Contract Year Effect in the NBA

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June 2, 2020

Introduction

Teacher unions have been a focal debate point for decades.

Some argue that teacher unions act as a monopoly, decrease competition, and therefore decrease educational quality. Others argue that it brings in more money for teachers to invest in education.

Research on this topic is ambiguous.

Treat teacher unions like a collusive oligopoly - does the market power influence educational quality?

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Why?

Ambiguity on this topic suggests it may not be merely the presence of a union or lack thereof that affects educational quality. The focus on market power is our contribution to the literature.

Ex: Efficient wage hypothesis? Higher market power increases wage and teachers become more motivated.

Market power $=/=$ union power. Union power incorporates intangible effects like the internal solidarity of its members and political activism; market power takes into account the market mechanisms between teacher unions and school districts.

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Key Statistics

Itemized lists are punctuated by little shields

- Item
- Item
  - Sub-item
  - Sub-item
- Item

Literature

The literature does not typically treat union behavior as firm behavior.

- Focused on aspects where unions may impact teacher performance.
- Focused on indirect effect that unions may have on teacher performance.
- Literature does treat unions as a form of imperfect competition.
  - Johnson and Ashenfeller (1969) - role of bargaining power
  - Booth (2014) - imperfect labor competition arising from trade unions

Literature

What about education?

- Cowen and Strunk (2015)
  - Modest negative impact on student quality
  - Propogation of rent seeking behavior
- Lott and Kenny (2013)
  - Decline in student performance after negotiation with teacher unions.

Literature

- Baron (2018)
  - Wisconsin Act 10 limited the power of teachers' unions
  - In the short run, Act 10, the law reduced average test scores.
- Baron (2019)
  - One year on, the increase in teacher supply due to Act 10 increased average test scores.
  - Time is a factor.
- More literature showing various results

Market Structure

- Upstream firm: Teacher Union
  - Consists of multiple teachers, acting like small, individual firms
  - In a collusion
  - Members may have incentive to leave the union/collusion
  - R can be thought of as the aggregate wage income
  - $c(\cdot)$, the cost, can be thought of as
    1. Disutility of labor
    2. Cost of maintaining the teacher's body and soul.

Market Structure

- Downstream firm: School District
  - Purchases educational services (from teachers)
  - Maximizes profit / educational outcome on three goods:
    1. Educational services
    2. Support services (schoolbus, administration)
    3. Other (food etc.)
- Consumer: Parents & Students
  - We focus mostly on the interaction between the upstream and downstream firms: teacher union and school district.

Generalized Lerner Index

Assume:

- Teachers are homogeneous in skill and quality
- Unionized and non-unionized teachers have similar working hours (homogeneity)

This ensures that we can use union participation rates as a proxy for market share. Then we can estimate the market power of the teacher union with the Generalized Lerner Index:

$$L = -\frac{s_i}{\epsilon_d}$$

L and s_i are the market power and market share of the teacher union; ϵ_d is the elasticity of demand for educational services with respect to price.

Estimating the elasticity of demand

We use the **Almost Ideal Demand System (AIDS)** method (Deaton and Muellbauer (1980)):
School districts act as a representative firm/consumer and has expenditure function

$$c(\mathbf{p}, u) = \left(a(\mathbf{p})^{\alpha}(1-u) + b(\mathbf{p})^{\alpha} u\right)^{1/\alpha}$$

With some derivation we obtain a tractable demand function:

$$w_E = \alpha_E + \sum_k \gamma_{E,k} \ln p_k + \beta_E \ln\left(\frac{w}{P}\right)$$

where w is the total expenditure, w_E is the expenditure share on educational services, and P is the price index.

Price Index

The price index has the formula

$$\ln P := \alpha_0 + \sum_k \alpha_k \ln p_k + \frac{1}{2} \sum_k \sum_j \gamma^*_{k,j} \ln p_k \ln p_j.$$

To estimate the price index, we follow Feenstra et al.'s (1999) strategy and approximate P with the Divisia index:

$$\ln P = \left[\frac{1}{6}\mathbf{w}_0 + \frac{2}{3}\mathbf{w}_{0.5} + \frac{1}{6}\mathbf{w}_1 \right] \cdot \ln \left(\frac{p_1}{p_0} \right)$$

where p_0, p_1 are the price index vectors for our three goods at some initial period and final period and $\mathbf{w}_i$ are the expenditure share vectors in the initial, middle, and final period. We will take the initial, middle, and final periods as consecutive years.

Price Index

For the price index for each of the three goods, we use the revenue-share-weighted average of the price of each component within this group. Ex:

$$p_E = \sum_{i \in E} \omega_i p_i.$$

where ω_i is the revenue share of component i of good E (instructional services). After the regression model which gives us $\gamma_{E,k}$, we can estimate the Marshallian self-price elasticity of educational services with

$$\epsilon_E^M = -1 + \left(\frac{\gamma_{E,E}}{w_E} \right) - \beta_E$$

From this, we can then estimate the market power of the teacher union with some assumptions.

Questions?

References

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