
Chapter 17: Salary Determination: Competition and Monopsony

Jugal Marfatia

March 27, 2019

Determination of Salary

Many wonder how an athlete can be worth so much money for playing a game. Answer? Supply and Demand.

We will look at how salaries are determined (in competitive and monopsonistic markets).

We will also look at how major leagues have tried to exercise buying power to keep salaries down.

Competitive Labor Market

Lets assume that the sports labor market is competitive (which is usually not the case). You can think of the teams as firms and the athletes as employees of the firm

$$Q = Q(L, K)$$

$$\pi = P(Q) * Q(L, K) - w * L - r * K$$

Where w is wage and r is rent for capital (or cost of capital).

Capital (K) is fixed in the short run (so rK fixed), whereas labor (L) can be changed. So the team only picks labor.

Notice that Price ($P(Q)$) is a function of quantity (Q). Increasing labor will increase quantity, and thus will decrease price.

Under competition, in order for the team to maximize profit, they need to satisfy equation:

$$MRP_L = w$$

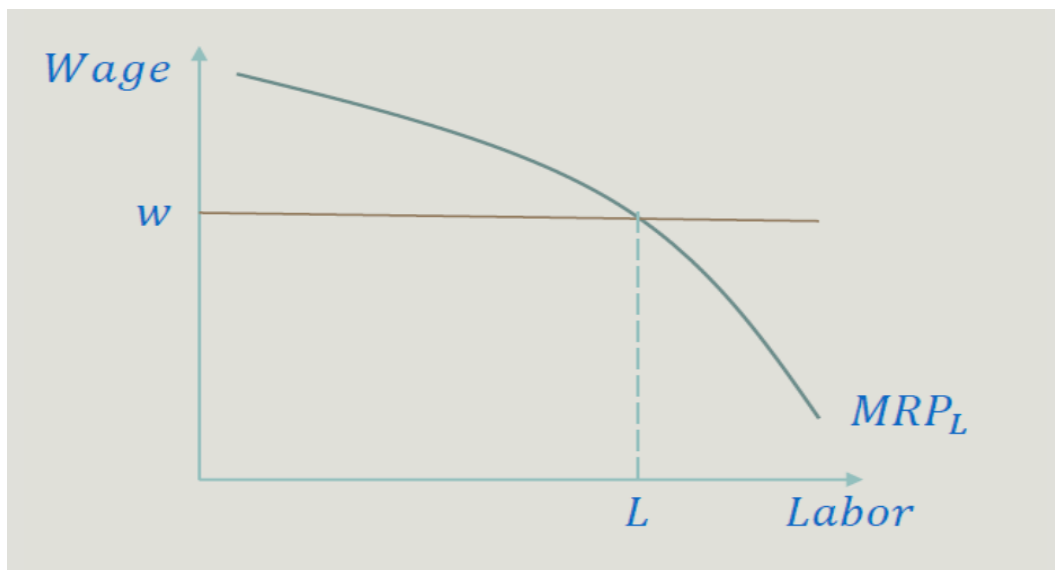
Or in other words marginal revenue product (of labor) is equal to wage. Marginal revenue product of labor can be further broken down:

$$MRP_L = w$$

$$MR * MP_L = w$$

where MR is the marginal revenue (additional revenue from increasing quantity), and MPL is marginal product of labor (additional quantity from increasing labor).

Notice that MRP_L is always positive as MR and MPL are always positive. However, MRP_L is decreasing in L.



Example Competitive Labor Market

Suppose that the supply of linebackers is (where L is number of linebackers and w is the wage) can be expressed as:

- $w = 100,000 + 5,000L$

and the marginal revenue product of linebackers is:

- $MRP_L = 1,000,000 - 4,000L$

As seen, in a competitive market, we can get the optimal L by equating $w = MRP_L$

$$w = MRP_L$$

$$100,000 + 5,000L = 1,000,000 - 4,000L$$

Solving for L yields: $L = 100$. Plugging L back into w yields: $w = \$600,000$

Monopsony Labor Market

Sports teams and leagues may exercise monopsony power (power on the buying side).

