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Title or Money

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Abstract

We examine what is more important for the professional boxers tending to fight on the ring. We employ a famous Nash bargaining (1950) tool and show that both a champion and a contender are concerned about championship title and monetary prize generated from the fans for watching the fight. However, both players value money revenue more than a championship title.

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1. Introduction

Like any other Martial Arts sports the boxing has also been evolving for centuries. Though the earliest evidence of fist-fighting dates back to the ancient Middle East in the 3rd and 2nd millennia BCE, the boxing was established to be a well developed sport in Ancient Greece (Poliakoff, 2013). Since then the popularity of it has been constantly rising and spreading all over the world[1]. If in the early years there was no rounds where fighters would fight until the loser acknowledges defeat, with the passage of time the rules have been developed depending on the types or levels of boxing be it amateur or professional.

Since the 17th century boxing sport has been motivated by money where two fighters compete for it, whereas promoters control the gate, and spectators bet on the result. However, it is fair to assume that money is not the only goal that boxers wish to achieve. As tastes differ, different people come to sport for several reasons. To name a few, these are to learn discipline, to gain self-confidence and self-control, to learn protective techniques, to become a champion and so on. But when it comes to professional boxing[2] it is curious whether fighters would fight on the ring for title to become a champion or to earn money. The aim of this paper is to introduce an economic model to explain this phenomenon as, to the best of our knowledge, there is no academic work applicable in professional boxing case.

As economics principle says people prefer more to less, any boxer wish to become a champion by making a name for himself and obviously to earn huge monetary prize rather than to possess one. This is unfortunate for the loser and fortunate to the winner. For the title, say a champion belt, cannot be divided between the two fighters. But the cake (money revenue) generated from the bout on the ring can be divided between the winner and loser ex ante. That is, the revenue split from the forthcoming bout between the fighters is negotiated in advance so that each player would know how much each would gain. Furthermore, if one of the fighters is an already established champ, he faces a trade-off between the belt and earning huge money. Who earns how much can be determined by means of bargaining tools widely used in economics.

As bargaining has been studied by economists for decades it can fairly be used to analyze the case of professional boxing[3]. It could be the cake-division model by famous contributor John Nash (1950, 1953) or the basic alternating-offers model by Ariel Rubinstein (1982). The fact that the Nash bargaining solution possesses sound strategic foundations is the

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[1]See Hearings on Business Practices in Boxing Before the Senate Comm. on Commerce, Science and Transp., 105th Cong. 43 (1998) [hereinafter Hearings on Business Practices in Boxing] (testimony of Gregory P. Sirb, President, ABC) (stating that approximately 50% of world title bouts are held in the United States); Fordham Sports Law Symposium Transcript, supra note 17, at 38 (statement of Jay Larkin, Senior Vice President, Showtime Sports and Event Programming) (stating that a bout between Mike Tyson and Evander Holyfield grossed $120 million in one night, the equivalent of the movie "Titanic" playing for four weeks on 2000 movie screens).

[2] Boxing is also unique among other professional sports since it is the only sports industry that runs without a private governing organization, or according to uniform business practices. See H.R. 1832, 106th Cong. 2(1) (1999).

[3]See Ubayidli, Omar Al, retrieved https://www.thenational.ae/business/economy/economics-101why-did-mayweather-earn-so-much-more-than-mcgregor-1.625040

most important reason to study and apply it (Muthoo 1999). Nash (1950) model predicts a bargaining outcome based only on information about each bargainer's preferences and the outcome in case of disagreement.

On the other hand, an alternative to Nash bargaining is Rubinstein's offer and counteroffer model of bargaining that specifies an attractive procedure of bargaining, where the players take turns to make offers to each other until agreement succeeds (Muthoo 1999).

This paper employs a simple Nash bargaining to understand what is more important for the fighters coming to the ring for professional bout by counting each fighter's outside option (disagreement payoff). The contribution of the paper is that the theoretical model predicts that each player is concerned about both money revenue and title. However, each player also prefers money revenue to championship title.

The rest of the paper consists of two sections: In the next section, the bargaining model employed along with results is explained. The succeeding section suggests possible extension for future work and concludes the paper.

2. Model and Results

Two boxers negotiate for the split of revenue on the forthcoming professional bout[4]. One is a champion, be it Mike Tyson or Floyd Mayweather, holding a Title, say UFC belt. Another is a contender, be it Evander Holyfield or Manny Pacquiao, who would be challenging him. Let *player 1* be a current champion and *player 2* be a challenger. The utility of each player is a separate additive linear function of Money ($M>0$) and Title (T): $U = U(M,T)$. More precisely, the payoffs of each fighter are:

