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Harashima, Taiji

Kanazawa Seiryo University

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A Model of Executive Compensation

Taiji HARASHIMA*

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Abstract

In this paper, I examine the mechanism of extremely high executive compensation based on the concept of ranking value and preference, and show that the origin of such extremely high compensation is economic rents. Ranking value and preference provide monopoly powers, profits, and rents to producers and generate "superstars" who are not only absolutely but, more importantly, are relatively superior to other executives. Furthermore, ranking value and preference enable a firm's product to be differentiated and provide the firm monopoly rents (profits). Executives who contribute to differentiating the product can obtain economic rents and be compensated similar to superstars on professional sports teams. The monopoly rents owing to ranking values can be socially justified, but they may not be socially justifiable if they are solely distributed to executives.

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Keywords: Economic rent; Executive compensation; Monopoly profits; Product differentiation; Ranking preference; Ranking value; Superstar

*Correspondence: Taiji HARASHIMA, Kanazawa Seiryo University, 10-1 Goshomachi-Ushi, Kanazawa, Ishikawa, 920-8620, Japan.
Email: harashim@seiryo-u.ac.jp or t-harashima@mve.biglobe.ne.jp.

1 INTRODUCTION

Compensations for corporate executives are high—extremely high in some cases. In economics, wages are thought to be determined basically by productivities. A simple and naïve interpretation of this theory is that extremely high executive compensation indicates extremely high productivity compared with that of ordinary workers. However, it is highly likely that the absolute abilities of executives are not as high as the levels of compensation suggest. For example, their memories are not a hundred or a thousand times larger than those of ordinary workers. Rather, their abilities are "relatively" higher than ordinary workers. Executive compensation has often been regarded as being determined differently from the usual wage determination mechanism.

Many explanations of the mechanism of executive compensation have been presented (cf. Murphy, 2013), and several researchers have attempted to classify them (e.g., Otten, 2008; Edmans et al., 2017). Otten (2008) classified them into three categories: the value approach (e.g., Roberts, 1956; Prendergast, 1999; Combs and Skill, 2003), the agency approach (e.g., Jensen and Murphy, 1990; Barkema et al., 1997), and the symbolic approach (e.g., Lazear and Rosen, 1981; Davis et al., 1997). The value approach includes the explanation that executive compensation is determined by differences in accumulated human capital. The agency approach includes the explanation that the determination of executive compensation is an example of the agency-principal problem. The symbolic approach indicates that executive compensation reflects socially constructed symbols, for example, the status or role that executives play in a society or firm. Edmans et al. (2017) classified the explanations into three different categories: the shareholder value view (e.g., Gabaix and Landier, 2008; Terviö, 2008), the rent extraction view (e.g., Bertrand and Mullainathan, 2001; Bebchuk and Fried, 2003), and the institutional influence view (e.g., Perry and Zenner, 2001). The shareholder value view indicates that executive compensations are the outcome of a firm's behavior that maximizes shareholders' objectives. The rent extraction view indicates that executive compensations are determined by the executives themselves. The institutional influence view indicates that executive compensations are substantially subject to legal and institutional constraints and practices.

Many of these explanations seem to commonly assume that some agents (e.g., shareholders, households, ordinary employees) are foolish, incompetent, or irrational, and that because of these properties a few executives can enjoy extremely high compensations. For example, in the agency approach, shareholders are very incompetent in monitoring executives' efforts and therefore have to provide extremely high compensations for the executives to make sufficient efforts. In explanations based on human capital, shareholders cannot replace the executive with an employee other than the executive

because other employees are significantly less competent than the executive, and thereby the executive possesses very strong bargaining power. These explanations maybe be true to some extent, but they seem insufficient because it is highly likely that shareholders, households, and ordinary employees are not significantly foolish, incompetent, or irrational.