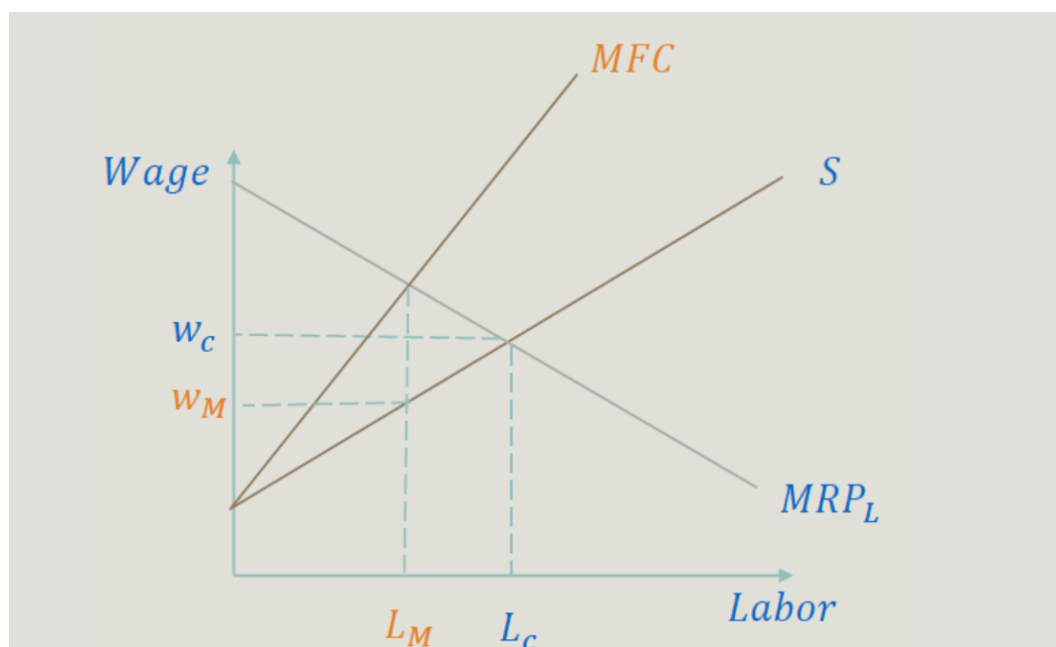
If a firm is the only purchaser of an input (in this case labor), it has monopsony power. Depending on the elasticity (slope) of the supply curve, the monopsonist has power to depress price of input (in this case wage) paid below the competitive level.

Since the monopsonist has power to change w (by changing L), the monopsonist will choose L such that:

