Favoritism

Yann Bramoullé* Sanjeev Goyal†

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Abstract

Favoritism is the act of offering jobs, contracts and resources to members of one's social group in preference to outsiders. Favoritism is widely practiced and this motivates an exploration of its origins and economic consequences.

Our main finding is that individuals have an interest to trade favors over time and that this will come at the expense of others, who are outside their group. We show that favoritism is relatively easier to sustain in smaller groups. Favoritism entails social costs as it usually leads to inefficient allocations. However, favoritism can lead to payoff advantages for larger groups. Productivity enhancing investments are larger in groups which practice favoritism. The availability of investment opportunities can reinforce payoff inequalities across groups.

*Department of Economics, Laval University. Email: yann.bramoulle@ecn.ulaval.ca

†Faculty of Economics & Christ's College, University of Cambridge. Email: sg472@econ.cam.ac.uk

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1 Introduction

Favoritism refers to the action of offering jobs, contracts and resources to members of one's own social group to the detriment of others outside the group. Favoritism appears to be widely practiced. On the death of Omar Bongo, Gabon's president, we read:

> *The suggestion of fiddling public finances flummoxed and infuriated him. Corruption, he once explained to a reporter, was not an African word. No more was nepotism: he simply looked after his family, supplying them with villas in Nice as well as the ministries of defence and foreign affairs.* (The Economist, 2009).

In a closely related vein, Chua's (2003) work highlights the prominence of ethnic minorities in a range of developing countries across the world. She proposes within-group favoritism and crony capitalism (which refer to ties between political elite and ethnic minorities) as an important element in the success of the ethnic minorities. Similarly, Pande (2003), presents evidence from India on how politicians direct public resources towards their own caste group.[1]

There is also evidence on the practice of favoritism in developed economies. Alumni of top graduate schools and universities have long been suspected of practicing unfair favoritism towards their members; for a recent empirical study in the French context, see Kramarz and Thesmar (2009). Similarly, Scoppa (2009) provides strong evidence for the role of favoritism in the Italian public sector. Empirical work over the past half century highlights the widespread use of social contacts in labor markets: summarizing the empirical evidence, Ioannides and Loury (2004) report that between thirty and sixty percent of jobs in developed economies are obtained via social connections: there clearly exists the potential for the practice of favoritism.[2]

Popular accounts highlight the exchange of favors as a key mechanism underlying favoritism: Mr. A does Mr. B a favor today and in turn Mr. B does a favor to Mr. C tomorrow, who in turn does Mr. A a favor sometime in the future. The aim of this paper is to identify the circumstances under which this trading in favors is possible and then study its economic consequences. We lay out the key elements of our model and describe our main findings now.

Profitable economic opportunities – production, investment and consumption – arise over time. To realize the gains from an opportunity, individuals must meet and transact: an

[1] See Franck and Rainier (2009) for a recent study finding strong evidence of ethnic favoritism in Africa.

[2] For an interesting study on favoritism in the financial sector see Charumilind, Kali and Wiwatankantang (2006).

investor needs a lender, a procurer needs a supplier, and an employer needs an employee. For simplicity, from now on, we will refer to the two individuals as the *employer* and *employee*. Some individuals – the experts – are better at a task as compared to others. The problem of matching employer and expert is straightforward: the employer hires an expert and this maximizes social welfare.

Now let us consider this matching process over time: an economic opportunity specifies an efficient/ideal match between some employer Mr. A and some expert Mr. X. If Mr. A offers the job to a non-expert Mr. B, the output is smaller; there is a cost to employing a non-expert. So Mr. A will only employ Mr. B if he is compensated for this loss in some form. A possible compensation would be for Mr. B to promise to offer a job to Mr. A in the future. Now, Mr. A compares the current cost of employing Mr. B with the potential gains from being employed himself in the future (in spite of being a non-expert). Offering non-expert Mr. B the job is a *favor* which is returned by Mr. B at some point in the future. This trading of favors may include other individuals, such as Mr. C and Mr. D, who offer 'favors' to Mr. A in return for favors that Mr. A offered to Mr. B in the past.

Our first observation is that in a market where everyone abides by the rule of employing the expert, there exist incentives for friends to start a club of mutual favors. This motivates a closer examination of the circumstances in which favoritism can arise in equilibrium of a repeated game. We show favoritism can be sustained within a group if players are patient enough and if non-experts are not too inefficient. Moreover, favoritism is easier to sustain in smaller groups (Proposition 2). Favoritism is sustained by the greater future employment, i.e., employment possibilities in the state when someone is a non-expert. However, the probability of being hired declines as group size grows because there are many more non-experts in the group at any point in time.[3]

We then turn to the consequences of favoritism. We observe that aggregate welfare decreases unambiguously in the extent of favoritism present in society and that welfare losses are highest when the two groups have equal sizes. This is because favoritism is practised *in effect* when employers and experts lie in different groups, and these situations occur most frequently when groups have equal sizes.[4]

Group sizes also shape economic inequality. When everyone abides by market rules membership of a group confers no payoff advantages. However, in a world with favoritism, payoffs

[3]For a classical account of the role of group size effects in collective actions problems, see Olson (1965).

[4]This result echoes theoretical and empirical findings showing that ethnic conflicts are also most likely in that case, see Esteban & Ray (1999) and Montalvo & Renyal-Querol (2005).

are intimately related to group size. In particular, if favoritism is widespread then the payoffs in a larger group are higher and this payoff advantage grows with size. Similarly, if only one group practices favoritism, its members earn more than those who abide by the market rule, and this payoff advantage is increasing in the size of the favoritism group (Propositions 3-4). This result is consistent with a variety of examples in which small and exclusive minority groups thrive in empires (for example, the Jewish community in Moorish Spain and in the Ottoman Empire[5]) and the modern market economy (for example, the Korean community in urban United States, and Jain community in the market for diamonds).

We then ask: what happens to the payoff advantages of favoritism to a group when growth opportunities open up and individuals can invest in productivity enhancing actions such as human capital? We first show that the switch to favoritism always creates greater incentives for investment (Proposition 5). As investments enhance productivity, this suggests payoff inequalities identified above may be reinforced in a more dynamic economy. On the other hand, within each group, non-expert individuals are competing for jobs with other non-experts: this leads to a form of rent-seeking. There are thus conflicting forces at work. In a society where one group practices favoritism while the other group abides by the market, investment opportunities lead to less payoff inequality. On the other hand, if both groups practice favoritism then the presence of productivity enhancing investment reinforces the payoff advantage of the larger group (Proposition 6). The key to understanding the difference in the results under limited and widespread favoritism is the observation that in a larger group a match between an employer and an expert is more likely and this lowers wasteful investment by the non-experts.

Our paper is related to three strands of the literature: one, the economics of discrimination, two, optimal contracts and organization design, and three, the theory of cooperative norms. The next section places our paper in the context of this literature. The rest of the paper is organized as follows. Section 3 develops a simple model of jobs and practice of favoritism, section 4 studies origins of favoritism and section 5 examines its consequences. Section 6 examines the robustness of our results to alternative formulations of the model, while section 7 concludes.

[5]For popular accounts of this success, see Kotkin (1992) and Gladwell (2008).

2 Related literature

Favoritism toward one's own social group may be reinterpreted as discrimination toward outsiders. Economists have developed two well known theories which explore the origins and consequences of discrimination. The first theory, which originates in the work of Becker (1957), takes as a given that individuals have a preference for working with some types of people and are averse to working with other types, and are willing to pay a price for this preference. The second theory, originating in the work of Arrow (1972) and Phelps (1972), starts with the hypothesis that individuals have limited information about the skills and abilities of others, and arrives at 'favoritism' as an equilibrium phenomenon which is sustained by negative beliefs regarding the relation between an observable characteristic (such as race or gender) and unobservable but endogenous characteristic (such as skill). There is, by now, a vast empirical literature which assesses the implications of a taste for discrimination and the role of self-fulfilling beliefs in sustaining wage differentials as well as occupational choices; see e.g., Altonji and Pierret (1999). However, the relative importance of these alternative explanations remains a contentious subject; for an illuminating discussion see List (2004). In addition, these theories cannot account for the exchange of favors that seems to be so prevalent in real-world favoritism. Given the importance of the subject, and the lack of definite empirical evidence, we believe it is worth asking if favoritism can arise and thrive in the *absence of informational problems and any social preference in favor of one's own group.*

In our paper, individuals who care only about output and earnings practice favoritism because this maximizes their discounted payoffs. An important and distinct implication of our approach is that the feasibility of favoritism depends on the size of the groups. This is clearly different from the standard model of discrimination where discrimination is an argument of the utility function and bears no relation to the size of the groups which practice it.