What amplifies the moderate difference in absolute abilities between executives and other workers to the extremely large difference in compensations between them? It is highly likely that some kinds of economic rent contribute to executive compensations, because the payments cannot be fully explained by the executives' productivities, but what kind of economic rent? In this paper, this question is examined on the basis of the concept of ranking value and preference, as shown by Harashima (2016, 2017, 2018a, 2018b). Ranking value and preference generate monopoly powers, profits, and rents. People have ranking preference because ranking is an important element in people's lives and economic activities, and ranking preference is deeply rooted in the process of evolution of human beings, who have dominance hierarchies (cf. Landau, 1951; Bayly et al., 2006). Therefore, goods and services have ranking values in addition to practical values, and some of them have extremely high ranking values. An important point is that ranking value and preference provide monopoly powers, profits, and rents to the producers of products that have high ranking values, and ranking values are generated not by absolute, but by relative, superiority among goods or services within the same category. For example, in professional sports, even though a player's absolute ability is not so different from that of the other players, the player can be a superstar if the player's ability is higher—even if only by a little— than those of the other players. Harashima (2018a) showed that superstars can be generated not only in individual sports but also in team sports. In addition, Harashima (2017) showed that, because of ranking value and preference, products can be differentiated, and differentiated products provide firms with monopoly powers, profits, and rents.

Combining these concepts of ranking value and preference, in this paper, I show that the mechanism that produces extremely high executive compensation is the same as that of superstars in team sports, and the origin of extremely high executive compensation lies in people's ranking preference. The important point here is that it is not the absolute, but rather the relative, abilities of executives (i.e., ranks) that determine compensation. Executives can be compensated like superstars if they can successfully differentiate the firm's products and provide monopoly power, profits, and rents to the firm with a relatively higher probability than other executives and workers. The monopoly rents owing to ranking values can be socially justified, but it does not seem to be justifiable that these monopoly rents are distributed solely to executives, because the households' utilities derived from ranking values are not affected by the executives' efforts. Therefore, measures that reduce economic inequality may need to be prioritized when society

considers the distribution of these types of monopoly rents.

2 RANKING VALUE AND PREFERENCE

In this section, the concept of ranking value and preference shown by Harashima (2016, 2017, 2018a, 2018b) is explained in brief.

2.1 Ranking value

Value is regarded as reflecting something useful. People feel, obtain, or consume value when using, enjoying, or consuming goods and services. Values derived from practical use have usually been considered in economics, but people will also consume values derived from ranking. For example, if a curio is evaluated to be the best among a set of similar types of curios, its price will become very high relative to those of the others, regardless of whether it is practically useful. Its price is so high only because it is the top-ranked item in the group. In this sense, people obtain utility not only from practical uses but also from a sense of ranking.

Therefore, value has two components: practical value and ranking value. Practical value is the value that people feel when consuming a good or service for practical purposes. Ranking value is the value that people feel from the rank of a good or service in a set of similar types of goods or services that people use, possess, or observe (e.g., the ranking of a book in a best-seller list or that of a professional baseball team in a league).

2.2 Ranking preference

Suppose that goods and services have the following properties: quantity, quality, and rank. Quality is related to practical value, rank is related to ranking value, and quantity is related to both values. Suppose also that the quality and rank of each good or service are given exogenously and fixed. Here, for simplicity, I assume that there is only one type of good or service in the economy, and that all goods or services belong to this type (these goods or services are hereafter called “goods” for simplicity) and are substitutable for each other for households’ practical uses. Although the goods are substitutable from the point of view of practical uses, they are differentiated from the point of view of rank.

Let R (= 1, 2, 3, …) be the rank of the goods. The good with rank $R = 1$ is most preferred by households, rank $R = 2$ is the next most preferred, and so on. For simplicity, it is assumed that there is no tied rank. A household’s utility derived from consuming goods with rank R is

$$u(q_{n,R}, q_{l,R}, R),$$

where $q_{n,R}$ and $q_{l,R}$ are the quantity and quality of the good with rank R, respectively. For simplicity, the utility of the household is modified to

$$u(\tilde{q}_R, R) \ ,$$

where $\tilde{q}_R$ is the "quality-adjusted quantity" of the good with rank R, and $\tilde{q}_R = q_{n,R}\, q_{l,R}$.

