Statistical Discrimination and Affirmative Action:
An Experimental Economics Perspective

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Outline (1)

- Statistical discrimination and affirmative action policy are investigated in experimental economics perspective.

- For statistical discrimination, as the theory predicts, discriminations against one of the groups were observed even though every groups were ex ante identical.

- As for affirmative action policy, laboratory experiments showed that it did not necessarily reduce efficiency. But there is little theory to explain those facts.

Outline (2)

- Then, we developed a model of institutional choice in the context of workers' promotion tournament in the work place.

- We showed that when a worker from majority population has inequality aversion preference, the more he is inequality averse, the more he is willing to choose the work environment with affirmative action and make higher effort.

- Thus, effectiveness of affirmative action policy is confirmed theoretically.

Experimental economics (1)

- In this research, we focus on recent development in experimental economics research concerning statistical discrimination and affirmative action policy.

- Experimental economics is an empirical method in economics research conducting laboratory and field experiments.

- Modern methodological foundation was built by the Nobel Laureate economist Vernon Smith.

Experimental economics (2)

- A distinguished feature in experimental economics among other empirical research is that unobservable factors e.g. preference and information as such are controllable in the laboratory.

- This way we can test economic theory in the laboratory more rigorously.

- The literature of experimental research is growing rapidly in recent years, and its application is found in almost all areas in economics.

Experimental economics (3)

- For an important policy issue such as a tax reform, sometimes economic theory provides multiple policy recommendations, and one cannot choose which policy is the best via empirical research because of the lack of relevant naturally occurring data.

- In that case, experimental economics provides relevant data by creating relevant economic environment carefully in the laboratory.

- This way experimental economics contributes to the policy debates among theorists and practitioners by providing empirical data.

Experimental economics and Disability studies

- Experimental economics will also contribute to the policy debates concerning disability studies for the lack of relevant data or some important factors are unobservable.

- Though there are a few literature on disability related policy making, statistical discrimination and affirmative action policy are exceptions.

Statistical discrimination

- Statistical discrimination theory is concerning the cause of discrimination.

- The theory has been developed by Arrow (1973) and Phelps (1972), and was extended by Coate and Loury (1993).

- The theory predicts that even if there is no intrinsic difference between two parties, that one party is discriminated can occur by wrong belief of the observer, that is, discrimination emerges without any compelling fact/reason.

- This theoretical prediction is confirmed in the laboratory and field experiments.

Affirmative action policy (1)

- To overcoming statistical discrimination, one can think that implementing affirmative action policy is effective (see Coate and Loury, 1993).

- As for affirmative action policy, main issue is whether implementing affirmative action policy causes efficiency/welfare loss or not.

- Fortunately, laboratory experiments so far conducted reveal that affirmative action policy does not necessarily lead to efficiency/welfare loss.

Affirmative action policy (2)

- Schotter and Weigelt (1992) is the first experiment on affirmative action.

- In their model, two workers participate in the promotion tournament.

- Each worker makes effort in production activity in the firm. The number of products depends on each worker's effort level.

- In making each level of effort, each worker has to pay effort cost proportional to the effort level.

- More productive worker wins the tournament and gets promoted.

Affirmative action policy (3)

- If two workers are identical in their productivity and neither of them is treated unequally, such a tournament is called *symmetric*.

- If their productivities are different, but neither of them is treated unequally, such a tournament is called *uneven*.

- If their' productivities are equal, but one of them is treated favorably in the tournament, such a tournament is called *unfair*.

Affirmative action policy (4)

- Innate difference between each worker's productivity is represented by a parameter α. That is, less productive worker has to pay α times more effort cost than the more productive worker.

- Favorable treatment in the tournament is represented by a parameter k. That is, k is added to the number of final products that a favorably treated worker produces.

Affirmative action policy (5)

- In these settings, *uneven* tournament is characterized by ($\alpha>0$, k=0) and *unfair* tournament is characterized by ($\alpha=0$, k>0).

- In *uneven* tournament, changing k = 0 to k > 0, that is, less productive worker is favorably treated, is called *affirmative action*.

- In *unfair* tournament, changing $\alpha>0$ to $\alpha=0$, that is, favorable treatment is removed, is called *equality of opportunity*.