$$U_1(M,T) = \beta M + E_1(T) \quad (1)$$

$$U_2(M,T) = (1-\beta)M + E_2(T) \quad (2)$$

Here $\beta \in (0,1)$ is a share of money that a champion would be negotiating for before the fight, and the rest, $1-\beta$, is a share of money that a contender is willing to get. The $E(.)$ is an expectation operator, which is uncertain if the title ex post will belong to a champion or to a contender. Let the value of a title for a champion be $T = V_1$ if he wins the upcoming bout and $T=0$ if he loses. Also, let the value of a title for a contender be $T = V_2$ if contender wins and $T = 0$ if contender loses. We further assume that due to reputational effects, winning the title is more important for the champion than for the contender such that $V_1 > V_2 > 0$. The probability of a win by a current champion is $\Pr(T = V_1) = p$. The expected payoff of title for current champ is

$$E_1(T) = pV_1 + 0(1-p) = pV_1 \quad (3)$$

[4] Normally, there are three parties in boxing deals: boxers, their managers and promoters. Since the promoter keeps the difference between total revenues (net of promotional expenses) and the share of revenue "captured" by the champion and the contender, he must minimize the amount paid to a fight's participants in order to maximize his profit. Hence, a conflict of interest arises between boxers and promoters. For the benchmark purpose, we assume the deal is made between two boxers, each of whom represents a big team consisting of their coach, manager, promoter, doctor etc.

Similarly,

$$E_2(T) = (1-p)V_2 + 0p = (1-p)V_2 \tag{4}$$

Here for simplicity we assume the probability of a win by a current champion is equal to the probability of a loss by a challenger. We assume the two boxers are negotiating for the monetary share of the forthcoming bout according to Nash rule as[5]:

$$\max_{\beta}(\beta M + E_1(T) - d_1)\big((1-\beta)M + E_2(T) - d_2\big) \tag{5}$$

Here d_1 and d_2 are the disagreement payoffs of a current champion and a contender, respectively. With another words, the disagreement payoff for each player is an alternative option (opportunity cost) in case the negotiation breaks down and fighters would earn by fighting with someone else on the line. Needless to say that for successful deal it is important $U_1 - d_1 \geq 0$ and $U_2 - d_2 \geq 0$ holds, otherwise each player would walk away. That is, the payoff from current deal must be higher than the outside option for each boxer. Plugging (3) and (4) into (5) we get:

$$\max_{\beta}\big(\beta M + pV_1 - d_1\big)\Big((1-\beta)M + (1-p)V_2 - d_2\Big) \tag{6}$$

The First Order Condition (FOC) yields us:

$$\beta^* = \beta^*\big(M, V_1, V_2, d_1, d_2\big) = \tfrac{1}{2} + \tfrac{(1-p)V_2 - pV_1 + d}{2M} \tag{7}$$

$$1 - \beta^* = \frac{1}{2} + \frac{pV_1 - (1-p)V_2 - d}{2M} \tag{8}$$

where $d = d_1 - d_2$. The optimal share of money for each player is a function of disagreement payoffs, the value of a title for each player, and money revenue collected from fans directly, advertisements, and other outlets.

In the context of Mayweather and McGregor 2017 fight, highly disparate disagreement payoff in favor of Mayweather is the primary reason for higher share[6]. Most of the time with few exceptions, the champions ex ante have a greater bargaining power, which leads to a greater

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[5] One could use an asymmetric Nash bargaining to account for asymmetric bargaining power as $\max_{\beta}(\beta M + E_1(T) - d_1)^{\eta}\big((1-\beta)M + E_2(T) - d_2\big)^{1-\eta}$, where $\eta \in (0,1)$ is a bargaining power of the first player and the rest $1-\eta$ is a bargaining power of the second player, respectively. As economist Omar Al Ubaydli (September, 2017) said *"....the higher your disagreement payoff, the stronger your bargaining hand...."*, the bargaining power can be considered as part of disagreement payoff. See https://www.thenational.ae/business/economy/economics-101-why-did-mayweatherearn-so-much-more-than-mcgregor-1.625040

[6] In September 2017 Mayweather-McGregor fight ended with 75-25% split. As history says McGregor's payoff never exceeded $10 from previous fights, whereas Mayweather did earn at least tens of millions. Hence, Mayweather had a higher disagreement payoff than his contender, $d_1 > d_2$.

share of monetary revenue[7]. So how does the optimal share of each player respond to the change in any of the parameters? Comparative statics analyses provide:

$$\frac{\partial \beta^*}{\partial d_1} > 0 \tag{9}$$

$$\frac{\partial \beta^*}{\partial d_2} < 0 \tag{10}$$

$$\frac{\partial \beta^*}{\partial V_1} < 0 \tag{11}$$

$$\frac{\partial \beta^*}{\partial V_2} > 0 \tag{12}$$

$$\frac{\partial \beta^*}{\partial M} = \frac{pV_1 - (1-p)V_2 - d}{2M^2} \begin{cases} > 0 \;\; if \; p > \bar{p} \\ = 0 \;\; if \;\; p = \bar{p} \\ < 0 \;\; if \;\; p < \bar{p} \end{cases} \tag{13}$$

The results in (9) and (10) are consistent. That is, the higher the outside option of the champion (challenger), the larger (smaller) is the share of money revenue for the champion (challenger). The comparative statics analyses in (11) and (12) at first may look weird, which state that the higher the value from the title by the champion (contender), the lower (higher) is the equity share to him. However, this result demonstrates the so-called trade-off between the title and money for the champion as mentioned before. For the title belongs to the champion ex ante. Accepting the challenge by a contender, he is risking not to retain it in case he loses the forthcoming fight. As there is a saying "to earn a title is too tough, but to retain it is even tougher", the champ is in difficult position between choosing money or title. So if the contender seems very aggressive to take away a title from the champ, especially if the champ feels it, then the champ would definitely want to hold a greater amount of the monetary revenue.