The utility function has the following conventional characteristics:

$$\frac{\partial u(\tilde{q}_R, R)}{\partial \tilde{q}_R} > 0$$

and

$$\frac{\partial^2 u(\tilde{q}_R, R)}{\partial \tilde{q}_R^2} < 0 \ .$$

In addition, for any $r \in R$,

$$u(\tilde{q}_r, r+1) < u(\tilde{q}_r, r)$$

and

$$u(\tilde{q}_r, r+2) - u(\tilde{q}_r, r+1) > u(\tilde{q}_r, r+1) - u(\tilde{q}_r, r) \ .$$

2.3 Implicit ranking

Although some goods and services have explicit rankings, most goods and services do not, because there is no open competition for them. However, it is highly likely that people still feel a sense of ranking, possibly unconsciously, from many goods and services because they usually want to know which products most people are paying attention to, and they want to buy the products that are the most popular and well known. Fame is valuable because it provides information about "implicit rankings" and generates a sense of ranking. Even if there is no explicit ranking of products, households want to know their implicit rankings by any means and are alert to every chance of obtaining the information about which product is more preferred and sold quantitatively in the market. Because implicit rankings are essentially formed on the basis of information about which product is more preferred and sold quantitatively, they are not an individual household's unique

and personal rankings; rather, they are socially and widely recognized rankings. That is, the implicit rankings will be basically common knowledge of households.

3 SUPERSTAR

3.1 A superstar model

3.1.1 Monopoly power and superstars

Ranking value and preference bring monopoly powers, profits, and rents to the producers of high-rank products, because selling ranking values to consumers requires no additional cost; that is, the marginal cost of producing a ranking value is zero. Therefore, producers of highly ranked products can set prices that are above their marginal costs (see Harashima, 2016, 2017, 2018b). If households' ranking preference is strong enough, therefore, the highest-rank producer can be a superstar.

3.1.2 Superstars in team sports

In team sports, teams—not individuals—compete, and championships are likewise won by the team, not by any individual player. Why then do individual superstars clearly exist in team sports? Harashima (2018a) showed the mechanism of generation of superstars in team sports. The origin of the extremely high compensation of superstars in team sports is also ranking value and preference. The mechanism is explained in brief in this section.

3.1.2.1 The probability of a win

Suppose that there are M teams and P players, and each team equally consists of n players such that $P = nM$. The probability that a rank r ($\in P$) player belongs to a rank m ($\in M$) team is identical for any m and r. The ability of a team is the sum of the abilities of all players who belong to the team, and the probability of a team winning is higher if the total ability of the team is higher than that of its opponent. As mentioned above, each team consists of n players, but there are many possible combinations of n players on a team. Suppose that the number of possible combinations in which a rank r player is included as one of n players on a team is Λ. A natural number is assigned to each of Λ possible combinations in order from 1 to Λ.

Let $\tilde{a}_r$ be the expected ability of a team to which a rank r player belongs, and $a_{r,\lambda}$ be the ability of team when the assigned number of combinations is λ ($\in \Lambda$). Because all of the combinations have the same probability of being realized, $\tilde{a}_r$ is calculated by the simple average of $a_{r,\lambda}$ such that

$$\tilde{a}_r = \Lambda^{-1} \sum_{\lambda=1}^{\Lambda} a_{r,\lambda} \ .$$

Because of the nature of $\tilde{a}_r$,

$$\tilde{a}_r - \tilde{a}_{r+1} > \tilde{a}_{r+1} - \tilde{a}_{r+2} \tag{1}$$

for any r (see Harashima, 2018a). Inequality (1) indicates that $\tilde{a}_r$ can be approximated by an exponentially increasing function of $P - r$; that is, $\tilde{a}_r$ increases exponentially as the rank of a player rises.