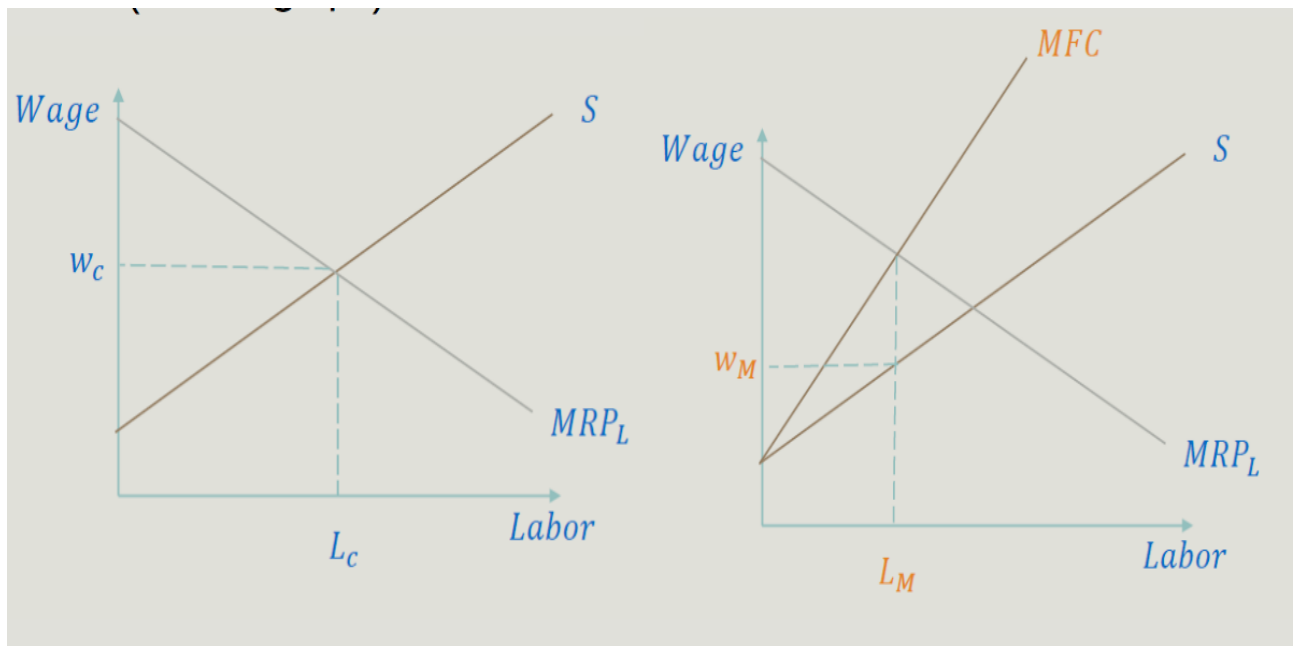
$$MRP_L = MFC$$

where MFC is the marginal factor cost (additional cost when increasing L).

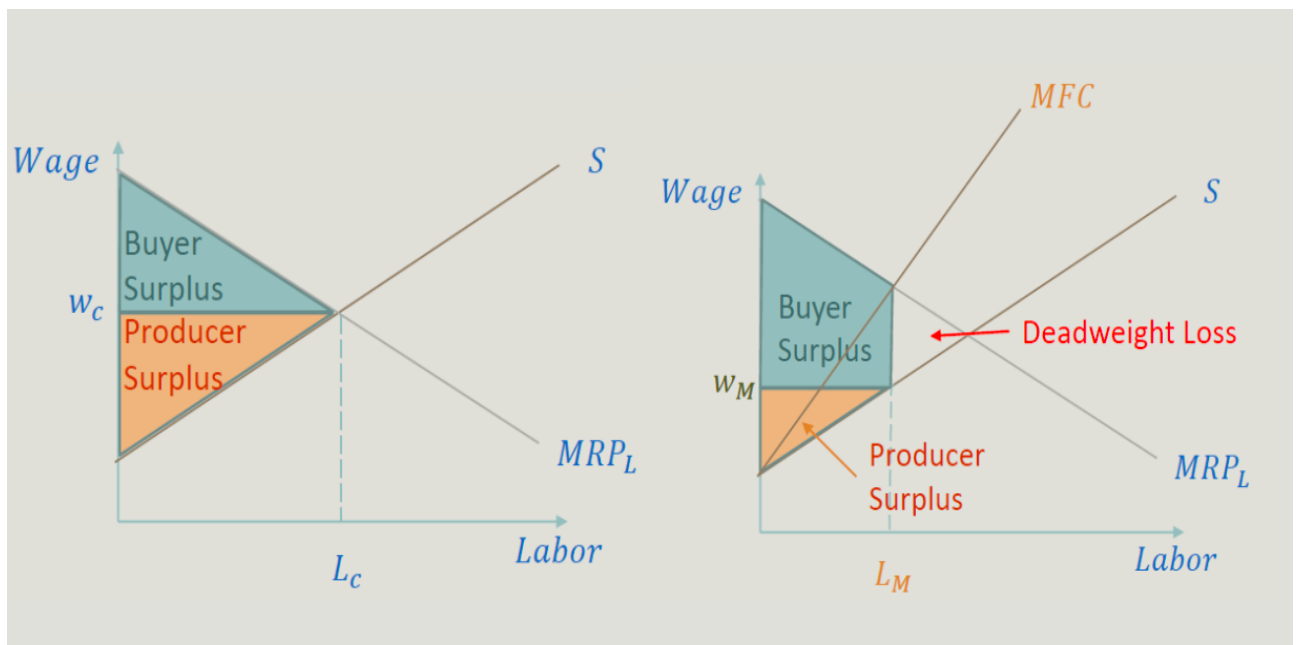
The MFC can be found by taking the supply function and doubling the slope. Notice that MFC is greater than the wage, thus the team stands to profit when they reduce employment below where $MRP_L = w$.



So the difference between competitive market (first graph) and monopsony market (second graph).



Notice below that buyer surplus is the surplus obtained by the team or league (firm), while the producer surplus is the surplus obtained by the athletes (producers of the labor).