Moreover, since individuals only care about earnings and have standard economic preferences, we can study welfare implications in a straightforward sense. We show that favoritism is welfare reducing and that this welfare cost is maximal when groups are of equal size. These costs are consistent with empirical observation; for instance, Becker (1992) argues that welfare costs of discrimination against blacks in the US are much smaller as compared to the costs in South Africa (due to the more equal proportions of the different races in the latter).

A few papers study the behavior of firms in the presence of individuals with biased preferences, see Prendergast and Topel (1996), Levine, Weinschelbaum and Zurita (2007). Prendergast and Topel (1996) consider a setting where supervisors have personal preferences over subordinates, which lead them to distort their evaluations. They study how this affects the optimal organization of the firm. Levine, Weinschelbaum and Zurita (2007) show that when firm owners have preferences which favor specific individuals, they may end up hiring inefficient and too many workers.[6]

A third branch of the literature studies favoritism as an equilibrium of a repeated game see, e.g., Abdulkadiroglu and Bagwell (2007), Hopenhyn and Hauser (2008), Mobius (2003), Hirshleifer and Rasmusen (1989), Bowles and Gintis (2004) and Kandori (1992). Favoritism here is an informal practice which leads to more efficient outcomes. Our approach has a message which is quite the opposite from this traditional view: we show there exist strong incentives for the emergence of group favoritism, and that this is typically strictly detrimental from a collective social point of view. In addition our results on productivity enhancing investments are quite different from the focus of the existing work.

3 A simple model

Individuals are partitioned in two groups $\mathcal{A}$ and $\mathcal{B}$ of respective sizes g_A and g_B with $g_A + g_B = n$; we will assume throughout that $n \geq 3$.[7]

At each period t, one individual is picked uniformly at random and gets a production opportunity. Call him the employer. To realize the production opportunity, this employer needs to hire an employee. One other individual is picked uniformly at random among the remaining individuals. This other individual is an expert, most qualified to do the job. If the employer hires the expert, the output produced is equal to 1. If the employer hires a less qualified employee, the output produced has a value of $l < 1$. The employer and the employee both get an equal share of the output; so if the output is y, they each get $y/2$. This equal division of output reflects a variety of considerations such as efficiency, fairness and simplicity. We discuss the role of the sharing rule in greater detail in section 6.

An important assumption in our model is that there are no information problems for the employer and that she can always identify the expert. While such information problems are pervasive and important in economic exchange, our aim here is to show that the practice of favoritism may emerge due to different reasons.

We shall say that an employer practices *market behavior* if she offers the job to the expert.

[6]For studies of favoritism in hiring as a response to adverse selection and moral hazard problems, see Montgomery (1991), Taylor (2000)) and Duran & Morales (2009).

[7]Our main results also hold if there are multiple groups.

By contrast, we shall say that an employer practices *favoritism* if she hires someone from her group, *irrespective* of whether the expert is in her group or not.

We will refer to the situation where a unique group practices favoritism as *limited favoritism*. We will also study the situation in which all groups practice favoritism; this will be referred to as *widespread favoritism*.

Denote by π_A the expected payoff of an individual in group $\mathcal{A}$ and by $W_A = g_A \pi_A$ the expected collective payoff of group $\mathcal{A}$.

4 Trading favors

This section studies the reasons behind the emergence of favoritism. We first look at the incentives of *groups*. We find that practicing favoritism is a dominant strategy for a group so long as the productivity of non-experts is not too low. Favoritism yields greater expected payoffs for everyone in the group no matter what individuals outside of the group do. It may not be incentive compatible, however, and its adoption can be viewed as a collective action problem. In a second step, we show that repeated interactions provide a partial answer to this problem. We show that favoritism can be sustained as a subgame perfect equilibrium of the repeated game when players are patient enough. Moreover, incentives to practise favoritism are higher in smaller groups.

Suppose first that all individuals in a group can costlessly commit, ex- ante, to a common norm of behavior. Consider a situation where the employer is in group $\mathcal{A}$ while the expert is in group $\mathcal{B}$. If all individuals in $\mathcal{A}$ practice favoritism, the employer hires a non-expert within and both earn $\frac{1}{2}l$. Overall, the group earns l. In contrast, if individuals in $\mathcal{A}$ practice market behavior, the employer hires the expert in the other group. Total payoff is equal to 1 but only half of it goes, through the employer's payoff, to group $\mathcal{A}$. Therefore, aggregate payoff in the group is greater under favoritism if $l > \frac{1}{2}$. The following result summarizes these considerations.

Proposition 1 *Suppose that groups can choose between market and favoritism. Favoritism is a dominant strategy at the group level if and only if $l > 1/2$. Moreover, aggregate payoff is higher when both groups practice market behavior.*

Proof: There are $n(n-1)$ ordered potential (employer, expert) pairs: $g_A(g_A - 1)$ in group $\mathcal{A}$, $g_B(g_B - 1)$ in group $\mathcal{B}$, $g_A g_B$ pairs in $\mathcal{A} \times \mathcal{B}$ and $g_A g_B$ pairs in $\mathcal{B} \times \mathcal{A}$. Let us write down the contribution to group welfare of one of these pairs as a function of where the pair lies and the behavior of the two groups (denoting the behavior of group $\mathcal{A}$ first).

$$\begin{array}{lcccc} & \mathcal{A}\times\mathcal{A} & \mathcal{B}\times\mathcal{B} & \mathcal{A}\times\mathcal{B} & \mathcal{B}\times\mathcal{A} \\ W_A(M,M) & 1 & 0 & \frac{1}{2} & \frac{1}{2} \\ W_B(M,M) & 0 & 1 & \frac{1}{2} & \frac{1}{2} \\ W_A(F,M) & 1 & 0 & l & \frac{1}{2} \\ W_B(F,M) & 0 & 1 & 0 & \frac{1}{2} \\ W_A(F,F) & 1 & 0 & l & 0 \\ W_B(F,F) & 0 & 1 & 0 & l \end{array} \tag{1}$$

Suppose, for instance, that both groups practice favoritism. If the employer is in group $\mathcal{A}$ and the expert is in group $\mathcal{B}$, then the employer hires an employee in group $\mathcal{A}$ and both earn $\frac{1}{2}l$, which brings l to group $\mathcal{A}$. This yields us the expression for $W_A(F,F)$ in the 5^{th} row and 3^{rd} column. Next observe that the behavior of group $\mathcal{B}$ is not relevant for the case where the employer is in group $\mathcal{A}$: in other words $W_A(F,M) = l$. We can similarly derive the other entries in the table above.

Next, from the table, we see that

$$W_A(F,M) - W_A(M,M) = W_A(F,F) - W_A(M,F) = \frac{g_A g_B}{n(n-1)}(l - \frac{1}{2}) \tag{2}$$

No matter what group $\mathcal{B}$ does, the critical situations for group $\mathcal{A}$'s choice are when the employer is in $\mathcal{A}$ while the expert is in $\mathcal{B}$. In these situations, group $\mathcal{A}$ obtains a total payoff of l under favoritism and of $\frac{1}{2}$ under market behavior. Thus, favoritism is dominant if and only if $l > 1/2$. In addition, when the employer and the expert are in different groups, hiring within generates a relative loss of $1 - l$ in terms of social welfare.

QED

The intuition behind this result can be viewed from two complementary perspectives. First, everyone in a group gains from favoritism when the payoff generated by an interaction within is always greater than the portion of the payoff staying in the group in an interaction across the two groups. Alternatively, the loss incurred by an employer hiring a non-expert must always be compensated by the gain of this non-expert. Here, the employer earns $\frac{1}{2}l$ instead of $\frac{1}{2}$, so he loses $\frac{1}{2}(1-l)$ relative to market behavior. The non-expert hired thanks to favoritism earns $\frac{1}{2}l$, which is greater than $\frac{1}{2}(1-l)$ if l is greater than $\frac{1}{2}$. In contrast, when $l < \frac{1}{2}$, groups may earn more from interactions across groups and strictly prefer to play the market. In other words, an employer practicing favoritism loses more than what a favored group employee earns. In the rest of the paper, we assume that $l > 1/2$.

Observe also that payoff sharing rule is to split the output equally: employer and employee each gets half of output produced. Favoritism may, or may not, be dominant under other rules. We study these issues and the determination of the sharing rule in more detail in section 6.