Because a win or loss is determined basically by the relative differences in the teams' abilities, the probability of a win for a team to which a rank r player belongs can be also approximated by an exponentially increasing function of $P - r$. In addition, because a team's revenue to which a rank r player belongs (Ω_r) is basically determined by the probability of a win, Ω_r can be also approximated by an exponentially increasing function of $P - r$.

Because even a slight difference in teams' abilities can be decisive in determining a win or loss, even a small relative difference between teams' abilities will result in a large difference in probabilities of a win. As a result, team revenue (Ω_r) will increase more sharply than players' abilities (a_r) do as r decreases from R to 1.

3.1.2.2 Mechanism of generation of superstars in team sports

The ability of a rank r player is assumed to be

$$a_r = \exp[\alpha(P - r)] \ , \tag{2}$$

where α (> 0) is a parameter and $a_P = 1$; that is, the ability of the rank P (the lowest ranked) player is normalized to be unity. Because of the nature of Ω_r, the salary of a rank r player (z_r) is

$$z_r = \Omega_r + (z_P - \Omega_P)$$

(see Harashima, 2018a). Therefore, the salary of a rank r player can be modeled as

$$z_r = (z_R - \delta) + \delta \exp[\alpha\beta(P - r)] \quad , \tag{3}$$

where β (> 1) and δ (> 0) are parameters.

Both ability (a_r) and salary (z_r) increase exponentially from the bottom to the top player, but an increase in the player's ability is greatly amplified in the corresponding increase in the player's salary. Therefore, even if the differences in players' abilities are small, differences in their salaries can be very large. A few top players can obtain extremely large salaries as compared with those of many other players.

4 PRODUCT DIFFERENTIATION

4.1 Monopoly rents derived from product differentiation

The importance of product differentiation has been emphasized in the study of business administration. The differentiation strategy is one of the three fundamental strategies in Porter's generic strategies (Porter, 1980, 1985). Product differentiation is important because it provides monopoly powers, profits, and rents to firms. Harashima (2017) showed that these monopoly powers, profits, and rents originate in household ranking preferences. The model of product differentiation shown by Harashima (2017) is explained in brief in this section.

4.1.1 Model of product differentiation

4.1.1.1 Household choice

Suppose that there are two products (Product 1 and Product 2) that are purchased by households for an identical practical use, and each of them is produced by one of two competing firms (Firm 1 and Firm 2); that is, Firm 1 and Firm 2 produce Product 1 and Product 2, respectively. A household purchases only one of the two products. Before purchasing it, a household compares the products and judges which one is better (i.e., which is the "winner"). A household evaluates the difference between the two products by awarding "points" to a product for each of various aspects and uses a weighted sum of the points awarded to each product to determine the winner (i.e., the one with more points). Finally, the household purchases the winner.

4.1.1.2 The model

Points for quality and taste are given by real numbers, but those for rank are given by natural numbers. Let q_i (i = 1, 2, …, Q) be points given by a household for a product with regard to aspect i of quality where there are a total of Q aspects. Let t_i (j = 1, 2, … , T) be points awarded by a household for a product with regard to aspect j of taste, where there are a total of T aspects. Suppose for simplicity that points given by households for any aspect of taste are uniformly distributed over a finite interval following the model of Hotelling (1929). Let R_P be points given by a household for a product with regard to rank. R_P = 1 indicates the highest rank and R_P = 2 is the second. Unlike q_i and t_i, R_P for each

product is common across households because R_P is a socially recognized rank. If an implicit ranking has not yet been formed socially, $R_P = 0$ for any product and household. Finally, let Π be the price of a unit of product and be commonly known to all households.

The total number of points awarded by a household to a product is

$$\tilde{T} = \Pi^{-1}\left(w_q \sum_{i=1}^{Q} q_i + w_t \sum_{j=1}^{T} t_j + w_R R_P \right) \quad , \tag{4}$$

where w_q, w_t, and w_R are constant weights. A household purchases the product that has the larger $\tilde{T}$. Suppose also for simplicity that Π is identical for the two products and equals 1. A household calculates equation (4) for both products and purchases the product with the higher $\tilde{T}$ value.

