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

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Summary of the Paper

- Based on the premise that interest cuts will increase firms' growth rate.
- This paper shows that with factor competition, this effect is weaker
  - Why? A decrease in the interest rate will increase factor prices because firms grow.
  - An increase in factor prices will reduce firms' growth rate, all else equal.
- Additionally, this paper finds that cash flow duration of the economy is important.
- When cash flow duration of firms in the region is high:
  - Real estate prices increase relatively more
  - But!! Employment grows less

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??
  - there is no maturity
  - future cash flows uncertain

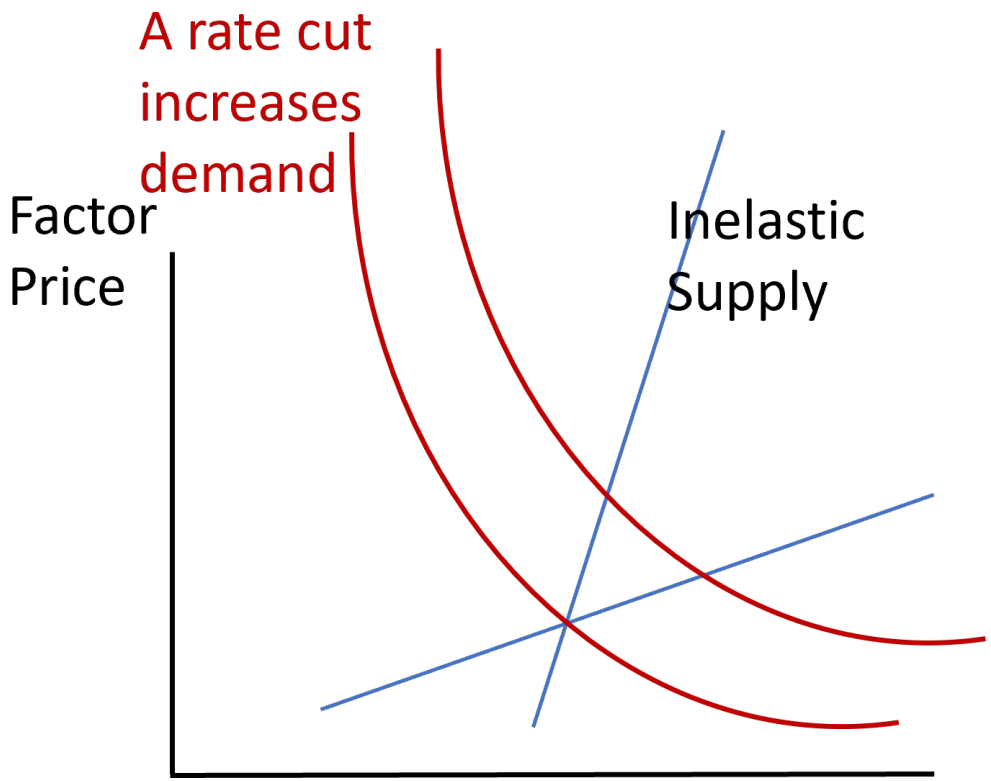
Cash flow duration

- Dechow, Sloan, and Soliman (2004) suggest measuring equity duration by future expected ROE and growth

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

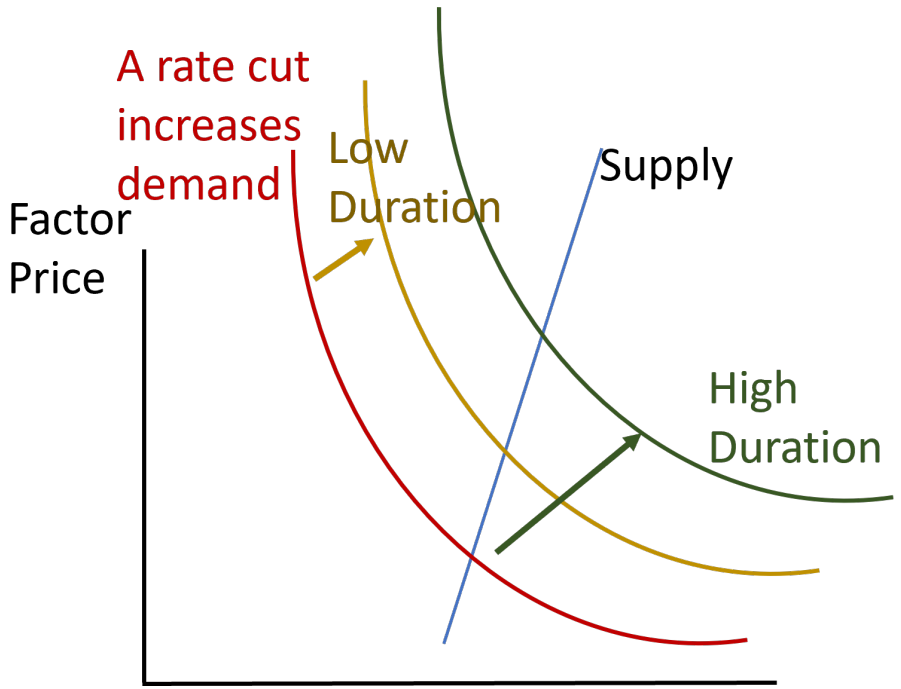
- Since high duration firms are expected to have cash flows realized at a later date, such firms will have
  - a lower earnings to price ratio
  - a higher market-to-book (e.g., Weber 2018)
- Similar to bond duration, their firm value will be more interest rate sensitive.