We now turn to the implementation of favoritism in a world where jobs arrive to individuals who can then decide on whether to give them to their own group members or to others. When an employer hires a non-expert from his own group, he incurs a loss in payoff given by $\frac{1}{2}(1-l)$. Moreover, in a static world an expert offered a job will never turn it down. Thus we have established: *market hiring and employment is the unique equilibrium outcome in one-shot interaction.*

Matters are more interesting if individuals interact repeatedly with each other as employers and employees. When interactions are repeated, in future periods, an individual who is not an employer or an expert may still be hired by an employer who practices favoritism. This prospect of future gain may induce an employer today to offer a job to a non-expert from his own group.

An important preliminary observation is that *market behavior is always a subgame perfect equilibrium.* The reason is that in the one-shot interaction, the employer offers the job to the expert and the expert accepts. So from standard considerations, it follows that repetition of the one-shot Nash equilibrium constitutes a subgame perfect equilibrium of the repeated game (see e.g., Mailath and Samuelson, 2006). How robust is this equilibrium? We start by looking at a simple example of mutual hiring by a group of two people.

Suppose everyone is practising market behavior: following every history, every employer offers the job to the unique expert, who accepts.

The payoffs from market behavior are

$$\frac{1}{2} + \frac{\delta}{1-\delta}\frac{1}{n} \tag{3}$$

Consider next two friends who deviate from this strategy to favor each other. They offer the job to each other, if they are picked to be the employers. The present discounted payoffs to an employer from this deviation, conditional on all other players abiding by the market,[8] are:

[8]This non-response by outsiders is discussed at length below at the end of this section.

$$\frac{1}{2}l + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\frac{1}{2}\left[2 + 2(n-2)l + n - 2\right] \tag{4}$$

Simplifying these equations, a player prefers favoritism if

$$\frac{1}{2}(1-l) \leq \frac{\delta}{1-\delta}\frac{n-2}{n(n-1)}\left[l - \frac{1}{2}\right] \tag{5}$$

For $l > 1/2$ and $n > 2$, the right hand side of the equation is positive, and so *a pair of patient individuals always has an incentive to practice mutual favoritism.* As shown by Proposition 1, both friends earn more in terms of expected utility when they both play favoritism. Under repeated interactions, the future gains from favoritism to a current employer – which arise when he is hired as a non-expert – can compensate for his current loss (from hiring a non-expert). This example motivates a closer examination of the emergence of favoritism under repeated interactions.

We now develop our concept of favoritism: an employer in a group always hires an employee within the group, but if an expert in the group is approached by an employer outside the group then he accepts such an offer.[9] Groups may try to enforce the practice of favoritism in a variety of ways. A simple possibility is that, if someone from the group deviates, then the group stops offering favors to this person. So the deviator is not hired when he is a non-expert any longer (though he may still be hired as an expert). We shall refer to this as the threat of *losing out on non-expert hiring.* Other punishments, such as ostracism – no hiring of a deviant or being employed by a deviant – are possible and we discuss them in section 6. As usual, strategies must specify actions following every possible history. In particular, group members who fail to punish deviators must be punished themselves. The details of the repeated game, the notation and the solution concept are presented in the Appendix.

Given some group size g, define $\delta^*(g)$ as the unique solution to the equation:

$$\frac{1}{2}(1-l) = \frac{\delta^*}{1-\delta^*}\frac{n-g}{n(n-1)}\left[l - \frac{1}{2}\right] \tag{6}$$

Observe that δ^* is an increasing function of group size g.

Proposition 2 *Suppose $l > 1/2$ and consider a group of size g. Favoritism (under the threat of losing out on non-expert hiring) is a sub-game perfect equilibrium of the repeated game if*

[9] We study a stronger form of favoritism in which individuals only interact with own group members in section 6.

and only if $\delta \in [\delta^*(g), 1]$. *Moreover, since* δ^* *is increasing with* g*, favoritism is easier to sustain in smaller groups.*

The proof is provided in the appendix. We need to verify that favoritism constitutes an equilibrium, after every possible history at any date t. It turns out that these conditions reduce to simple computations similar to those presented in the example above. The left hand side of equation (6) captures the one-shot cost incurred by an employer hiring a non-expert within. The right hand side is proportional to the relative gain of belonging to a group practicing favoritism. Thus, the key mechanism is that favors expected to be received in the future can compensate for the current costs of providing one. Equation (6) also clarifies the relation between individual and group incentives. It is only because a group practicing favoritism brings higher payoff to its members (since $l \geq 1/2$) that individuals may be inclined to practice favoritism. In turn, this explains the size effects. Individual gains to belong to a group practicing favoritism are decreasing in the group's size, as the competition for favors between group members increases. Thus, *favoritism is a collective action problem and is harder to sustain in larger groups.*

How does a change in economic fundamentals affect the prevalence of favoritism? Observe that an increase in l has two effects which go in the same direction. It reduces the cost of practicing favoritism, as non-experts are more efficient. It also increases the relative benefit from belonging to a group which practices favoritism, since the relative gain of a favored non-expert increases while the relative loss of an employer decreases. Therefore, δ^* is decreasing in l. Favoritism becomes more prevalent if non-experts become more efficient.

We now briefly relate our results to empirical patterns highlighted in the research in labor economics. One prediction of our model is that favoritism equilibrium exhibits lower wages. This is consistent with empirical evidence on wage discount on jobs found through social contacts, see e.g., Loury (2006), Simon and Warner (1992), Bentolila, Michelacci and Suarez (2004) and Sylos-Labini (2004). A second prediction of our model is that favoritism is only possible when non-experts are not too inefficient relative to experts ($l > 1/2$). Productivity differences are likely to be smaller in semi-skilled/less-skilled work as compared to highly skilled work. Thus our result is consistent with empirical evidence for the greater use of social networks in less skilled jobs, see e.g., Ioannides and Loury (2004), Granovetter (1974), Rees (1966), Scoppa (2009), and Montgomery (1991).

Justifying the absence of a response to favoritism: We have assumed that the practice of favoritism by a group does not provoke a response from those outside the group. In other words, there are no penalties or punishments on those who practice favoritism. We explore the role of this assumption now. A good point to start is to return to the example of a market economy in which two friends deviate. Suppose, to fix ideas, that the two friends are penalized by a legal authority: this penalty takes the form of no future employment being offered to these friends by those who abide by the market rules. The per period payoff to the deviating individual is:

$$\frac{1}{n}\left[\frac{n-2}{n-1}\frac{1}{2}l+\frac{1}{n-1}\frac{1}{2}\right]+\frac{n-1}{n}\left[\frac{1}{n-1}\left[\frac{1}{n-1}\frac{1}{2}+\frac{n-2}{n-1}\frac{1}{2}l\right]\right]=\frac{1}{n(n-1)}\left[(n-2)l+1\right] \quad (7)$$

It is easily checked that this payoff is lower than the payoff from the market $1/n$. Hence, a permanent ban on employment in the market acts a deterrent to favoritism. What are the circumstances under which such penalties will be implemented successfully?

One possible way in which penalties can be implemented is through a combination of formal legal and administrative institutions. The main difficulty an institution is likely to face is to establish that favoritism has actually taken place. Such formal procedures require clear and verifiable evidence; but in many, if not most settings, output is difficult to measure and specifically attribute to individual actions.[10]

A second way is for penalties to be carried out by individual agents who are involved in the trade or in employment (and therefore have access to information). However, decentralized punishments are constrained by individual incentive problems. Suppose group $\mathcal{A}$ abides by the market while group $\mathcal{B}$ practices favoritism. Punishment by an individual in group $\mathcal{A}$ of someone in group $\mathcal{B}$ must take the form of not employing an expert in that group. Not hiring an expert is costly for the employer, and he must be compensated for this cost. However, the market rule dictates that, in every period, only experts are hired. So the market does not have a natural compensation mechanism to reward individuals in group $\mathcal{A}$ for their efforts. Let us turn next to the scenario in which both groups $\mathcal{A}$ and $\mathcal{B}$ practice favoritism. The natural form of punishment by group $\mathcal{A}$ individuals is to not hire an expert who belongs to group $\mathcal{B}$. But in the widespread favoritism equilibrium, by construction, individuals in group $\mathcal{A}$ do not have incentives to offer group $\mathcal{B}$ members any jobs. So this punishment is not meaningful.