The total points given by households to Product v (v = 1, 2) are assumed to be uniformly distributed between the interval from $T_v - 1$ to $T_v + 1$ for any v, where T_v is the mean of total points given by households to Product v. Let $\tilde{T}_v$ be the total points awarded by an individual household to Product v. The probability that a household judges that the total of the points given by it on Product 1 ($\tilde{T}_1$) is higher than that on Product 2 ($\tilde{T}_2$) is

$$p\left(\tilde{T}_1 > \tilde{T}_2\right) = \frac{1}{8}\left[(T_1 - T_2)^2 + 4(T_1 - T_2) + 4\right] \ ,$$

where $p\left(\tilde{T}_1 > \tilde{T}_2\right) = 1$ if $T_1 - T_2 \geq 2$ (see Harashima, 2017).

4.1.1.3 The decisive role of rank in households' choices

Because ranks are intrinsically discrete, there is a lower limit of difference between different ranks (i.e., 1), and thereby there is also a lower limit of difference between $w_R R_P$ for adjacent ranks (i.e., w_R). On the other hand, there is no lower limit of the difference between adjacent points for quality or taste because they are represented by real numbers, and there is no lower limit of the difference between adjacent values of $w_q \sum_{i=1}^{Q} q_i$ or $w_t \sum_{j=1}^{T} t_j$. Therefore, it is the implicit ranking that usually differentiates competing products (see Harashima, 2017).

Let $\overline{R}_P = R_{P,2} - R_{P,1}$, where $R_{P,1}$ and $R_{P,2}$ are the R_P of Products 1 and 2, respectively, and $R_{P,1} \leq R_{P,2}$ ($R_{P,1} = R_{P,2}$ only if $R_{P,1} = R_{P,2} = 0$) and thereby $\overline{R}_P \geq 0$. Because of the natures of quality, taste, and rank, usually

$$p\left(\tilde{T}_1 > \tilde{T}_2 \middle| \overline{R}_P = 1\right) \cong \frac{w_R^2 + 4w_R}{8} \quad , \qquad (5)$$

(see Harashima, 2017). Equation (5) indicates that product differentiation is usually governed by the strength of households' ranking preferences.

4.1.1.4 Monopoly rents

By equation (5), Firm 1 obtains monopoly power. In the previous sections, it is assumed that $\Pi = 1$ for both products. However, Firm 1 can set the price of Product 1 higher than that of Product 2 because of its monopoly power. Because the marginal costs of producing Products 1 and 2 will be almost identical, Firm 1 can set the price of Product 1 higher than its marginal cost as well higher than the price of Product 2. Therefore, Firm 1 can exploit monopoly rents through product differentiation.

4.2 Way to obtain higher implicit product rank

Because high implicit ranks of products provide large amounts of monopoly rents to firms, obtaining a higher rank is essential for a firm to prosper. However, because there are many competing firms it will not necessarily be easy for a firm to gain a higher implicit product rank. Technological superiority over rival firms will be important for a firm to successfully differentiate its products from those of rival firms, but the level of technology will not usually differ greatly among competing firms because they would otherwise stop competing. If technologies are almost equal among competing firms, the ability of employees—particularly executives—of a firm will be significantly important as the factor that differentiates a firm's products and allows them to obtain higher implicit ranks.

Because the abilities of workers will certainly be heterogeneous even if the differences are small, the average ability of employees in a firm will be also heterogeneous across firms. If the employees' average ability in a firm is higher than those in rival firms, the probability that the implicit rank of the firm's product is higher than those of rival firms will also be higher. In particular, if a firm's executives' average ability is higher than that of the rival firms, the probability of a higher implicit ranking will also be higher.

