

Election of Workers' Representatives: Based on Lexicographic Preferences Ordering Method

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Abstract

It is very important for the labor to have a national election mechanism of workers' representatives in order to safeguard rights and interests of labor. The essential nature of the election of workers' representatives is to aggregate the set of different individual preferences orders of every voter into a single sequence of group preference rationally and scientifically. It has been proved that lexicographic preferences ordering provides a better fit for voting representatives due to effects of irrational factors like emotion, desire, faith and some others. The paper, at first step, makes a mathematical description of worker voters' behaviors based on the rule of lexicographic preferences ordering, performs an evaluation operations to instruct the operating mechanism of lexicographic ordering, and then establishes associations among lexicographic ordering method, indifference curve of utility, majority vote counting method, Borda counting method and Condorcet counting method after a series of in-depth discussion of voters' inter-behavior and their outcomes.

Key words: Election of workers' representatives; Lexicographic preference ordering; Preference order of attributes

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INSTRUCTION

In recent years, various types of enterprises in China have been undergoing severe challenges in the reform storm with China's economic development entering a new normal state, resulting in realities of increasingly intensified labor-capital contradictions. There were approximately 200 events of unlawful dismissal disputes triggering off workers' collective struggles in which about one million workers were involved in the first three quarters of 2015, as revealed in a rough investigation by an authorized mass media. If the labor, in a relatively disadvantageous position, wants to fight for more interests though a series of efficient collective bargaining lawfully, first of all, workers' representatives on behalf of the actual will of labor's group must be selected out. Therefore an election mechanism of workers' representatives reflecting the labor's group will be rationally needed urgently. Specifically speaking, the election mechanism incorporates two procedures. One is to generate m individual preference orders for candidates through m voters' independent poll following a certain voting rule; the other is to form voters' group preference order out of the set comprised by above-mentioned individual preference orders in light of some counting method. Aiming at facts of ubiquitous inefficiency observed after tracing the election of workers' representatives in some famous corporations such as Hisense and Kelon, Microsoft (China), Nokia (Suzhou), the study focuses on the problem of worker voters' individual preference ordering.

1. LEXICOGRAPHIC PREFERENCE ORDERING OF WORKERS' CANDIDATES

As for worker voters choosing from among the candidates, election is nothing but a social

choice¹ at the individual level with an essence of voter's ranking the voted in light of his own preference. Two aspects should be deliberated when observing workers' voting behavior. The first one is what are behavioral traits of worker voters and how to realize self-consistent² between individual behavior with his action goals? The second one is how the voters' traits affect the voting behaviors of their own?

1.1 The Ordering Behavior of Voters

An efficient social choice requires rational voting behaviors at least. On the basis of economic man hypothesis in economics, the hypothesis of rational man abstracted in social choice theories is: a) he can always make his own decision when confronting a series of options; b) he always orders according to his own preference so as to have every selected object to be superior, inferior, or indifferent to others; c) the preference order is transitivity, that is, if he thinks of, then; d) he chooses the most preferred item as his final choice as usual; e) he would make the same decision in the confrontation of the same choice. In a brief, a rational man in social choice theories lays stress on ordering in accordance with individual preference, possesses

$$f(x_i) > f(x_k), \quad i \in n, k \in n, n \in N \text{ 且 } i < k$$

$$f(x_i, x_k + h) > f(x_i, x_k), \quad i \in n, k \in n, \text{ 且 } i < k, 0 < h \leq \infty$$

$$f(x_i + g, x_2) > f(x_i, x_k + h), \quad i \in n, k \in n, \text{ 且 } i < k, 0 < g \leq \infty, 0 < h \leq \infty$$

The expression of aforesaid formulas is that the voter is always prefer the group with higher level whatever how desirable is, if he deem superior to. For instance, if a lady had a tendency of lexicographic preference ordering in the case of choosing her spouse, to assume the ordering of candidates' attributes having impacts on her choice is incometemper, then the one with the highest income level would be chosen no matter how nice others' temper is, unless income levels of all of the selected were exactly the same. We can express voters' preference ordering for attributes by utility gradient formulas as below:

$$(0,0) < (0,1) < (0,2) < (0,3) < \dots < (0, \infty)$$

$$< (1,0) < (1,1) < (1,2) < (1,3) < \dots < (1, \infty)$$

$$< (2,0) < (2,1) < (2,2) < (2,3) < \dots < (2, \infty)$$

$$< (3,0) < (3,1) < (3,2) < (3,3) < \dots < (3, \infty)$$

$$< \dots$$

¹ There are two kinds of social choice. One is to choose the commodities or combination of commodities by monetary approach, in which, the utility function of buyers is assumed as a continuous and differentiable one generally; the other is to make social choice by voting, in which, the utility function of voters can't be described by a continuous and differentiable function in many cases.

