

# Discrimination as a Coordination Device

## Markets and the Emergence of Identity

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**WORLD BANK GROUP**

Development Economics Vice Presidency

Office of the Chief Economist

November 2015

## Abstract

The paper develops a new theory of group discrimination in which the discrimination in favor or against certain groups is simply a coordination device. It is built on the axiom that a person who gets to perform many tasks is more effective in carrying out each task, which implies increasing returns to productivity in doing the same task or strategic complementarity between doing different tasks. The theory helps us

understand discrimination in free markets and the finding of some empirical studies that show that people discriminate in job markets against certain groups even when all other traits are held constant. The model gives insight into the relation between group size, discrimination, and productivity.

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# **Discrimination as a Coordination Device**

## **Markets and the Emergence of Identity\***

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**JEL Classification Numbers:** D4, D82, J7

**Keywords:** Discrimination, Group Identity, Coordination, Focal Points, Market

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\*I am grateful to Tito Cordella and Jose Luis Diaz Sanchez for discussion and comments. For editorial assistance I would like to thank Gabriela Calderon-Motta.

# 1 Identity and Discrimination

This paper lies at the intersection of three developments in modern economics—the realization that, for good or for bad, group identity matters in determining the nature of market outcomes (Akerlof and Kranton, 2000; 2010); the recognition that for a large number of human activities there is strategic complementarity among the tasks, so that doing one task badly adversely impacts on the efficacy of other tasks (Kremer, 1993); and the finding, under well-controlled trials, that in labor markets there can be discrimination against certain groups, even when individuals are otherwise identical in terms of their individual, productivity-related traits (Bertrand and Mullainathan, 2004). This paper shows that bringing these three seemingly weakly-related ideas to bear upon labor markets gives us some deep insights into discrimination, productivity, and other features of market equilibria, and how markets can give rise to spontaneous identity.

That certain categories of people, based, for instance, on race, religion, gender or sexual orientation, face discrimination in labor markets is evident. One can find plenty of examples of this from around the world. However, what had long remained an open question was whether such discrimination was simply an expression of innate prejudice or an outcome of the search for more productive workers, given that productivity can rarely be directly observed and so has to be judged by statistical association with other traits.<sup>1</sup> By constructing a controlled experiment, Bertrand and Mullainathan (2004) sought to put an end to this debate. By sending out fictitious resumes in response to help-wanted ads in Chicago and Boston, they showed that, purely having a name that is typically African-American, an applicant is disadvantaged, all other relevant traits, such as education and experience, remaining the same. If you have a name like Lakisha rather than Emily, you will have to send out 50% more job applications to get a call back. And being white is equivalent to eight additional years of work experience. By shedding light on this persistent question, Bertrand and Mullainathan’s paper became the benchmark reference on the subject.<sup>2</sup>

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<sup>1</sup>The classics on these alternative exploration include Becker (1957), Phelps (1972), Arrow (1973, 1998), Spence (1974), and Stiglitz (1974).

<sup>2</sup>For similar empirical studies which suggest pure racial bias, see Pager, Western, and Bonikowski (2009), Glaeser, Sacerdote and Scheinkman (1996), and Hamilton et al (2015). For other kinds of racial discrimination in the U.S., which may not be pure bias but are nevertheless ubiquitous see Sander (2006), Coleman and Gulati (2005).

The present paper tries to argue that while their paper does bring a host of hotly debated matters to a close, it leaves one important matter unidentified. It does not shed light on whether racial discrimination of the kind identified in their paper is indeed an expression of pure taste-based prejudice or a search for greater productivity in an economy characterized by strategic complementarity among various tasks, similar in spirit to what is described by Kremer (1993) and Maskin (2015).

Let me explain. Most jobs involve interaction. Suppose you want to hire a worker for your sales department. How productive the worker will be certainly depends on his or her experience, education and intelligence, but it also depends on whether others want to interact with the person. If she contacts a customer, offering to sell a refrigerator with regular service (for this is what her firm requires her to do), her success will depend on whether the customer takes her to be an effective person, able to provide the monthly service on time, to send out a good mechanic for this, and so on. In brief, for a whole lot of work, how productive a person  $i$  will be to you depends on how willing others are to interact with  $i$ . In other words, there is a coordination problem involved. If all those who potentially have to interact with  $i$  treat  $i$  as productive and so are more willing to interact with  $i$ , then  $i$  will be more productive.<sup>3</sup>

If I am trying to hire an artist who will sit in a closed room for a month and produce for me a work of art, this interactive aspect of the labor market may not be important. But leaving aside such extreme solipsistic activities, work typically entails multiple interaction, with other workers, with customers, with other firms. In all such situations, there is indeed a coordination problem to be solved.