Affirmative action policy (6)

- According to Schotter and Weigelt (1992)'s experiment, both affirmative action and equality of opportunity raised winning chance of less productive worker.

- Moreover, as implementing affirmative action policy and equality of opportunity make the tournament more competitive, both workers' effort levels were increased.

- Thus, implementing affirmative action policy does not necessarily reduce social efficiency.

Institutional choice problem (1)

- To simplify the argument, we suppose that there are two types of worker, non-disabled and disabled.

- They are competing to get promoted as in Schotter and Weigelt (1992).

- Non-disabled worker constitutes the majority in a firm, so his opinion has decisive power in the firm.

- So, whether affirmative action policy is implemented or not depends on non-disabled worker's preference for it.

Institutional choice problem (2)

- Chance for promotion depends on their work efforts. A worker with higher effort wins the tournament.

- When a worker gets promoted, that worker receives an extra bonus R>0.

- On the other hand, each worker has to pay effort cost proportional to the effort level.

- One of the workers is disabled, and her labor productivity is lower than non-disabled worker.

- Here we call the non-disabled worker as player ND and the disabled worker as player D.

Institutional choice problem (3)

- Thus, even though they make same level of effort, player D produces less products than player ND does.

- To simplify the argument, we suppose that effort levels that workers can choose is either High (H) or Low (L), H>L, and marginal effort cost is c=1.

- Further we assume that even though player D chooses H as her effort level, she has no chance to win the promotion tournament.

Institutional choice problem (4)

Game X

ND \ D	H	L

H	R-H
	
	                 -H
		R-H
		
		                 -L

L	R-L
	
	                 -L
		R-L
		
		                 -L

In this game, player ND has a dominant strategy, L. Then, if player ND chooses L, L is best response for player D. Thus, (L, L) is only Nash equilibrium in this game.

Institutional choice problem (5)

- Next we consider the effect of affirmative action policy.

- In this case, a player choosing higher effort wins the tournament and gets promoted.

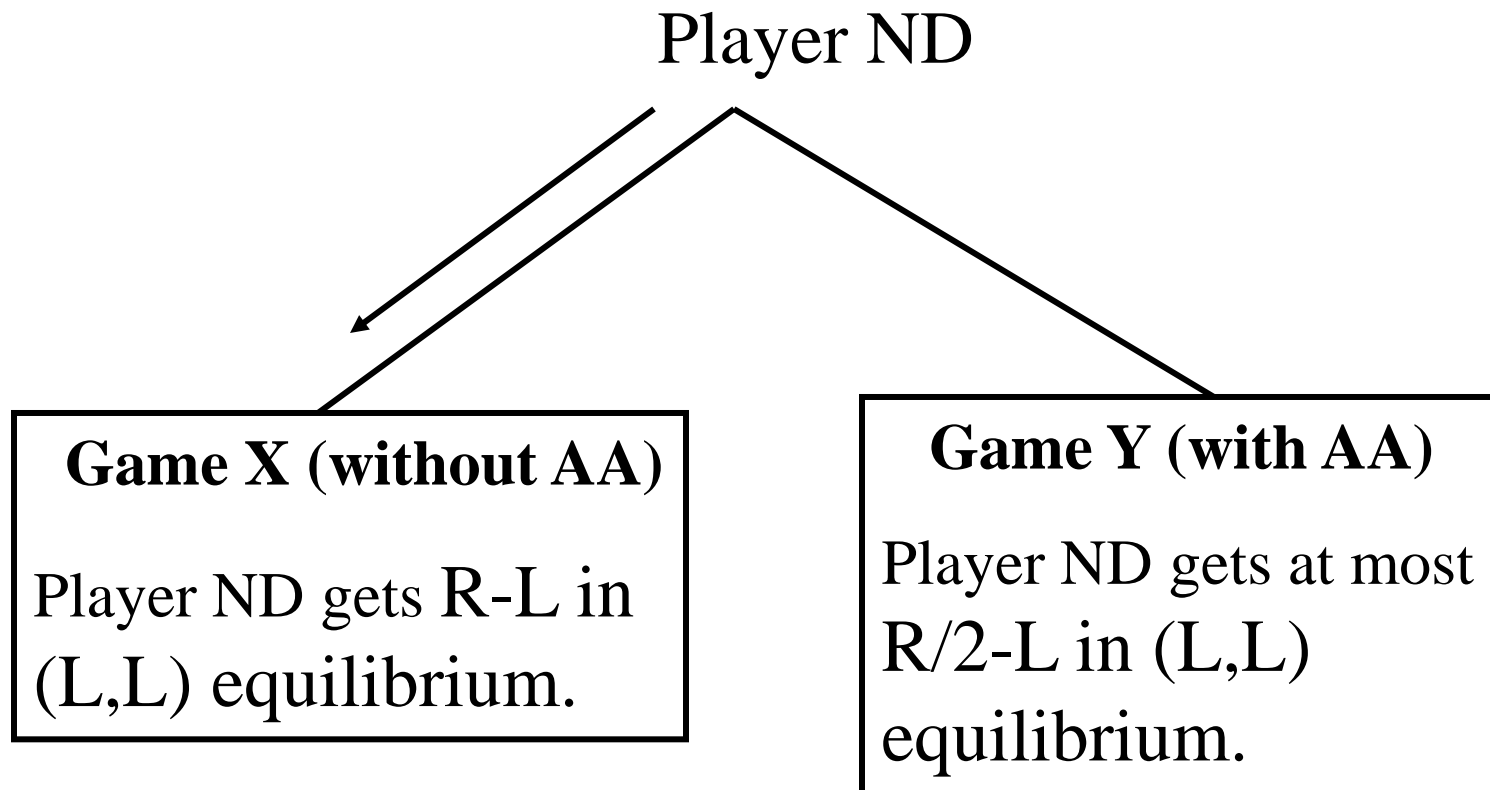- If both players choose the same level of effort, chance for promotion is equal, that is, probability 1/2.