[10]Take for instance, a well known lament: it is easier to publish papers in prestigious journals if an author is well connected to the editor. Laband and Piette (1994) explore this claim for economics. They find evidence that connections indeed help but also argue that this partiality can be explained by a greater ability of editors to discern quality in their own fields of expertise (they measure quality in terms of citations of the published papers).

In view of these considerations, we feel it is reasonable to assume that the practice of favoritism by a group does not provoke a response from those outside the group.

5 The consequences of favoritism

We examine the effects of favoritism on efficiency, inequality and productivity enhancing investment. In a market economy a single group gains by practising favoritism, while the rest of the population, which abides by the market, loses. In a setting with widespread favoritism, on the other hand, members of both groups lose, relative to the market. Favoritism leads to tasks being assigned inefficiently; the welfare loss due to favoritism is greatest when the groups are of equal size. Favoritism has serious implications for inequality: a switch to favoritism by a group increases the payoffs of its members. Moreover, the payoff advantage of favoritism is increasing with the size of the group which switches to favoritism. Finally, we introduce the possibility of productivity enhancing investments. We identify circumstances under which payoff advantages of favoritism are reinforced or mitigated, respectively.

5.1 Welfare and inequality

Consider first the implications of one group switching to favoritism while the other group abides by the market rule, i.e., *limited favoritism.* When everyone abides by the market, since the model is symmetric every individual has an equal chance of being a part of a productive pair. Therefore, using (1), we can write the individual payoff as:

$$\pi_A(M, M) = \pi_B(M, M) = \frac{1}{n} \tag{8}$$

Next suppose that group $\mathcal{A}$ practices favoritism, while group $\mathcal{B}$ members abide by market behavior. An individual in the group practicing favoritism earns:

$$\pi_A(F, M) = \frac{1}{n(n-1)}\left[g_A - 1 + (l + \frac{1}{2})(n - g_A)\right] \tag{9}$$

By contrast, the payoff to member of the market abiding group $\mathcal{B}$ is:

$$\pi_B(M, F) = \frac{1}{n(n-1)}\left[n - 1 - \frac{1}{2}g_A\right] \tag{10}$$

An inspection of (8)-(10), reveals a switch to favoritism by a group increases its payoffs but lowers the payoffs of the outsiders who abide by the rules of the market. Moreover, the payoffs of the favoritism group are also higher than payoffs which accrue if everyone abides by the market.

Next consider a society in which all groups practice favoritism, i.e., the case of *widespread favoritism*. Individual payoffs in group $\mathcal{A}$ and group $\mathcal{B}$ are respectively:

$$\pi_A(F,F) = \frac{1}{n(n-1)}\left[g_A - 1 + l(n-g_A)\right] \tag{11}$$

$$\pi_B(F,F) = \frac{1}{n(n-1)}\left[g_N - 1 + l(n-g_B)\right] \tag{12}$$

An inspection of equations (8)-(12) reveals that payoffs are higher in the larger group but payoffs of both groups are lower than the market payoff.

Favoritism involves a inefficient match between an employer and a non-expert: so it entails a welfare loss. The magnitude of the welfare loss is determined by how often the employer and the expert are in different groups. In our model, these situations occur most frequently when groups have equal sizes. Favoritism is practised *in effect* when the expert and employer lie in different groups. The probability of this mismatch is maximal when the two groups are of equal size. The following result summarizes these observations.

Proposition 3 *(i). Suppose favoritism is limited to one group: payoffs in favoritism group are larger than the payoffs in a market which are larger than the payoffs in a market abiding group. (ii). Suppose favoritism is widespread: payoffs are higher in the larger group but both payoffs are lower than payoffs in the market. Aggregate payoff loss from favoritism is maximal in a society with two equal size groups.*[11]

A recurring theme in the discrimination and favoritism is its relation to inequality. Observe first that there is no inequality in the market regime since individuals are ex-ante homogeneous and everyone earns $1/n$. Suppose that group $\mathcal{A}$ practices favoritism while group $\mathcal{B}$ abides by market rules. Subtracting (10) from (9) yields us:

$$\pi_A - \pi_B = \frac{1}{n(n-1)}\left[(l-\frac{1}{2})n + (1-l)g_A\right]. \tag{13}$$

[11]The welfare loss is of course higher under widespread favoritism as compared to limited favoritism (holding group sizes constant).

So there is always a difference in payoffs across groups and the payoff advantage of the favoritism group increases with its size. Finally consider widespread favoritism:

$$\pi_A - \pi_B = \frac{1}{n(n-1)}(1-l)(g_A - g_B) \tag{14}$$

The larger group earns higher payoffs, and this difference is increasing in the size of the majority. These observations on inequality are summarized in the following result.

Proposition 4 *An individual's payoff advantage from practicing favoritism is increasing in the size of own group.*[12]

5.2 Productivity enhancing investment

We have seen that larger groups fare better than smaller groups under favoritism. We now examine an economy in which growth opportunities open up and individuals can invest in productivity enhancing actions. Our interest is in understanding how favoritism shapes individual incentives and, in particular, if the availability of productivity enhancing investment opportunities mitigates or exacerbates the payoff advantages of large groups.

Suppose that individuals can improve their productivity through costly investment $c > 0$. This investment raises productivity by a factor $\rho_e > 0$ for an expert and by $\rho_n > 0$ for a non-expert. Thus an educated expert produces $1 + \rho_e$ while an educated non-expert produces $l(1 + \rho_n)$. A special case of this is $\rho_e = \rho_n$ which we may interpret investment as general purpose education. We will assume throughout that $l(1 + \rho_n) < 1$: this means that an educated non-expert produces less than an expert.

How does favoritism affect incentives for investment? Suppose group $\mathcal{B}$ plays by market rules, and let us consider the effects of group $\mathcal{A}$ switching to favoritism. There are two factors at work. On the one hand, an expert in group $\mathcal{A}$ is always hired, irrespective of the identity of the employer. On the other hand, an expert in group $\mathcal{B}$ will not be hired with positive probability (when the employer is in group $\mathcal{A}$). The second factor is that a non-expert in group $\mathcal{A}$ has a chance of being hired if the employer is in group $\mathcal{A}$ *and* the expert is in group $\mathcal{B}$. Both these factors make investment for members of group $\mathcal{A}$ more attractive. A similar

[12] Another way to study inequality is to look at payoff variance. We can show that under limited favoritism, variance first increases and then decreases as g_A increases from 0 to n. At some point, adding one other individual to the favoritism group dominates the fact that the other group becomes relatively poorer. Similarly, variance first increases and then decreases as g_A increases from $n/2$ to n under widespread favoritism.

incentive enhancing effect also obtains when group $\mathcal{B}$ also practice favoritism. The following result summarizes these arguments.

Proposition 5 *Suppose $l(1+\rho_n) < 1$. A switch to favoritism by a group raises the incentives to invest in that group and lowers the incentives to invest in the other group.*

This result is consistent with empirical evidence that favoritism toward one's own group (and discrimination against outsiders) creates substantial differences in incentives to acquire education and human capital across communities, see e.g., Becker (1957, 1964), Loury (1992) and Goldberg (1982). More generally, our result is consistent with the finding that social ties facilitate greater capital intensity of production, reported in Banerjee and Munshi (2004).[13]

Proposition 5 demonstrates that favoritism creates greater incentives for investment. Investments enhance productivity and this could potentially reinforce the payoff inequalities identified in Proposition 3. However investment is costly, and non-experts who are educated are competing for 'rents' with other non-experts. These forces go in opposite directions and necessitate a careful analysis of payoffs. For simplicity, we restrict attention to interior equilibrium for groups practicing favoritism.

Suppose favoritism is limited: group $\mathcal{A}$ practices favoritism while group $\mathcal{B}$ abides by the market. In an interior equilibrium in group $\mathcal{A}$, investors and non-investors in $\mathcal{A}$ obtain the same payoff. Moreover, since payoffs are falling in number of investors and returns from investing are always larger in the favoritism group, it must be the case that no one invests in group $\mathcal{B}$. In an interior equilibrium, the payoffs in group $\mathcal{A}$ and group $\mathcal{B}$ are, respectively:

$$\pi_A = \frac{1}{2n(n-1)}\left[g_A - 1 + k_A\rho_e + l(1+\rho_n)(n-g_A) + n - 1\right] \tag{15}$$

$$\pi_B = \frac{1}{2n(n-1)}\left[n - 1 + k_A\rho_e + n - g_A - 1\right]. \tag{16}$$

So the difference in payoffs under favoritism, in the presence of investment opportunities is:

$$\Delta\pi^I = \pi_A - \pi_B = \frac{1}{2n(n-1)}\left[g_A + (l(1+\rho_n) - 1)(n - g_A)\right]. \tag{17}$$

From equation (13) we know that payoff difference between groups $\mathcal{A}$ and $\mathcal{B}$ in the basic mode is:

[13] For an interesting and related analysis of social connections and access to financial loans on softer terms, see Charumilind, Kali and Wiwatankantang (2006).

$$\Delta\pi^N = \pi_A - \pi_B = \frac{1}{2n(n-1)}[g_A + (2l-1)(n-g_A)]. \tag{18}$$

Since $l(1+\rho_n) - 1 < 0 < 2l - 1$, it follows that payoff advantages from favoritism decline with the arrival of productivity enhancing opportunities.