5 EXECUTIVES AS SUPERSTARS

5.1 Resemblance between monopoly rents of teams and firms

Sections 3 and 4 indicate that the monopoly rents of professional sport teams and those of firms that successfully differentiate their products commonly originate in ranking value and preference. In addition, teams and firms share the common feature that, to obtain a

higher rank, it is essential to hire more talented employees—in particular, players or executives. In these respects, a team and a firm can be seen as the same kind of economic agent or organization in that they are the beneficiaries of households' ranking preferences. In addition, a player and an executive can be seen as a similar type of economic agent. Therefore, it is highly likely that the mechanism of executive compensation is the same as that for players' salaries in team sports. This means that some executives can be compensated like superstars in team sports.

Note that firms can also enjoy monopoly rents that are not attributed to ranking value and preference—for example, through a natural monopoly or patents. However, because the sources of the monopoly rents in those cases are not household ranking preference, the salary mechanism described here will not necessarily work in those firms.

5.2 Abilities relevant to superstars in firms

5.2.1 Tasks, duties, and abilities of employees

There are many different kinds of tasks and duties in business. However, in this paper, the focus is only on those that contribute to making the implicit ranks of products higher. Although any task or duty may contribute, or be related directly or indirectly, to making implicit ranks higher to a greater or lesser extent, examples of those that contribute mainly to higher ranks and the resulting monopoly rents are:

- correctly expect the households' average weights ($w_{q,i}$, w_R, and $w_{t,j}$)
- correctly anticipate relevant actions of rival firms
- achieve and maintain a higher intrinsic product quality than rival firms'
- continuously generate more relevant innovations than rival firms'
- influence households' perception of the implicit ranks (e.g., by advertising).

In the following discussion, the "ability" of workers includes only the ability to implement these tasks and duties and increase the implicit ranks of products.

Some workers (including executives) have high levels of ability and others have lower levels; ability thus differs across workers. In addition, these differences can be measured by the degree of contribution to monopoly rents. Hence, in this paper, the ability of workers is assumed to be cardinally measurable.

5.2.2 The property of employees' abilities

Employee ability can be divided to two types:

(1) ability to accomplish one of many subdivided and separated tasks and duties that contribute to making implicit ranks higher, and

(2) ability to coordinate and allocate employees who have different kinds of type (1) abilities within a firm.

Type (1) ability is required for ordinary employees and type (2) ability is required for executives. For a mid-level manager a mix of the two types is required, but executives and ordinary employees will also have some mix of type (1) and (2) abilities. Therefore, the ability of each employee, including executives, is the weighted sum of type (1) and (2) abilities, although ordinary employees will typically have mostly type (1) abilities and executives will typically have mostly type (2) abilities.

As noted in Section 5.2.1, ability is assumed to be cardinally measurable, and therefore all workers (including executives) in an economy can be ranked by ability. For simplicity, it is assumed that ability is unchangeable and there are no tied ranks. The greater the ability of a worker is, the higher the rank. (Note that a higher rank has a lower number; i.e., rank 1 is higher than rank 2.) It is highly likely that executives will be included in the top tier of workers, because type (2) abilities will receive a greater weight than type (1) abilities. Therefore, the top-ranked set will consist mostly of executives.

In addition, it is highly likely that the abilities of executives will exponentially increase as the rank increases, because abilities of people in general will approximately follow a normal distribution, and workers in the top group (mostly executives) will correspond to the tail of the ability distribution. Therefore, as with players in team sports, the abilities of executives will approximately increase exponentially from the lowest ability executive to the highest, even though the differences will be small because of the upper limit of human ability.