² Self-consistent means someone can prove that he is at least not contradictory or wrong in accordance with his own logical deduction.

implied a pre-set of continuously differentiable utility function partly and his preference ordering is transitivity.

In reality, it is a certain non-classical individual preference ordering such as lexicographic ordering that can give a much better explanation when discussing political choices (e.g. election of councilors), properties portfolio (assets distribution of the divorced) owing to some irrational elements such as emotion, desire, belief which forming an utility function which is non-continuous, non-differentiable, or neither continuous nor differentiable.³ The above-mentioned irrational elements may cause individual preference ordering to deviate from the rule of transitivity. Of course, the situation that ordering follows both of transitivity rule and lexicographic ordering rule may appear also if some irrational elements are involved. Therefore, many studies believe that maybe lexicographic ordering is fitting for individual ranking behaviors if regarding irrational elements as decisive bases.

Let's suppose candidates have n kinds of attributes (written as x_1, x_2, \dots, x_n), and the individual utility function (written as $f(x_1, x_2, \dots, x_n)$, ($n \in N$) is non-continuous function, then, we have

1.2 Multiple Attributes of Candidates

Every candidates have multiple attributes, being related to workers' collective struggle, which include more or less: a) whether the candidate has commitments being consistent with voters' interest request or not (written as C); b) whether the candidate supported by strong mass base or not (written as P); c) whether the candidate has a dominant voice or not (written as A); d) whether the candidate is active in collective struggle of the labor or not (written as T); e) whether the candidate has satisfactory representative capacity or not (written as Y); f) whether the candidate has good teamwork ability or not (written as S) and so on. In actual, election of workers' representatives is an action to choose and order among P candidates and combination of their attributes.

1.3 A Evaluation Simulation on Voting Mechanism of Workers' Representatives

Suppose we have two voters, X and Y, and 5 candidates, a, b, c, d, e. Then assume the set of election criteria consisted by candidates' attributes recommended by election organization is (C, P, T, Y, A, S). Table 1 shows

³ To take the derivative of Lagrangian function composed of a continuous and differentiable individual utility function and constraint condition of social choice can describe a curve of individual preference order and figure out optimal utility point. This kind of ordering is called classical preference ordering.

clearly candidates' attributes are ranked as Y, C, A, P from top to bottom according to its relative importance. The five candidates, a, b, c, d, e is marked in every attribute item by X (score is decided to float between 0-10 points). Then X's preference order is $c > b > d > e > a$ following the steps ① and ② in Table 1.

Table 1
Voting Situation of X

	A	b	c	d	e
Y	0	10	10 ^①	0	0
C	6.5	6.5	8.5	7.0	6.7 ^②
A	0.5	10	0.5	0.9	0.1
P	3.5	4.5	8.5	6.5	3.5

Similarly, we have Y's preference order, $d > c > b > a > e$ following the steps ① and ② in Table 2 in which there are only threegraded attributes item, C, Y, P.

Table 2
Voting Situation of Y

	a	b	c	d	e
C	5.6	8.4	8.4 ^②	8.4	3.9
Y	6.5	7.0	7.0 ^①	8.3	6.7
P	3.5	4.5	8.5	6.5	3.5

From that, the two voter, X and Y, determine his own preference order individually based on different lexicographic ranking and grading as for candidates of a, b, c, d, e.

Table 3
Subset of Individual Preference Ordering of X and Y

Voter	Individual preference order (ranking from the first candidate to the fifth candidate)				
X	c	b	d	e	a
Y	d	c	b	a	e

According to this method, we've got the set of individual preference orders of all the voters. The method of lexicographic ordering is fitting for voters' behavior rules. Besides simplicity of manipulation, the significance is the voting method fully demonstrates multilevel and sequentiality of individual preference. It's easy to bring about a self-consistent result if adopting the method of lexicographic ordering in the case of election of workers' representatives.

2. ANALYSES ON ORDERING BEHAVIORS OF MULTIPLE VOTERS

When voting, individual preference ordering may be manifest very often as two kinds, say lexicographic preference ordering or non-lexicographic preference ordering. We would like to discuss how voter's

individual ordering has effects on the election of workers' representatives when different voters interact on condition that they have different preference order.

2.1 The Situation of Voters' Having the Same Lexicographic Preference Order

If voters exactly had the same lexicographic preference order with every other, subjective scoring of voter decides the candidates' rank.

Case 1: If there were no material difference among voters' subjective scores, the situation would be similar to Unanimous Approval. As a result, a rational group voting sequence would generate after a single vote and counting which is the same as majority voting rule in essence. Contrarily, majority poll is needed on too strict conditions to be applied in any cases in order to get aso-called rational group electing result.

Case 2: If there is material difference among voters' subjective scores as often, then a set comprising various individual preference orders will form. In this case, some scientific method of counting, for example, Borda counting method and Condorcet counting method, must be introduced so as to aggregate the above-mentioned set into a rational unitary order.