There are two forces which account for this surprising result: one, employers in group $\mathcal{B}$ can use the investments by experts in group $\mathcal{B}$, while the employers in group $\mathcal{A}$ do not have access to such investments by experts in group $\mathcal{B}$. Two, as pointed out in Proposition 5, incentives to invest are higher in a group which practices favoritism due to employment of non-experts. However, the competition between non-experts drives rents to zero in an interior equilibrium.

Next consider widespread favoritism: Suppose the investment game has an interior solution in both groups. The payoffs to group $\mathcal{A}$ and group $\mathcal{B}$ are, respectively:

$$\pi_A = \frac{1}{2n(n-1)}\left[2(g_A - 1) + k_A\rho_e + l(1+\rho_n)(n-g_A)\right] \tag{19}$$

$$\pi_B = \frac{1}{2n(n-1)}[2(g_B - 1) + k_B\rho_e + l(1+\rho_n)(n-g_B)] \tag{20}$$

Subtracting (20) from (19) yields us:

$$\Delta\pi^I = \frac{1}{2n(n-1)}\left[(2 - l(1+\rho_n))(g_A - g_B) + (k_A - k_B)\rho_e\right] \tag{21}$$

Recall, from equation (14), that the payoff difference between two favoritism groups in the basic model is:

$$\Delta\pi^N = \frac{1}{2n(n-1)}[2(1-l)(g_A - g_B)]. \tag{22}$$

Since $k_A > k_B$ and $2 - 2l < 1 < 2 - l(1+\rho_n)$, it follows that investment opportunities reinforce payoff advantages of larger groups! The discussion on payoff implication of investment opportunities are summarized in our next result. The statement expresses payoff advantages *relative* to the scenario with no productivity enhancing investment.

Proposition 6 *Consider an interior equilibrium for groups practicing favoritism in the investment game. (i) Suppose favoritism is limited: the presence of productivity enhancing investment lowers the payoff advantage of the favoritism group. (ii) Suppose favoritism is widespread: the presence of productivity enhancing investment reinforces the payoff advantage* *of the larger group.*

The key to understanding the difference between the limited and widespread favoritism cases is the following observation: in a larger group a match between an employer and an expert is more likely and this lowers rent seeking activity among non-experts.

6 Discussion

This section takes up a number of themes relating to the practice of favoritism.

6.1 Ostracism

This section examines the prospects of favoritism under more severe punishments. If an individual deviates, she is *ostracized* by the other group members: they do not offer her a job in the future but they still accept to work for her. Moreover, this ostracism is recursive: if an employer deviates from this ostracism punishment then she is in turn ostracized by his own group. At the extreme, if only two individuals remain who have not deviated and one of the two deviates, the other reverts to market behavior. Observe that punishments are more severe than under hiring favoritism which we studied in the basic model: here a deviant is not hired even he is an expert.

Our next result shows that hiring favoritism can be sustained as an equilibrium of the repeated game. Let $\delta_{HO} = \delta^*(2)$ denote the unique solution to the equation

$$\frac{1}{2}(1-l) = \frac{\delta}{1-\delta}\frac{n-2}{n(n-1)}(l-\frac{1}{2}) \tag{23}$$

Proposition 7 *Suppose $l > 1/2$. Hiring favoritism under the threat of ostracism is a subgame perfect equilibrium if and only if $\delta \in [\delta_{HO}, 1]$.*

Proposition 7 shows that the condition under which hiring favoritism under the threat of ostracism is stable does not depend on group sizes. This appears at first sight to be surprising and indeed an inspection of the computations reveals that an individual has a lower incentive to deviate if the group is larger. This is intuitive: being ostracized from a larger group is more costly because it leads to a smaller set of potential partners. However, the robustness of favoritism depends on the incentives of members to punish deviators with ostracism. So we need to verify that Mr. k member wishes to punish $k+1^{th}$ who deviates. However, this in turn depends on the incentive of the $k-1^{th}$ member's incentives to punish Mr. k. This in turns on the incentive of Mr $k-2$, and so on. Through a backward induction argument, the credibility of the overall punishment scheme relies on its being credible when only 2 individuals remain. Observe that the incentive condition here is identical to equation (5). As soon as one pair of individuals has a joint incentive to deviate from market behavior, favoritism practiced by all groups, small or large, is stable.

Favoritism under strong ostracism: If an individual deviates, the group members refuse to interact with her again, either as an employee or as an employer. If in a subsequent period an employer or an employee deviates from the punishment, then he in in turn is ostracized by the remaining group members. Again, at the extreme, if only two individuals remain who have not deviated and one of the two deviates, the other reverts to market behavior.

We show that favoritism under the threat of strong ostracism cannot be sustained in a subgame perfect equilibrium. Under strong favoritism, an expert cannot work for an employer outside the group. This increases the costs of favoritism without increasing its benefits and the costs now dominate.

Proposition 8 *Favoritism under the threat of strong ostracism cannot be sustained in a subgame perfect equilibrium.*

6.2 Rule of output division

In our basic model, the bargaining outcome takes the form of equal split: the employer and expert each get one half while the employer and non-expert each get $l/2$. This division of output is simple and a natural one in many ways, but it is one of many different ways in which the output can be divided between the two individuals. So we would like to understand the aspects of the rule that are important for our results.

An important element of the division of output between two players is that it takes place against a background of other opportunities for them. Consider for instance a benchmark of pure, frictionless competition. Suppose that every potential employee (expert and all non-experts) can costlessly bid to work for the employer. The employer offers the job to the person who offers him the highest earnings. The natural equilibrium of this process of bidding is one in which the expert asks for $1-l$, and all the non-experts offer to work for 0. The employer hires the expert and earns l. Let us examine the prospects of favoritism in this setting. Suppose that a similar bidding process also allocates surplus for favoritism hiring: An employer hiring a non-expert earns l while the non-expert earns 0. Here, competition within groups reduces the rents of non-experts to zero while the employer is indifferent between hiring an expert and a non-expert. Thus, individuals have no incentive to engage in favoritism, since there is no favor expected in the future. This shows the crucial role played by the rule of output division. We next study arbitrary rules and the prospects of emergence of favoritism when departing from this benchmark. Our main point is that favoritism is easier to sustain in the presence of fairness in rule of output division.

Consider the following arbitrary division of output. The employer earns α when he hires an expert and βl when he hires a non-expert. Thus, $1-\alpha$ and $1-\beta$ capture the portion of the output earned by the expert and non-expert employees. When does a collective switch to favoritism leads to an increase in the utility of everyone in a group? Observe that an employer hiring a non-expert loses $\alpha - \beta l$ with respect to market behavior. In contrast, the favored group member gains $(1-\beta)l$. Thus, expected utility in the group increases if and only if $\alpha - \beta l < (1-\beta)l \Leftrightarrow \alpha < l$. The individual gain to the employer in a market transaction must be lower than the total gain in a favor-based interaction. Then, as in section 3, we can show that favoritism may be sustained as a subgame perfect equilibrium of the repeated game for sufficiently patient players if and only if $\alpha < l$.[14] Overall, *favoritism may emerge under unequal surplus division as long as the inequality is not too high.*

For instance, suppose that the division of surplus in favor-based transactions is determined exogenously, e.g. through social norms of fairness internal to the group. In contrast, suppose that this division in market-based interactions is determined via bargaining between the employer and the expert. In the absence of frictions, the employer can always threaten to hire a non-expert and earn βl. Thus, Nash bargaining between the employer and the expert leads to an allocation of $\frac{1}{2} + \frac{1}{2}\beta l$ to the employer. Applying the previous finding, favoritism emerges if and only if $\frac{1}{2} + \frac{1}{2}\beta l < l$, which is equivalent to

$$\beta < \hat{\beta} = 2 - \frac{1}{l}$$

Observe that β cannot be too high: else the employer has a very attractive outside option which enables him to extract most of the surplus in market-based interactions. The expected future gains from a favor are then simply not attractive enough compared to the losses from hiring within. In addition, $\hat{\beta}$ increases with l. As non-experts become more efficient, favoritism becomes easier to sustain which confirms earlier related results obtained under equal split.