5.3 Promotion from within and hiring from outside

As shown in Section 5.1, executives and players can be treated as the same kind of economic agent, but they have some different properties. The probability that a higher rank position is filled by promoting a lower rank employee from within a firm (or team) rather than hiring a person from outside the firm (team) will be higher in the case of executives than in the case of players. The importance of firm (team)-specific human capital (skills and knowledge that are useful only within a specific firm or team) most likely differs for executives and players. Before being able to fully demonstrate their abilities, executives and players have to accumulate firm (team)-specific human capital. Because accumulating human capital takes time and incurs costs, the mobility of executives and players will be constrained to some extent. If the amount of firm (team)-specific human capital to be accumulated is relatively larger in one firm (team), it would be relatively more difficult for outside talents to become employed with that firm or team. In addition, it is also relatively more difficult for workers inside a firm (team) to move to

other firms (teams), because it is likely that workers who accumulate a large amount of firm (team)-specific human capital may not accumulate a sufficient amount of more general human capital; that is, the human capital that they have accumulated is specific to one firm (team).

It is likely that the amounts of firm (team)-specific human capital that executives have to accumulate are far larger than those that players in team sports have to accumulate, and therefore that the mobility of executives is more constrained than players. For example, a baseball pitcher versus a CEO. This means that the mobility of executives across firms is more constrained than that of players. Nevertheless, firms can recruit executives from outside and executives can change firms and, in actuality, many executives have been hired from outside a given firm.

If mobility is constrained, executives and players cannot necessarily obtain all of the monopoly rents, unlike in the case of perfect mobility, because constrained mobility indicates an imperfect market for executives or players. For example, even if an executive demands the high level of compensation that could be obtained if mobility were not constrained, a firm can reject this demand because it knows that the executive cannot easily move to other firms. The constrained mobility therefore acts to reduce the level of executive compensation. This means that a portion of the monopoly rents is distributed to other stakeholders—for example, stockholders or ordinary employees. How this portion is distributed among the stakeholders may be determined by the relative strengths of the bargaining powers of the stakeholders.

Note that there is another difference between executives and players. There are leagues/union rules (most notably salary caps) on players/teams but not for executives and firms.

5.4 Executives as superstars in firms

Sections 5.2 and 5.3 indicate that the compensations of executives and the salaries of players in team sports are basically governed by the same mechanism. Hence, a model of executive compensation can be constructed on the basis of the superstar model shown in Section 3.1.2. Suppose that there are P executives, and by the reason shown in Section 5.2.2, suppose also that the ability of executives increases exponentially from the rank P executive to the rank 1 executive, such that

$$a_r = \exp[\alpha(P - r)] \quad , \tag{6}$$

where r is executive rank, a_r is the ability of the rank r executive, $a_P = 1$, and α (> 0) is a parameter. By the same mechanism as shown in Section 3.1.2, the compensation of a rank r executive (z_r) can be modeled by

$$z_r = (z_R - \delta) + \delta \exp[\alpha\beta(P - r)] \ , \qquad (7)$$

where β (> 1) and δ (> 0) are parameters. Equations (6) and (7) are identical to equations (2) and (3), respectively, and indicate that both ability (a_r) and compensation (z_r) increase exponentially from the bottom to the top executive. An important point is that an increase in an executive's ability is amplified in the corresponding increase in that executive's compensation. Therefore, a few top executives can obtain extremely high compensation, similar to superstars in team sports.

Even if the ability of the rank 1 executive is not so different from those of other executives, the rank 1 executive can get a far larger portion of the monopoly rents generated by households' ranking preference than the other executives. The rank 2 executive can also obtain a much larger compensation than those of executives lower than rank 2, but a far smaller compensation than the rank 1 executive. This is the reason for the extremely high compensation of some top executives. The rank 1 executive across the entire pool of executives can obtain the highest compensation in the case of perfect mobility.

6 JUSTIFIABILITY

Can extremely high executive compensations be justified even if their source is monopoly rents? Some monopoly rents (e.g., those derived by natural monopoly) are not socially justified and are usually regulated by the authorities, but others (e.g., those from patents) usually are justified. Whether monopoly rents are justifiable will depend on their effects on the economy and society. The basic question here is: Can monopoly rents attributed to households' ranking preferences be justified? In addition, even if they can be socially justified, are uneven distributions of these monopoly rents, e.g., the distribution of most of these monopoly rents to executives, justified?

