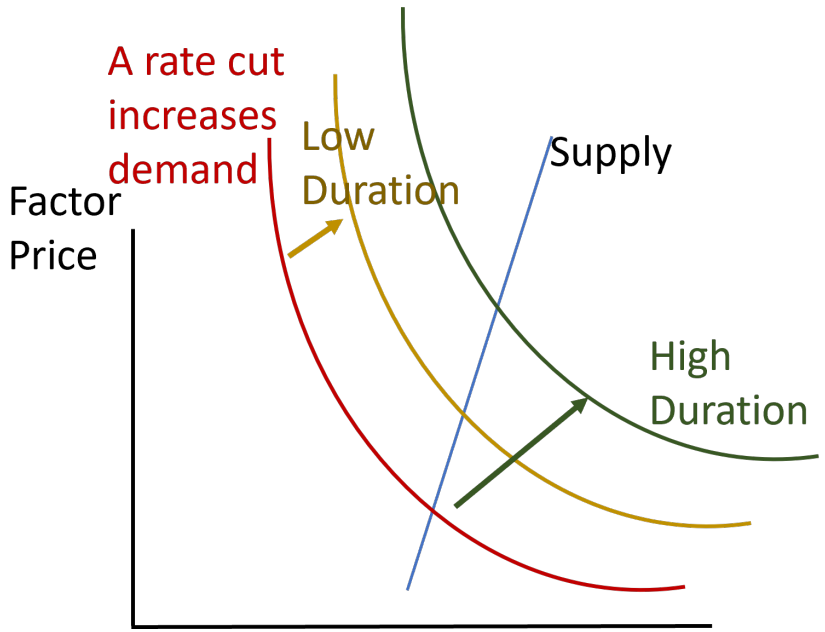
- ▷ Firm Value $\approx$ PV of production - Investment cost
- ▷ If duration is high:
  - "PV of production" will be more sensitive to interest rate changes
  - MB $>>$ MC per unit per additional unit of investment
  - Capital demand will increase more.

Prediction 1: Factor price and interest rate



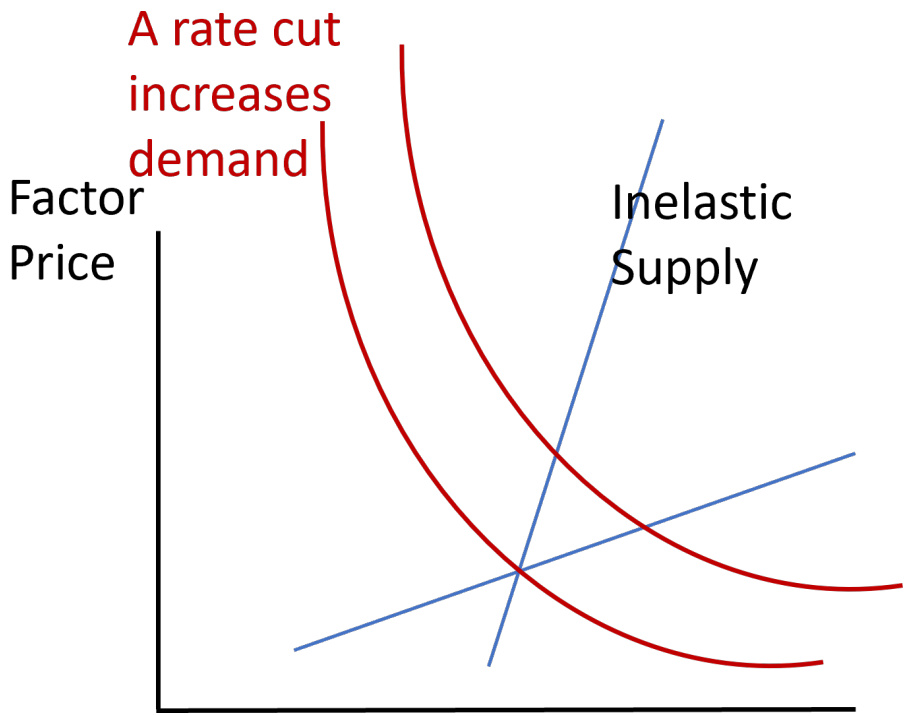
- Prediction 1: Factor prices will be more sensitive to changes in interest rate if the duration of the economy is high.