2.2 The Situation of Voters' Having Different Lexicographic Preference Order

Provided there were very different lexicographic preference orders among voters, an extreme situation should be deliberated firstly. If there formed pairs of completely-inverted sequence among voters in spite of their consensus scores in every attribute item for all candidates, Condorcet vote cycle would appear inevitab (see Table 4 and Table 5). And then it can be inferred that the more inverted among voters' preference order, the higher the probability of the emergence of Condorcet vote cycle was. The inference extended to reality is that it is scarcely possible to form a rational group election order only adopting a simple poll rule or counting method, like majority voting rule, if there was a convincing show of disagree in opinion on appraisal of the importance candidates' attributes and ranking them. In this circumstance, situation of One Vote Veto or being elected by one vote would take shape, having a very high system risk, if adopting the method of voting with singular voter as usual also as to avoid Condorcet vote cycle. In actual, the right improving directions are as follows. The first one is to have an internal talks at the first step to decide evaluation weight of every kind of voter on candidates' attributes (for instance, the more powerful the damage, the higher the weight), then to organize a election following rule of weighted and rule of lexicographic ordering. The second one is to divide voters into two groups firstly and then to elect insubgroup with plain sequence and the one with the reverse sequence respectively.

Table 4
Rating Scale of Plain Sequence Group

	A	B	C	D
X ₁	1	1	0.5	0.3
X ₂	0.5	1	0	0.5
X ₃	0	0	1	1

Table 5
Rating Scale of Reverse Sequence Group

	A	B	C	D
X ₃	0	0	1	1
X ₂	0.5	1	0	0.5
X ₁	1	1	0.5	0.3

2.3 The Situation That Some Voters Have Lexicographic Preference Order and Others Have Non-Lexicographic Preference Order

We'd like to discuss an extreme situation as well when some voters ranked individual preference according to lexicographic ordering rule and others did it with some non-lexicographic ordering rule. Assume the voters (written as B) with non- x_{1BG} lexicographic preference order have a group of indifference curves as for a certain candidates' attribute (written as I, II, III), which intersecting with the utility curve of voters with lexicographic preference order (written as A, and A prefer x_1) at $H(x_{1AC})$ and (x_{2AD}) represent the initial score of candidates' attribute, say (x_1, x_2) . AA's appraisal of As Figure 1 shows, H is Pareto optimality. This appears that the final utility of A increases from $F(x_{1AC}, x_{2AD})$ to $F(x_{1AH}, x_{2AD})$ because of B's indifferent selection in group counting after individual vote ordering.

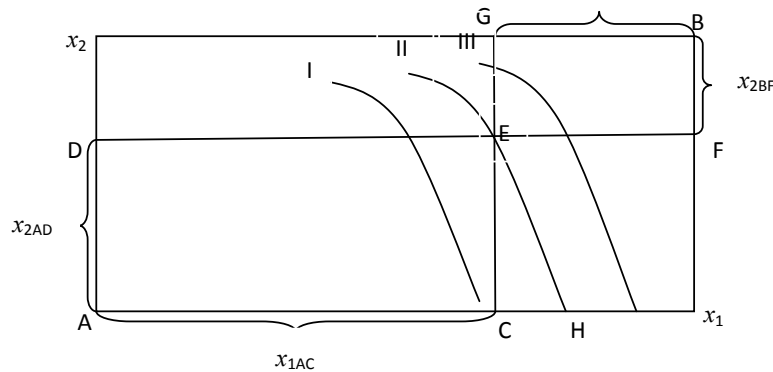


Figure 1
Analysis on Utility of A and B based on Edgeworth Box

In common, B's ranking of attributes is random when the preference can be described by indifference curve. If there was an order on attributes recommended by election organization, the probability of B's choosing the recommended order would be normal distribution. The voting result is subject to manipulation of election organization because of the existence of B.

CONCLUSION

The social choice of workers' representative requires individual preference orders are aggregated rationally into one group order according to a certain scientific voting and counting rule. Comparing with some classical preference ordering methods, method of lexicographic ordering is fitting for voters' behaviors by far the most due to some irrational factors such as emotion, desire, belief and so on. We can get more complex interacting results when voters have different ordering tendency. The consequences are as follows:

(a) Majority voting rule commonly used would appear its rationality only on condition that all the voters had coherent lexicographic ordering tendency for

candidates' attributes.

(b) Borda counting method and Condorcet counting method should be introduced to get a rational aggregating group order if there appeared similar lexicographic orders among voters.

(c) If there appeared reverse among voters' preference orders, appraisal weight should be taken into consideration firstly, or to divide the initial voting group into sub-group with plain sequence, sub-group with the reverse sequence and then to elect respectively.

(d) If voters' ordering tendency was indifferent, the electing result is subject to manipulation of election organization.

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