There exists deadweight loss when the team acts as a monopsonist. Also, notice that the producer surplus is greater under monopsony. Buyer surplus, producer surplus, and deadweight loss can all be calculated by finding the areas of each in the graphs in the previous slide.

Example

Suppose that the supply of NFL quality quarterbacks is given by:

$$w = 1,000,000 + 600,000(QB)$$

where w is the wage and QB is the number of quarterbacks. The marginal revenue product of such quarterbacks is:

$$MRP = 10,000,000 - 300,000(QB)$$

Under a **competitive market**, the wage and number of QB hired will be determined by setting $w = MRP$.

$$1,000,000 + 600,000(QB) = 10,000,000 - 300,000(QB)$$

$$\implies 900,000(QB) = 9,000,000$$

$$\implies (QB) = \frac{9,000,000}{900,000} = 10$$

And plugging $QB = 10$ back into the wage equation we get

$$w = 1,000,000 + 600,000 * 10 = 7 \text{ Million.}$$

Next, under a **monopsony**, the wage and number of QB hired will be determined by setting $MRP = MFC$.

And from the supply equation we know, by doubling the slope that the MFC is:

$$MFC = 1,000,000 + 1,200,000(QB)$$

And setting $MRP = MFC$ we get.

$$1,000,000 + 1,200,000(QB) = 10,000,000 - 300,000(QB)$$

$$\Rightarrow 1,500,000(QB) = 9,000,000$$

$$\Rightarrow (QB) = \frac{9,000,000}{1,500,000} = 6$$

And plugging $QB = 6$ back into the wage equation we get

$$w = 1,000,000 + 600,000 * 6 = 4.6 \text{ Million.}$$

Next let's study the buyers surplus (BS), producer surplus (PS) and dead weight loss (DWL) caused by monopsony.

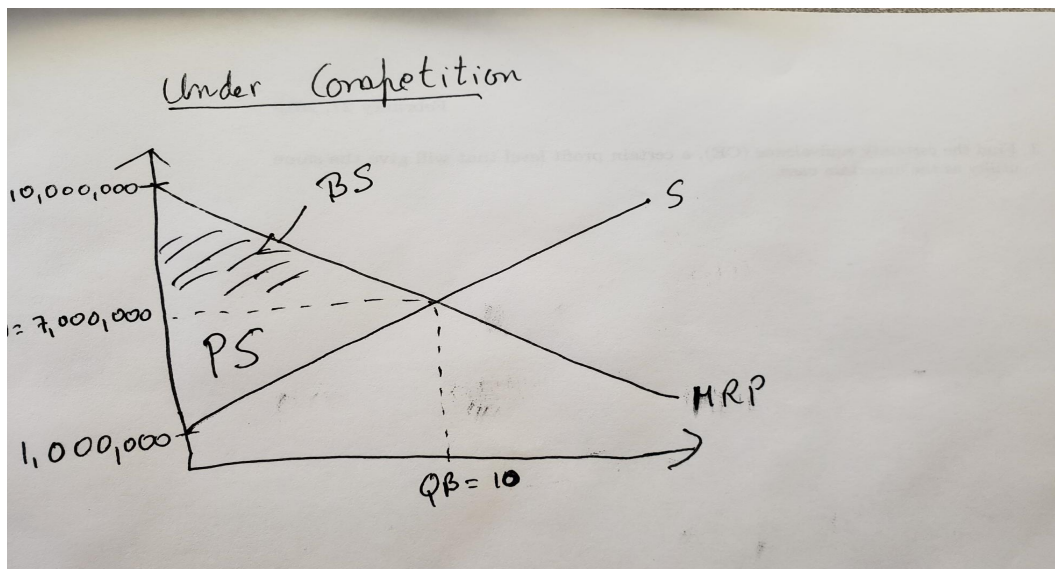
Under competitive market

$$BS = 0.5 * (10,000,000 - 7,000,000) * 10 = 15,000,000 = 15 \text{ Million}$$

$$PS = 0.5 * (7,000,000 - 1,000,000) * 10 = 30,000,000 = 30 \text{ Million}$$

And $DWL = 0$.

This is shown in the below graph.