First, I examine whether the monopoly rents derived from ranking values themselves can be justified. As shown in Section 2, the utilities that households obtain from ranking values are in addition to the utilities they obtain from practical values. Hence, if an authority (i.e., the government) were to eliminate differentiated products by force, households would lose some amount of utility (that obtained from ranking value) without obtaining any additional utility from practical values. In this sense, regulating differentiated products by force is disadvantageous for households. Therefore, the monopoly rents derived from ranking values themselves can be justified.

Next, I examine who should obtain the monopoly rents derived from ranking values. In the case of patents, innovators can obtain monopoly rents exclusively for

defined periods because (1) people benefit from newly generated innovations and (2) motivation and incentive for innovators to generate innovations are significantly enhanced under this scheme. Hence, whether executives can obtain a large portion of the monopoly rents should be judged by whether people benefit by enhancing executives' motivation and incentive. A household's ranking preference is not related to the absolute abilities of executives; rather, it is related to their relative abilities. Some executive must be the top-ranked executive in any given period, even if that executive's absolute ability is very low from a historical perspective. Conversely, the utilities households derive from ranking values are not affected by the historical level of absolute abilities of executives. Hence, even if the motivation of executives to work harder is enhanced through a high level of compensation, their enhanced efforts are irrelevant to the utilities that households eventually obtain from ranking values. Whether executives work harder or not, the amount of utility that households derive from ranking values does not change. Therefore, it is not necessarily justifiable to distribute a large portion of the monopoly rents owing to ranking values to executives. Note, however, that this does not mean that executives should not obtain any of the monopoly rents.

To whom should the monopoly rents be distributed? There are several possibilities: shareholders, ordinary employees, consumers, and executives. It appears to be difficult to judge who contributes to the generation of the monopoly rents and how much they contribute. The distribution of monopoly rents, therefore, may have to be evaluated from a different perspective—particularly that of inequality. The existence of extremely high incomes indicates the existence of extreme economic inequality. If extreme economic inequality is not socially supported, and if justifiable ownership of these monopoly rents cannot be determined, society may justifiably prioritize reducing this type of economic inequality, for example by imposing a high income tax rate on these monopoly rents.

7 CONCLUDING REMARKS

Compensations for some corporate executives are extremely high, but it is difficult to explain this by their contribution to productivity. Therefore, many types of explanations of the mechanism of executive compensation have been presented. Many of these seem to commonly assume that some economic agents (e.g., shareholders, households, or ordinary employees) are foolish, incompetent, or irrational, but it seems highly likely that these agents are not significantly so.

At issue is the large discrepancy between differences in absolute abilities and those in levels of compensation. In this paper, this issue was examined on the basis of the concept of ranking value and preference shown by Harashima (2016, 2017, 2018a, 2018b).

It is highly likely that some kinds of economic rent underlie these high levels of compensation, because the payments cannot be fully explained by productivity. Ranking value and preference provide monopoly powers, profits, and rents to firms that produce the products that have high ranking values. Thanks to the monopoly powers, profits, and rents derived from people's ranking preferences, superstars can be generated not only in individual, but also in team, professional sports (Harashima, 2016, 2018a, 2018b). In addition, products can be differentiated because of households' ranking values and preferences, and differentiated products provide firms with monopoly powers, profits, and rents (Harashima, 2017). Therefore, executives and players in team sports are both beneficiaries of people's ranking preferences. Executive compensations and player salaries are generated through commonly perceived ranks; that is, they are determined by the relative, not absolute, abilities of executives or players. Some executives therefore are similar to the superstars in team sports and receive high compensations by the same mechanism.

The monopoly rents owing to ranking values can be socially justified because the households' utilities derived from ranking values are in addition to those derived from practical values. However, it does not seem to be justifiable that these monopoly rents are distributed solely to executives, because the households' utilities derived from ranking values are not affected by the executives' efforts. Therefore, measures that reduce economic inequality may need to be prioritized when society considers the distribution of these types of monopoly rents.

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