The effect of a rate cut - most baseline case



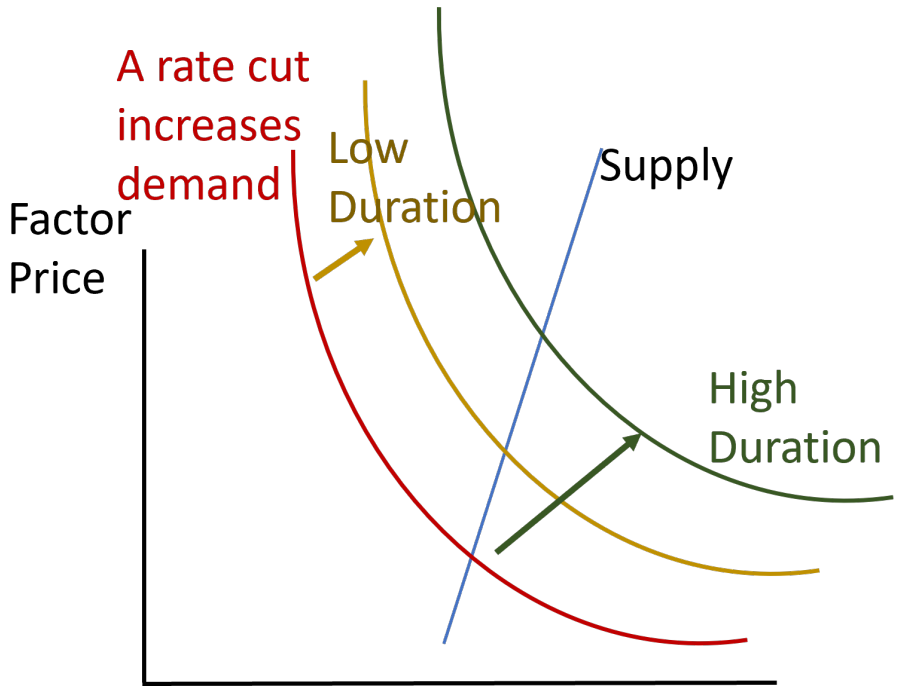
- Interest rate cut → increase in firm investment → increase in demand for factors
- Factor price will increase more if factor is inelastic (i.e., land)

Cash flow duration



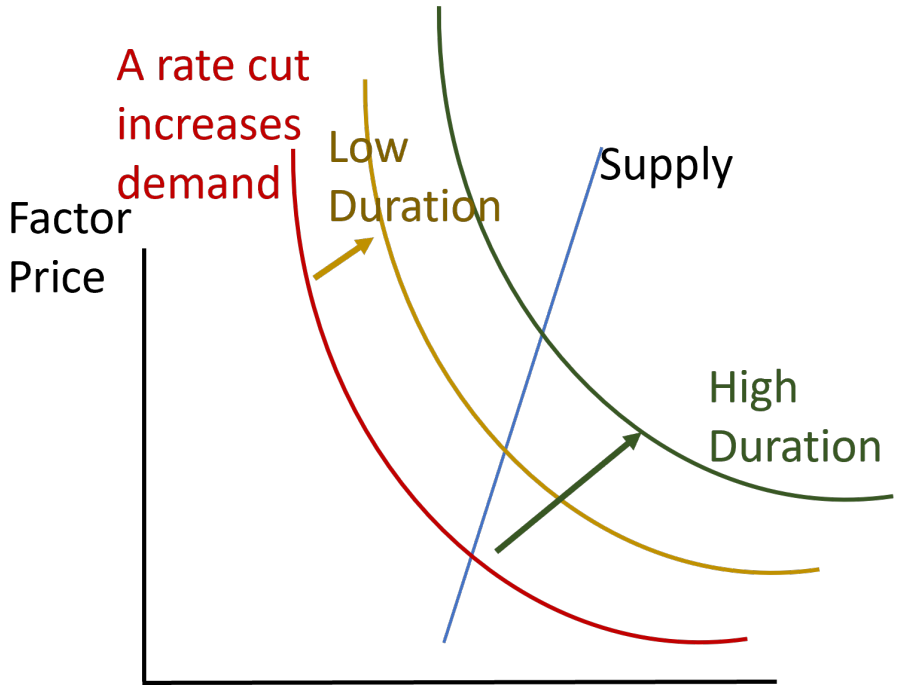
- Firm Value = PV production - Investment cost
- If duration is high:
  - "PV of production" more sensitive to interest rate changes
  - MB >> MC per unit of additional investment
  - Capital demand will increase more.