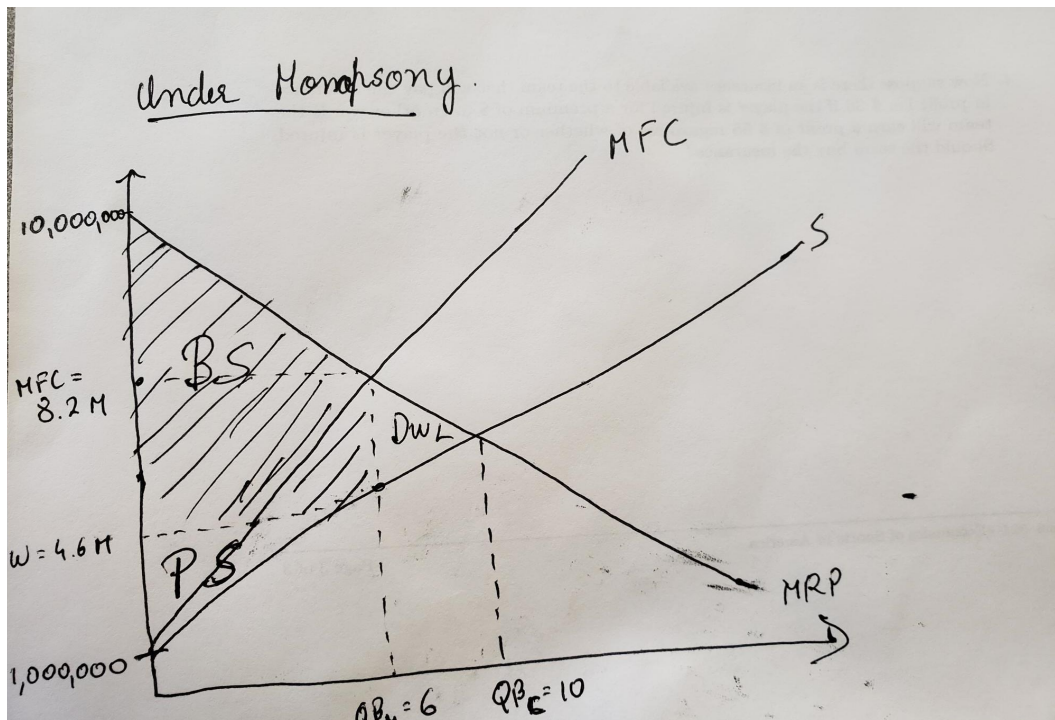
Under monopsony

$$BS = \left(0.5 * (10,000,000 - 8,200,000) * 6 \right) + \left((8,200,000 - 4,600,000) * 6 \right) = 27,000,000 = 27 \text{ Million}$$

$$PS = 0.5 * (4,600,000 - 1,000,000) * 10 = 18,000,000 = 18 \text{ Million}$$

$$\text{And } DWL = 0.5 * (8,200,000 - 4,600,000) * (10 - 6) = 7,200,000 = 7.2 \text{ Million}$$

This is shown in the below graph.

**Monopsony Power**

Major leagues have used a variety of tactics to obtain and retain monopsony power over the players. Some of these include:

- Incorporating the reserve clause
- Using a reverse-order player drafts
- Outright collusion

Collusion

There are now completely unrestricted free agents in all major league sports. However, this has not stopped team owners from colluding at times to avoid competing in the player market. The owners may simply agree not to raid the rosters of rival teams (they agree not to bid competitively in the free agent markets).

Example of collusion: In the 80s, owners in the MLB decided to collude rather than compete in the free-agent market. This was done by establishing a salary offer data bank where each team agreed to report any offers that it made to free agents. Reports to the data bank revealed whether a club was cheating on the agreement. When each club made its offers known to the other owners, the offers tended to be lower.