Institutional choice problem (6)

Game Y

ND \ D	H	L

H	R/2-H
	        R/2-H
		R-H
		        -L

L	-L
	        R-H
		R/2-L
		        R/2-L

In this game, both (H, H) and (L, L) are Nash equilibria.

Institutional choice problem (7)

Player ND

Game X (without AA)

Player ND gets R-L in (L,L) equilibrium.

Game Y (with AA)

Player ND gets at most R/2-L in (L,L) equilibrium.

Institutional choice problem (8)

- Suppose that player ND has inequality averse preference U below.
  - U=x1-α.max(x2-x1,0)-β.max(x1-x2,0)
- x1 is player ND's material payoff, x2 is player D's material payoff and α>=β and 0<=β<1.
- This means that
  - (1) if player ND's payoff is less than player D's, player ND suffers disutility (envy) α times difference between both players' payoff,
  - or (2) if player ND's payoff is greater than player D's, player ND suffers disutility (guilt) β times difference between both players' payoff.

Institutional choice problem (9)

Game X'

ND \ D	H	L
H	R-H-βR -H	R-H-β(R-(H-L)) -L
L	R-L-β(R+(H-L)) -H	R-L-βR -L

In this game, player ND has a dominant strategy, L. Then, if player ND chooses L, L is best response for player D. Thus, (L, L) is only Nash equilibrium in this game.
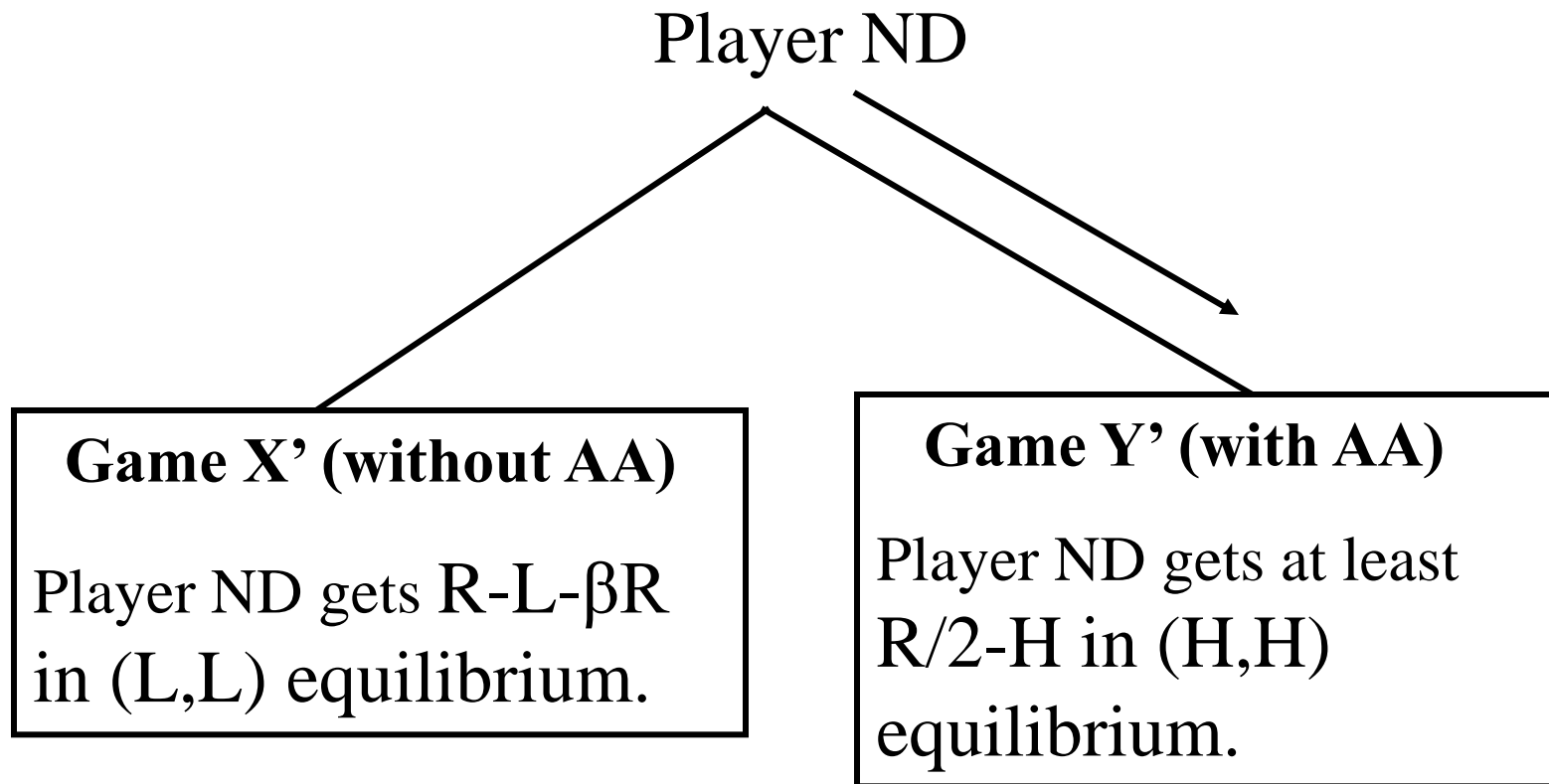
Institutional choice problem (10)

Game Y'

	D	H	L
ND			
H		R/2-H R/2-H	R-H -β(R-(H-L)) -L
L		-L-α(R-(H-L)) R-H	R/2-L R/2 -L

In this game, both (H, H) and (L, L) are Nash equilibria.

Institutional choice problem (11)

Player ND

Game X' (without AA)

Player ND gets $R-L-\beta R$ in (L,L) equilibrium.

Game Y' (with AA)

Player ND gets at least $R/2-H$ in (H,H) equilibrium.

If $\beta > 1/2$ and $R > (H-L)/2$, player ND chooses Game Y', and makes higher effort H.

Institutional choice problem (12)

- Assume that player ND, who constitutes majority, is motivated by inequality averse preference, then the more player ND is inequality averse ($\beta > 1/2$), and R>(H-L)/2, the more he is willing to choose the work environment with affirmative action policy (Game Y') than the one without it (Game X') and makes higher effort, H.

- This way, efficient outcome (H, H) is attained as an equilibrium.

Conclusion

- We developed a model of institutional choice in the context of workers' promotion tournament.

- Then, we showed theoretically that when a worker from majority population has inequality aversion preference, affirmative action policy did not necessarily reduce efficiency.

- This way effectiveness of affirmative action policy is confirmed theoretically in very weaker requirement.

- Of course, this is only a theoretical prediction, it should be further tested in the laboratory. This will be our future research.