[14]The division of surplus in favor-based transactions, β, affects the incentives to deviate, and hence also affects the range of discount rates under which favoritism is subgame perfect.

This suggests favoritism may emerge from fairness considerations within groups and even in the absence of frictions in the market.

In many societies, there exist minimum wage laws which may have put in place to protect the interest of workers. One reason for these laws is that they protect the interests of 'workers'. Presumably, this protection is needed as bilateral bargaining may yield an 'unfair' outcome. Thus, a natural interpretation of these laws is that they stipulate fair and equitable rules of division. Affirmative action rules have a similar foundation: they seek to provide opportunities for individuals who may otherwise not be hired. In doing so, they strive to promote equitable terms of recruitment. Minimum wage laws are now in place in a wide range of economies, specially those in the OECD countries. Similarly, affirmative action policies have been enshrined into law in many countries, both rich and poor. So we believe that fairness considerations embodied in our assumption of the equal split rule are descriptively well founded.

We conclude this discussion by noting that the presence of frictions make the emergence of favoritism even more likely. At the extreme, suppose for instance that an employer can only bargain with one player in a period and that the transaction opportunity lapses after that period. Here, competition has no bite as the employer has no more outside options. Then the equal split between employer and employee is a reasonable outcome. More generally, transaction costs and bargaining frictions lower the employers' outside options, hence they limit the inequality of output division and facilitate the emergence of favoritism.

7 Conclusion

Favoritism is the act of offering jobs, contracts and resources to members of one's social group in preference to outsiders. Favoritism is widely practiced and this motivates an exploration of its origins and economic consequences.

Our main finding is that individuals will find it in their self-interest to trade favors over time and that this will come at the expense of others, who are outside their group. This form of favoritism is relatively easier to sustain in smaller groups. Favoritism entails social costs as it usually leads to inefficient allocations. However, favoritism can lead to payoff advantages for larger groups. Productivity enhancing investments are larger in groups which practice favoritism. The availability of investment opportunities can reinforce payoff inequalities across groups.

8 Appendix.

Proof of Proposition 2: Let us first define some notation and terminology for the repeated game. In any period $t = 1, 2...$, nature picks a employer $m_t \in N$, and conditional on this employer picks an expert from the complementary set $N \backslash \{m_t\}$. Each player has an equal and independent chance of being picked as employer in each period. Moreover, conditional on choice of employer, each of the other players have an equal and independent (across time) probability of being chosen as experts. In each period t, the employer m_t chooses to offer the job to someone $a_{m_t} \in N_{m_t}$ where $N_{m_t} = N \backslash \{m_t\}$. Player $a_{m_t} \in N$, is the respondent; he chooses a response, $r_{a_{m_t}} \in \{1, 0\}$, where 1 stands for YES and 0 stands for NO. Define $p_t = \{m_t, e_t, a_{m_t}, r_{a_{m_t}}\}$.

At time t, the history of the game consists of moves of nature in choice of employer and expert and the actions of the employer and the respondent. Define history at time t as $h_t = \{p_1, p_2, ...p_{t-1}\}$. Let H_t be the set of possible histories at time t. The strategy of an employer picked at time t is $s_{m_t} : H_t \to N_{m_t}$, while the strategy of a respondent chosen by m_t is $s_{a_{m_t}} : H_t \to \{1, 0\}$. All other players have no choice of action at time t.

An employer practices *hiring favoritism* if she offers the job to a member of her own group. Formally, if $m_t \in g_x$ then $s_{m_t}(.) = e_t$ if $e_t \in g_x$ and some player $j \in g_x$ otherwise. In the latter case, the player is chosen at random with equal probability across all members of group (excluding m_t). At the start of the game, $t = 1$, the favoritism strategy for employer $m_1 \in g_x$ where $x = A, B$, is simply: $s_{m_1} = e_1$ if $e_1 \in g_x$ and $j \in g_x \backslash \{m_1\}$, otherwise. The respondent a_{m_1}'s strategy is $r_{am_1} = 1$.

Consider time $t \geq 2$. Suppose m_t is the employer and $m_t \in g_x$, for $x = A, B$. Given history h_t, the employer knows for each date $\tau < t$, the employer m_τ the expert e_τ and their actions a_{m_τ} and $r_{a_{m_t}}$. Start at time $t = 2$: the employer constructs an *effective group* as follows: if $m_1 \in g_x$, then she checks if m_1 followed favoritism. If yes, this employer remains in her effective group. If m_1 deviated from favoritism then m_2 excludes her from her effective group at date $t = 2$. Next she turns to the respondents, and checks if $a_{m_1} \in g_{x,1}$. If yes, then she verifies if a_{m_1} accepted the offer made to him. If yes then respondent remains in her effective group; if no, then she excludes him from the effective group. Using these operations she then defines an effective group $g_{x,2}$ at date $t = 2$. Employer m_2 then has the favoritism strategy: $s_{m_2} = e_2$ if $e_1 \in g_{x,2}$ and some $j \in g_{x,2} \backslash \{m_2\}$, otherwise. The respondent a_{m_2} at date $t = 2$ always accepts an offer $r_{a_{m_2}} = 1$.

The effective groups are defined recursively for any time period t. In particular, at any point t, it is common knowledge if a player is in an effective group $g_{A,t}$ or $g_{B,t}$ or out of these groups. Define $d_{A,t} = g_{A,1} - g_{A,t}$ and $d_{A,t} = g_{A,1} - g_{A,t}$, as the players who have been excluded from groups $\mathcal{A}$ and $\mathcal{B}$, respectively, between periods $\tau = 1$ and $\tau = t-1$. The favoritism strategy for employer $m_t \in g_{x,t}$, at time t is then simply: $s_{m_t} = e_t$ if $e_t \in g_{x,t}$ and $j \in g_{x,t} \backslash \{m_t\}$, otherwise. Employers who are not in an effective group, $m_t \in d_{A,t} \cup d_{B,t}$ offer the job to the expert: $s_{m_t} = e_t$. The respondent a_{m_t} always accepts an offer $r_{a_{m_t}} = 1$.

In period $t = 1$, if she is the employer $m_1 = i$, then $s_{m_1} = e_1$ if $e_1 \in g_x$ and $j \in g_x \backslash \{m_1\}$, otherwise. If she is the respondent $i = s_{m_1}$, then $r_i = 1$. For $t \geq 2$: if $i = m_t$ and history h_t a member of an effective group practices favoritism within effective group as follows: $s_{m_t} = e_t$ if $e_t \in g_x$ and $j \in g_{x,t} \backslash \{m_1\}$, otherwise. If $i = s_{m_t}$, she accepts the offer, $r_i = 1$. Players who are not members of effective groups play the market: always offer jobs to experts and accept all offers made to them.

There are two types of histories: one, where effective groups are the initial groups, and two, where they have changed as players have deviated. Let us take them up them in sequence.