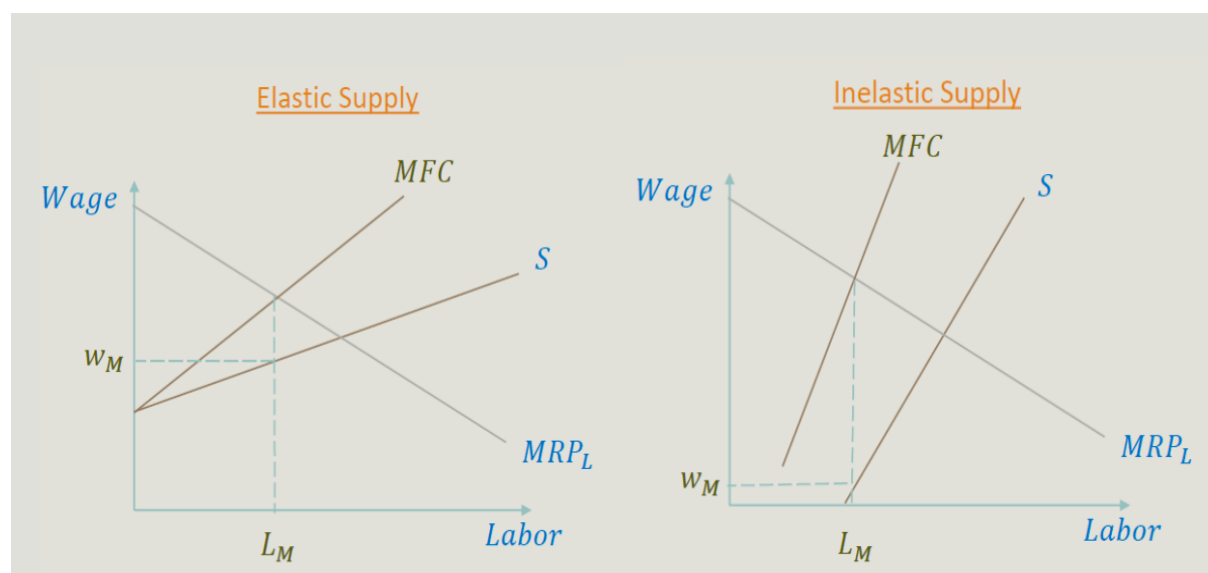
<https://www.nytimes.com/1990/07/19/sports/arbitrator-finds-3d-case-of-baseball-collusion.html>

Measuring Monopsony Power

Lerner Index of monopsony power can be used to calculate monopsony power (just like we did for monopoly power). The Lerner Index (γ) is thus:

$$\gamma = \frac{MRP_L - w}{w} = \frac{1}{\epsilon}$$

where ϵ is the elasticity of supply of labor. Notice that increases in supply elasticity decreases monopsony power (γ).



Notice that the more inelastic the supply is, the lower the wage offered by the team can be (or in other words, the team has more monopsonistic power).

Monopsonistic Exploitation

Monopsonistic exploitation refers to the fact that a profit-maximizing monopsonist will hire athletes to the point where $MRP = MFC$ rather than where $MRP = w$ (athletes are underpaid or exploited). Athletes have been exploited in the sense that they have been paid less than they were worth to the team. It can be seen by the following equation (which has been derived in the book):

$$MRP - w = \frac{w}{\epsilon}$$

Observe that the smaller the elasticity of supply, the greater the exploitation (the more underpaid an athlete is). This has been seen in the data (see book for evidence).

Market Value

Market value of a player are based on some easy to measure performance measures such as:

- Home runs
- Goals
- Batting average
- Rushing yards
- Points per game

Players value is also based on some of the below characteristics that cannot be fully measured.

- Off field issues
- Positive attitude
- Team protection

Spillovers

A more generic factor not mentioned in the book is the productivity spillover effect. Even

though a player may not perform well relative to normal performance measures, they may still positively (or negatively) affect their teammates.

Positive spillovers may include an older (more experienced) player, a confident and vocal player, etc.

An example of spillovers in a non-athletic environment is the effect brought about by a dumb student as opposed to a brilliant student. Notice that the dumber person may increase the intelligence of a class as a whole since the dumber student may ask more clarification questions that will help the class than the brilliant student.

Category	MRP	Salary	Lerner Index
Mediocre Hitter	-129, 300	60,800	-3.1
Mediocre Pitcher	-53, 600	54, 800	-1.9
Average Hitter	906,700	196, 200	3.6
Average Pitcher	1,119,200	222, 500	4.0
Star Hitter	3,139,100	477, 200	5.6
Star Pitcher	3,969,600	612, 500	5.5

Paper on Measuring Monopsony Power

"Pay and Performance in Major League Baseball", Gerald W. Scully,
The American Economic Review Vol. 64, No. 6 (Dec., 1974), pp. 915-930

https://www.jstor.org/stable/1815242?seq=1metadata__tab=contents

graphicx