As for the last equation, the answer to the question if the amount of money would raise the equity share of the champion depends on the "threshold" probability of win by a champion $\bar{p} = \frac{V_2+d}{V_1+V_2}$. Hence, we obtain the following results:

Proposition 1: *If the probability of win by a champion is greater than that threshold level, then the optimal equity share by a current champ will increase from additional money revenue from fight. If the the probability of win by a champion is lower than the throeshold level, then the opposite is true. If the probability of win by a champion is equal to that threshold level, then the optimal equity share by a current champ will remain the same from additional money revenue from fight*.

[7]The Belt of a champion is not the only determinant of the bargaining power. Middle weigh champion Guennady Golovkin (GGG) earned a lower share (35%) of money from September 2017 fight against the contender Saul "Canelo" Alvarez, who earned 65%. This happened because contender (Canelo in this case) has previously fought against the big name Mayweather, this is what increased his bargaining power despite the fact that GGG had 4 belts and a title of middle weight champion.

Now, the main question is *what is more important for the fighter? Title or Money?* The net optimum payoff of each player is

$$U_1^* = \frac{M+(1-p)V_2+pV_1-d_1-d_2}{2} \quad (14)$$

$$U_2^* = \frac{M + pV_1 + (1-p)V_2 - d_1 - d_2}{2} \quad (15)$$

From the equations (14) and (15) the following results are straightforward to establish.

Proposition 2: *For each player (i=1,2), the marginal net payoff both from additional money revenue and from greater value of title is positive. However, each player prefers money revenue to championship title.*

Proof: The results follow immediately from Proposition 2 after differentiating U_i^* with respect to M, V_1 and V_2.

That is, the marginal net payoff from additional money revenue is $\frac{\partial U_i^*}{\partial M} = \frac{1}{2}$. The marginal net payoffs from greater value of title are $\frac{\partial U_1^*}{\partial V_1} = \frac{p}{2}$ and $\frac{\partial U_2^*}{\partial V_2} = \frac{1-p}{2}$. Since normally the probability of win by any player is not perfect, $p < 1$, then this implies the players are concerned both about title and money they would generate from the fight: $\frac{\partial U_i^*}{\partial M} > 0$ and $\frac{\partial U_i^*}{\partial V_i} > 0$. Furthermore, notice also $\frac{\partial U_i^*}{\partial M} > \frac{\partial U_i^*}{\partial V_i}$. This implies if the players had a choice to prefer one, then each would bet on money revenue rather than title. Given that the payoff of each player and the use of Nash bargaining are trivial, we leave them to the reader to comment.

3. Conclusion

This paper demonstrates that fighters in a professional boxing come to the ring to earn money and the champion title seems to be of minor concern for both boxers. In order to understand whether it is true or false, we employed famous Nash bargaining model. The outcome of Nash bargaining is not surprising. Because the championship title – belt – as we said before is always hard to retain. This is especially true if the contender is too strong. Every boxer, more or less, should be aware of it. On the other hand, the money that each fighter earns from the bout is not reimbursed. Hence, boxers come to the ring to earn huge money.

To repeat, this outcome is a result of a simple Nash bargaining model. There are a number of ways for future researchers to extend it. One could employ Rubinstein's offer and counteroffer alternating model in order to analyze how the patience (discount rates) play a role in determining the size of a cake for each player from forthcoming professional bout. Another way could be to add multiple issues to the Nash bargaining model as in the case of GGG-Canelo 2017 fight to understand why the contender did earn a larger size of a cake rather than a current champion holding belts. Paradox! Does it mean that fighting against a big famous names generate huge money revenue? One can also incorporate the concept of risk into the model. That is, one boxer may be more risk averse than his opponent. Hence, the utility of payoff for each player does not have to be identical. And see who would earn a greater share of money from forthcoming fight. This is especially true for the current champion who is taking

a risk of losing a title. We have assumed that only fighters negotiate with each other on how to split money revenue.

However, in fact, the negotiation procedure is held between the promoters and managers of each fighter as said before. In case of GGG-Canelo the true negotiators are Tom Loeffler and Oscar de la Hoya, not the fighters themselves. In reality, the beneficiaries of the organized professional boxing fight are not only the boxers themselves, but also promoters, managers, coaches, medical doctors etc. Therefore, one could think of contract theory between the fighter and promoter.

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