Prediction 2: Factor competition channel



- Why? Since factor prices increase more if duration of the economy is high, individual firms in the economy will invest less in response to the rate cut.
- Firm Value $\approx$ PV of production - Investment cost
- The cost increases relatively more if duration of the economy is high

Prediction 3: Factor competition channel and supply elasticity



- ▷ The factor competition is weaker if factor supply is elastic
- ▷ This is because factor price will increase less

Independence assumption in the model

- The last two predictions strongly relies on the assumption that D_i is independent of average duration of the economy $E[D_i]$
- Equation (4) in the model (Prediction 1):

$$\frac{\partial \log k_i}{\partial r} = -\frac{\partial \log p}{\partial r} - D_i$$

- Assuming D_i is independent from $E[D_i]$, Equation (10) is derived (Prediction 2):

$$\frac{\partial \log k_i / \partial r}{\partial E[D_i]} = -\frac{\partial \log p / \partial r}{\partial E[D_i]} = \frac{1}{1+\eta}$$

Independence assumption

- Is D_i independent from $E[D_i]$?
- Empirically, this translates to whether the zip code duration (D_i) is independent from the county level duration ($E[D_i]$).
- When we set $D_i = E[D_i] + \epsilon_i$,
  where $\epsilon_i \perp E[D_i] \rightarrow$ we would get

$$\frac{\partial \log k_i / \partial r}{\partial E[D_i]} = -\frac{\partial \log p / \partial r}{\partial E[D_i]} = \frac{1}{1+\eta} - 1 < 0$$

- How should we think about GM factory being located next to a Biotech cluster?
- I would like to see some evidence that supports this assumption.

Empirical Results

- Prediction 1: Factor prices will be more sensitive to interest rate if duration of the economy is high

$$\log p_{j,z,c,t} = \beta r_t \times D_{z,t} + \psi_{c,u,t} + \zeta_j + \epsilon_{j,z,c,t},$$

z = zip code, c= county, t=year, $D_{z,t}$ zip code duration

- Should you include r_t and $D_{z,t}$ in the regression?

Table 2

The factor competition channel: factor price

Dependent Variable: Factor (Property) Price

	(1)	(2)	(3)	(4)
r =	Cum. Shock FFR		10Y	
r×Zip dur.	−0.018**		−0.009**	
	(0.009)		(0.004)	
r×Zip IR sens.		−0.046***		−0.017***
		(0.013)		(0.005)
Observations	1,680,778	1,680,778	1,680,778	1,680,778
Adjusted R^2	0.838	0.838	0.838	0.838

Empirical Results

- Prediction 2: Firms located in high duration economy will invest less in response to the rate cut

$$\Delta E_{i,z,c,t} = \lambda \Delta r_t \times D_{z,t} + \psi_{c,i,t} + \zeta_z + \gamma \Delta E_{i,z,c,t-1} \epsilon_{j,z,c,t},$$

- Why is the shock Δr_t in this table and r_t above?

Table 3
The factor competition channel: employment

	(1)	(2)	(3)	(4)
r =	Shock FFR		Shock NS	
$\Delta r \times$Zip dur.	2.407***		2.105***	
	(0.384)		(0.396)	
$\Delta r \times$Zip IR sens.		3.021***		3.140***
		(0.541)		(0.595)
Observations	9,930,680	9,930,680	9,930,680	9,930,680
Adjusted R^2	0.254	0.254	0.254	0.254

Relatively minor comments

- Figure 1 includes a graphical presentation of cash flow duration in the US. It is difficult to read. A more concrete examples would be helpful.
  - Is there substantial zip code level variation within a county, where one would expect that they would not exist.
  - Sonoma county? Clark county?
- Sample period is 1998-2019. These are times when aggregate firm values tend to decrease in response to a rate cut. This paper assumes the opposite.
- There seems to be several typos in the model. In Eqn. (3), should D_i be in log terms? If so, what would happen if the log Duration is negative? (if firm is near default) The model implies a sign switch?!

Conclusion

- The model has an interesting setting, with a rich set of implications to test
- Interesting analysis at the ZIP code level
- Empirical results are consistent with model implications
- I think there is some potential, but a further clean-up of the paper would be helpful!