History with $(g_{x,t}, g_{y,t}) = (g_x, g_y)$. Consider the choice of an employer when the expert is in the other group, as the incentives to deviate are greatest in this situation. If he hires within the group, he earns

$$\frac{1}{2}l + \frac{\delta}{1-\delta}\left[\frac{1}{n}\left[\frac{g_x-1}{n-1}\frac{1}{2} + \frac{n-g_x}{n-1}\frac{1}{2}l\right] + \frac{n-1}{n}\left[\frac{g_x-1}{n-1}\left[\frac{1}{n-1}\frac{1}{2} + \frac{n-2}{n-1}\frac{n-g_x}{n-2}\frac{1}{g_x-1}\frac{1}{2}l\right]\right]\right]. \tag{24}$$

This can be simplified to:

$$\frac{1}{2}l + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[g_x - 1 + l(n-g_x)\right] \tag{25}$$

On the other hand, if he deviates and offers the job to an expert outside the group, he earns

$$\frac{1}{2} + \frac{\delta}{1-\delta}\left[\frac{1}{n}\frac{g_x-1}{n-1}\frac{1}{2} + \frac{1}{n}\frac{n-g_x}{n-1}\frac{1}{2} + \frac{n-1}{n}\left[\frac{g_x-1}{n-1}\left[\frac{1}{n-1}\frac{1}{2}\right]\right]\right]. \tag{26}$$

Either an individual is the employer (with probability $\frac{1}{n}$) and he gets $\frac{1}{2}$, or he is the expert and the employer is in his group (with probability $\frac{1}{n-1}\frac{g_x-1}{n}$) and he also gets $\frac{1}{2}$. This can be rewritten as follows:

$$\frac{1}{2}+\frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[\frac{1}{2}(g_x-1)+\frac{1}{2}(n-1)\right]. \tag{27}$$

So, a player practices favoritism if

$$1-l<\frac{\delta}{1-\delta}\frac{1}{n(n-1)}(2l-1)(n-g_x) \tag{28}$$

Second, consider a history in which $(g_{x,t}, g_{y,t}) \neq (g_x, g_y)$. Notice first that for someone who has deviated already, there is positive cost to practicing favoritism but no gain, as ex-group members do not offer favors after a deviation. Hence for a deviating player it is clearly optimal to practice market behavior. Similarly, it is easy to see that the respondent will always find it optimal to accept an offer. So, again we need to check the incentives of an employer $m_t \in g_x$ who is faced with an expert $e_t \notin g_x$. If he hires within the group, he earns

$$\begin{aligned}\frac{1}{2}l+\frac{\delta}{1-\delta}\left[\frac{1}{n}\left[\frac{g_x-1}{n-1}\frac{1}{2}+\frac{n-g_x}{n-1}\frac{1}{2}l\right]\right]\\ +\frac{\delta}{1-\delta}\left[\frac{n-1}{n}\left[\frac{g_{x,t}-1}{n-1}\left\{\frac{1}{n-1}\frac{1}{2}+\frac{n-2}{n-1}\frac{n-g_x}{n-2}\frac{1}{g_{x,t}-1}\frac{1}{2}l\right\}+\frac{g_x-g_{x,t}}{n-1}\frac{1}{n-1}\frac{1}{2}\right]\right]\\ +\frac{\delta}{1-\delta}\left[\frac{n-1}{n}\frac{g_y-g_{y,t}}{n-1}\frac{1}{n-1}\frac{1}{2}\right].\end{aligned} \tag{29}$$

This can be simplified to:

$$\frac{1}{2}l+\frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[g_x-1+l(n-g_x)+\frac{1}{2}(g_y-g_{y,t})\right] \tag{30}$$

If the employer deviates, his payoff is equal to

$$\frac{1}{2}+\frac{\delta}{1-\delta}\left[\frac{1}{n}\frac{1}{2}+\frac{n-1}{n}\left[\frac{g_x-1}{n-1}\frac{1}{n-1}\frac{1}{2}+\frac{g_y-g_{y,t}}{n-1}\frac{1}{n-1}\frac{1}{2}\right]\right]. \tag{31}$$

Therefore, playing favoritism in this case is individually rational if

$$1-l<\frac{\delta}{1-\delta}\frac{(n-g_x)}{n(n-1)}(2l-1). \tag{32}$$

We observe that the incentives to practice favoritism do not depend on the history of the game so long as there are at least two members in the effective group for a player.

Finally, define δ^* as the unique solution to the equation:

$$1 - l = \frac{\delta^*}{1-\delta^*}\frac{n-g}{n(n-1)}(2l-1) \tag{33}$$

Observe that δ^* is an increasing function of group size g. The result now follows.

QED

Proof of Proposition 3: We have $W(M,M) = W_A(M,M) + W_B(M,M) = 1$. Under prevalent favoritism,

$$W(F,F) = W(M,M) - \frac{2g_A g_B}{n(n-1)}(1-l)$$

since each interaction within generates a social loss of $1-l$. Similarly, under limited favoritism

$$W(F,M) = W(M,M) - \frac{g_A g_B}{n(n-1)}(1-l)$$

In both cases, the loss is maximized when $g_A g_B$ is maximized.

QED

Proof of Proposition 5: Suppose first that both groups play the market. Let us write down the payoff from NOT INVESTING, when k others have invested:

$$\pi^{M,M}(N,k) = \frac{1}{n}\left[\frac{k}{n-1}\frac{1}{2}(1+\rho_e) + \frac{n-1-k}{n-1}\frac{1}{2}\right] + \frac{1}{n}\frac{1}{2} \tag{34}$$

where the first part represents the payoff if the individual is the employer and the second part the payoff if the individual is the expert. The payoffs to INVESTMENT, if $k \geq 1$ others invest are:

$$\pi^{M,M}(I,k) = \frac{1}{n}\left[\frac{k}{n-1}\frac{1}{2}(1+\rho_e) + \frac{n-1-k}{n-1}\frac{1}{2}\right] + \frac{1}{n}\frac{1}{2}(1+\rho_e) - c \tag{35}$$

Investing only affects payoffs via the effects on the employee, as it does not change the payoff of an educated person who is an employer. This is reflected in the following expression:

$$\pi^{M,M}(I,k) - \pi^{M,M}(N,k) = \frac{1}{n}\frac{1}{2}\rho_e - c \tag{36}$$

Thus, in a market, everyone invests if $\rho_e > 2nc$ and no one invests if $\rho_e < 2nc$.

Next, suppose that group $\mathcal{A}$ switches to favoritism. A market participant in group $\mathcal{B}$ now earns returns from education only when he is an expert AND the employer is an outsider as well. So the net payoffs from investing for a member of group $\mathcal{B}$ are:

$$\pi^{M,F}(I) - \pi^{M,F}(N) = \frac{\rho_e}{2n} - \frac{\rho_e g_A}{2n(n-1)} - c \tag{37}$$

The payoff to a group $\mathcal{A}$ member from NOT INVESTING when $k_A \geq 1$ others *in his group* have invested is:

$$\begin{aligned} \pi^{F,M}(N, k_A) &= \frac{1}{n}\left[\frac{g_A - 1}{n-1}\left[\frac{k_A}{g_A - 1}\frac{1}{2}(1+\rho_e) + \frac{g_A - 1 - k_A}{g_A - 1}\frac{1}{2}\right] + \frac{n - g_A}{n-1}\frac{1}{2}l(1+\rho_n)\right] \\ &\quad + \frac{n-1}{n}\frac{1}{n-1}\frac{1}{2}. \end{aligned} \tag{38}$$

The first line reflects payoffs when individual is the employer. There are two sub-cases corresponding to whether the expert is in own group or in the other group. If expert is own group then we need to keep track of whether he is educated or uneducated. The second line covers the case when the individual is not an employer. He now earns a payoff only if he is the expert, since $k_A \geq 1$ group members have invested.

The payoff to INVESTING when $k_A \geq 1$ others invest is:

$$\begin{aligned} \pi^{F,M}(I, k_A) &= \frac{1}{n}\left[\frac{g_A - 1}{n-1}\left[\frac{k_A}{g_A - 1}\frac{1}{2}(1+\rho_e) + \frac{g_A - 1 - k_A}{g_A - 1}\frac{1}{2}\right] + \frac{n - g_A}{n-1}\frac{1}{2}l(1+\rho_n)\right] + \\ &\quad \frac{n-1}{n}\frac{1}{2}\left[\frac{1}{n-1}(1+\rho_e) + \frac{n-2}{n-1}\frac{n-g_A}{n-2}\left[\frac{k_A}{g_A - 1}\frac{1}{k_A} + \frac{g_A - 1 - k_A}{g_A - 1}\frac{1}{k_A + 1}\right]l(1+\rho_n)\right] \\ &\quad -c. \end{aligned} \tag{39}$$

The first line is the payoff if the individual is the employer. The second line covers the case when the individual is not an employer. In the latter case, if he is an expert he earns $(1+\rho_n)/2$, while if he is not an expert he is employed only if the employer he is in his group *and* the expert is not. Moreover, the probability of being hired also depends also on whether the employer is a educated or non-educated, as this affects the competition among the educated non-experts.

Subtracting (38) from (39) yields us the returns to someone in group A when $k_A \geq 1$ others invest:[15]

$$\pi^{F,M}(I,k_A)-\pi^{F,M}(N,k_A)=\frac{\rho_e}{2n}+\frac{(n-g_A)}{2n(n-1)}\frac{g_A l(1+\rho_n)}{k_A+1}-c. \tag{40}$$

An inspection of (37) and (40) with (36) reveals that when group $\mathcal{A}$ switches to favoritism this raises the returns from investment to its members, and at the same time lowers the returns from investment for members of group $\mathcal{B}$.