Prediction 1: Factor price and interest rate



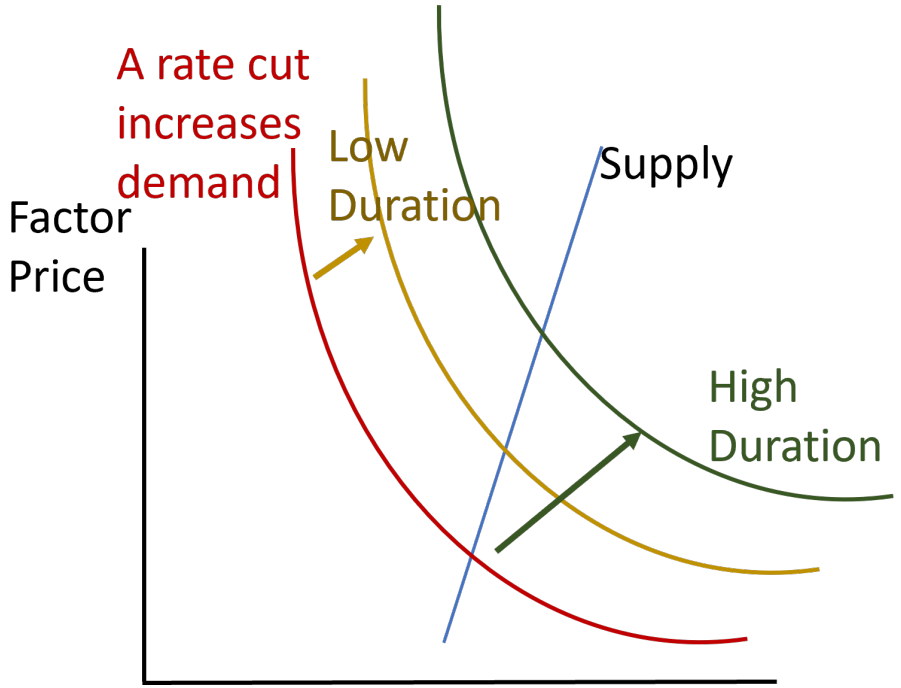
- Prediction 1: Factor prices will be more sensitive to changes in interest rate if duration of the economy is high.

Prediction 2: Factor competition channel



- 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.

Independence Assumption



- 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.
- This logic requires that D_i to be independent of average duration of the economy $E[D_i]$

Independence Assumption

- In the model, Equation (4) implies

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

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

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

- Is D_i independent from $E[D_i]$?
- When $D_i = E[D_i] + \epsilon_i$,
  $D_i \perp E[D_i]$ is different from $\epsilon_i \perp E[D_i]$
- One would require that D_i is negatively related to $E[D_i]$
- A GM factory next to a Biotech cluster?

A temporary shock in interest rate?

- For bonds duration is most sensitive to the maturity.
- For firms, it is assumed that they will last forever. However, imagine:
  - Firm A is expected to earn 10% from a 9-year project versus
  - Firm B is expected to earn 10% from a 10-year project.
- What happens if the interest rate shock is transitory (i.e., the 10-year yield does not move at all)?
- A related comment is whether you should use a long-term yield in the empirical analysis?

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

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

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 here Δr_t and above r_t?

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. Can you provide concrete examples to show that there is substantial variation in duration, where one would imagine that there would not be a variation?
  - Sonoma country? Clark county (NV)?
- 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), D_i seems to 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
- A further clean-up of the paper would be helpful!