Next we consider effects of switching to favoritism in a setting where the other group practices favoritism. If the employer is in one group and the expert is in the other, the employer now hires a non-expert within but he prefers to hire one who is educated. Consider an individual in group $\mathcal{A}$. The payoff of NOT INVESTING when $k_A \geq 1$ other individuals *in his group* have invested is:

$$\begin{aligned}\pi^{F,F}(N,k_A) \quad = \quad & \frac{1}{n}\left[\frac{g_A-1}{n-1}\left[\frac{k_A}{g_A-1}\frac{1}{2}(1+\rho_e)+\frac{g_A-1-k_A}{g_A-1}\frac{1}{2}\right]+\frac{n-g_A}{n-1}\frac{1}{2}l(1+\rho_n)\right] \\ & +\frac{n-1}{n}\frac{g_A-1}{n-1}\left[\frac{1}{n-1}\frac{1}{2}\right]\end{aligned} \tag{41}$$

The payoff to INVESTING in human capital, if $k_A \geq 1$ others invest is:

$$\begin{aligned}\pi^{F,F}(I,k_A) \quad = \quad & \frac{1}{n}\left[\frac{g_A-1}{n-1}\left[\frac{k_A}{g_A-1}\frac{1}{2}(1+\rho_e)+\frac{g_A-1-k_A}{g_A-1}\frac{1}{2}\right]+\frac{n-g_A}{n-1}\frac{1}{2}l(1+\rho_n)\right]+ \\ & \frac{n-1}{n}\frac{g_A-1}{n-1}\frac{1}{2}\left[\frac{1}{n-1}(1+\rho_e)+\frac{g_B}{n-1}\left[\frac{k_A}{g_A-1}\frac{1}{k_A}+\frac{g_A-1-k_A}{g_A-1}\frac{1}{k_A+1}\right]l(1+\rho_n)\right] \\ & -c.\end{aligned} \tag{42}$$

[15]When $k_A = 0$, the returns to investment are

$$\frac{\rho_e}{2n}+\frac{(n-g_A)}{2n(n-1)}(g_A-1)l(1+\rho_n)-c$$

Simplifying (41) and (42), we obtain returns from investment when $k \geq 1$ others invest:[16]

$$\pi^{F,F}(I, k_A) - \pi^{F,F}(N, k_A) = \frac{1}{n(n-1)}\frac{1}{2}\left[(g_A - 1)\rho_e + (n - g_A)l(1 + \rho_n)\frac{g_A}{k_A + 1}\right] - c \qquad (43)$$

Recall from equation (37) that the returns to an individual in the market faced with a group which practices favoritism are $\rho_e(g_A - 1)/2n(n-1)$. A comparison with equation (43) reveals that returns are larger when group switches to favoritism. This completes the proof.

QED

Proof of Proposition 7: Let us start with period $t = 1$ strategies. Consider the employer m_1. Suppose without loss of generality she is in group g_x, where $x = A, B$. The incentives to deviate from favoritism are clearly larger when $e_1 \notin g_x$. It is sufficient to check that favoritism is optimal even if $e_1 \notin g_{x,1}$. In this case, hiring within the group yields:

$$\frac{1}{2}l + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[g_{x,1} - 1 + l(n - g_{x,1})\right]. \qquad (44)$$

In contrast, an offer to the expert $e_1 \notin g_x$ yields

$$\frac{1}{2} + \frac{\delta}{1-\delta}\left[\frac{1}{2n}\right]. \qquad (45)$$

if $g_x > 2$ and

$$\frac{1}{2} + \frac{\delta}{1-\delta}\left[\frac{1}{2n} + \frac{1}{2n(n-1)}\right] \qquad (46)$$

when $g_x = 2$.

When $g_x > 2$, this holds if and only if:

$$\frac{1}{2}\left[1 - l\right] \leq \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[(g_{x,1} - 1 + l(n - g_{x,1})) - \frac{1}{2}(n-1)\right]. \qquad (47)$$

The term within the square brackets simplifies to

$$g_{x,1}[1 - l] + \frac{n}{2}(2l - 1) - \frac{1}{2} \qquad (48)$$

[16]When $k_A = 0$, similar computations lead to

$$\pi^F(I, 0) - \pi^F(N, 0) = \frac{1}{n(n-1)}\frac{1}{2}\left[(g_A - 1)\rho_e + (n - g_A)l(1 + \rho_n)(g_A - 1)\right] - c$$

and is always positive, if $l > 1/2$. Define $\delta_0(g_x)$ as the cutoff value of the discount factor for which favoritism is incentive compatible. Using equation (47), we can write this as:

$$1 - l = \frac{\delta_0}{1-\delta_0}\frac{1}{n(n-1)}\left[2g_{x,1}[1-l] + n(2l-1) - 1\right]. \tag{49}$$

$$1 - l = \frac{\delta_0}{1-\delta_0}\frac{1}{n(n-1)}\left[2g_{x,1}[1-l] + 2n(2l-1) - 2\right]. \tag{50}$$

When $g_x = 2$, the corresponding equation becomes

$$1 - l = \frac{\delta_0}{1-\delta_0}\frac{1}{n(n-1)}(2l-1)(n-2) \tag{51}$$

In any case, δ_0 is decreasing with g_x and is highest for $g_x = 2$.

Next consider the respondent's strategy at time $t = 1$. If respondent is the expert and accepts the offer, his payoff is:

$$\frac{1}{2} + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[g_A - 1 + l(n - g_A)\right], \tag{52}$$

If the expert respondent deviates and rejects the offer he is ostracized and earns:

$$\frac{\delta}{1-\delta}\frac{1}{n(n-1)}\left[\frac{1}{2n}\right]. \tag{53}$$

if $g_{x,1} > 2$. It is easy to verify that we know the payoffs from ostracism are smaller than the payoffs from following the norm. So the expert respondent will always accept an offer. Similar considerations imply that a non-expert respondent will always accept an offer.

Next consider a period $t \geq 2$: Suppose m_t is the employer and $m_t \in g_{x,t}$, for $x = A, B$. Given history h_t, we derive $(g_{A,t}, g_{B,t}, d_{x,t}, d_{y,t})$.

As before the only incentive we need to check is the case where expert is outside the employer's effective group. The payoff to employer $m_t \in g_{x,t}$ from favoritism when expert $e_t \notin g_{x,t}$, is:

$$\frac{1}{2}l + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\frac{1}{2}\left[2(g_{x,t}-1) + 2(n - g_{x,t})l + d_{x,t} + d_{y,t}\right], \tag{54}$$

By contrast, the payoff from offering the job to the expert $e_t \notin g_{x,t}$ is:

$$\frac{1}{2} + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\frac{1}{2}\left[(n-1) + d_{x,t} + d_{y,t}\right] \tag{55}$$

if $g_{x,t} > 2$ and

$$\frac{1}{2} + \frac{\delta}{1-\delta}\frac{1}{n(n-1)}\frac{1}{2}\left[(n-1) + d_{x,t} + d_{y,t} + 1\right] \tag{56}$$

if $g_{x,t} = 2$.

The incentive for favoritism turns out to be identical to the incentive at date $t = 1$. Especially, it is lowest when the effective group is of size 2. Moreover, a respondent will always accept an offer, as rejection lowers current payoffs and results in ostracism which lowers future payoffs as well. To yield a subgame perfect equilibrium, the strategies must be individually rational for any possible history of the game. Some histories lead to an effective group of size 2, so δ must be greater than or equal to $\delta_0(2)$. This condition is actually sufficient since $\forall g > 2$, $\delta_0(g) < \delta_0(2)$.

QED

Proof of Proposition 8: The key observation is that from a situation where everyone practises market behavior, one pair of individuals does *not* have an incentive to deviate and practice strong favoritism. To see this, observe that the individual payoff to practice strong favoritism is this case is equal to

$$\frac{1}{n(n-1)}[1 + l(n-2)] \tag{57}$$

This is much lower than the incentive to practice hiring favoritism in the same situation. Here, an expert in the pair loses 1 every time the employer is not his partner. We can easily see that this payoff is lower than the expected payoff of practising market behavior, $\frac{1}{n}$, as soon as $n \geq 3$. Under repeated interactions, this also means that deviating from strong favoritism is individually rational for any value of δ. To complete the proof, observe that there exist histories of the game leading to a pair of individuals practising strong favoritism and all others practising market behavior both under ostracism and market reversion.

QED

9 References

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