What this paper argues is that discrimination against certain groups could be a coordination device. I prefer a person of type  $W$  simply because I believe others prefer a type  $W$ , which makes  $W$  a more productive type. A group identity by this argument is simply a focal point among

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<sup>3</sup>In this model the agency of the service operator does not play any role. He or she mechanically carries out the task. It is just that the effectiveness depends on how many others are willing to work with them. A different but plausible route is to introduce the concept of self-esteem and what it may do to individual behavior (Akerlof, 2015). One could then argue that if you belong to a sought-after group then that in itself inspires you to work harder. This could lead to some group outcomes similar to the ones explored here.

employers, customers and firms trying to decide whom to interact with and whom to avoid.

It is worth digressing briefly to point out that the model developed in this paper is rooted in the mainstream assumption of fully rational agents. It is not surprising that when it comes to understanding racial and other kinds of discrimination, there is now a growing literature rooted in behavioral economics (see World Bank, 2015; Hoff, 2015). Many of these psychological biases have deep historical roots (Sen 2006; Loury, 2002), which prompt people to reject data and hard information in favor of prior opinions. This raises the important question of whether there are ways for correcting these biases and bringing in better norms (Sunstein, 1996). In a recent paper Hoff (2015) shows that we can give a qualified positive answer to this question. There are interventions to at least partially correct these biases.

In some ways the roots of group discrimination identified in this paper are more troublesome because they sprout up in domains of full rationality and free, untrammelled markets.

It is not being suggested that the model developed in this paper is the way labor markets invariably work, but it is being asserted that this is possible, and, as one thinks about it, plausible, that Bertrand and Mullainathan's paper does not rule this out.<sup>4</sup> The aim of this paper is to pursue this idea of discrimination as the coordination device or the outcome of the search for a focal point, and to get a sense of what this implies in terms of market outcomes. It turns out that this does provide some interesting insights into the nature of discrimination<sup>5</sup>. It explains why the many identities that we all have and which play a dormant role in the market can spontaneously acquire significance and become markers of productivity.<sup>6</sup> It also shows, for instance, that discrimination

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<sup>4</sup>There is a hint of this being tested in the finding of Bertrand and Mullainathan (2004) that the bias against African-Americans is not greater for jobs where customer or coworker contacts are higher. To be persuasive one will need to do sharper design of two kinds of jobs – those done in complete isolation and those involving interaction.

<sup>5</sup>While most of the examples cited in this paper refer to the U.S., similar issues concerning productivity and groups identity can be found across the world. India with its caste identities is a good case study. For a long time economists had ignored this subject. In recent years, they have entered the field and indeed this as given us some deep insights (see, for instance, Deshpande, 2010; Deshpande and Sharma, 2014; Deshpande and Weisskopf, 2014). An interesting recent study documents the discrimination faced by Dalits and Muslims in the Delhi rental housing market (Thorat, Banerjee, Mishra and Rizvi, 2015) and the authors conjecture that, like in the U.S. labor market, this was a case of pure prejudice.

<sup>6</sup>This is related but distinct from the analysis in Basu (2005), (2010), where a small, initial discrimination acquires

against some groups may be good for growth and yield a higher national output.

Apart from other things this is a morally interesting challenge. Human beings have a propensity to assume that all good outcomes go together—the empowerment of women is also good economics, societies that treat people as equal also develop faster, and so on. By demonstrating that such “good” outcomes do not always go hand in hand, the paper shows that we might have to confront tradeoffs between various good outcomes and morally desirable behaviors more frontally than we have done so far. This paper shows that we may have to choose between a society in which no group faces adverse discrimination and that does less well in terms of output and growth, and a society in which growth is rapid but is predicated on discrimination against some groups. Faced with such a choice, I would (of course with some qualification about intensities of these differences) tend to choose the former. But there is no need for the reader to share this normative precept with the writer in order to read and agree with the rest of this paper, which is an exercise in purely positive economics.

## 2 Discrimination as a Coordination Device

### 2.1 The Model

In the model that is developed here, there are two kinds of agents—service operators and customers, that is, those who sell services and those who buy them. In reality, the same people will do both, but the algebra is vastly simpler if we separate out these two kinds of agents and treat the customers as virtually exogenous agents. This suggests what I am developing is a partial equilibrium model.

Consider first a service operator. She will be doing many tasks or services. She may be a sales agent and so she tries to sell goods, but she also has to order the supplies, she may have to get loans from banks, she would need to rent an office, and so on. Since all such actions can be described from the demand or supply side, we shall think of a service operator as a person who supplies many different kinds of services. The agents who buy these are called customers. In keeping with the discussion in the previous section, I shall assume that the value a service operator offers to one

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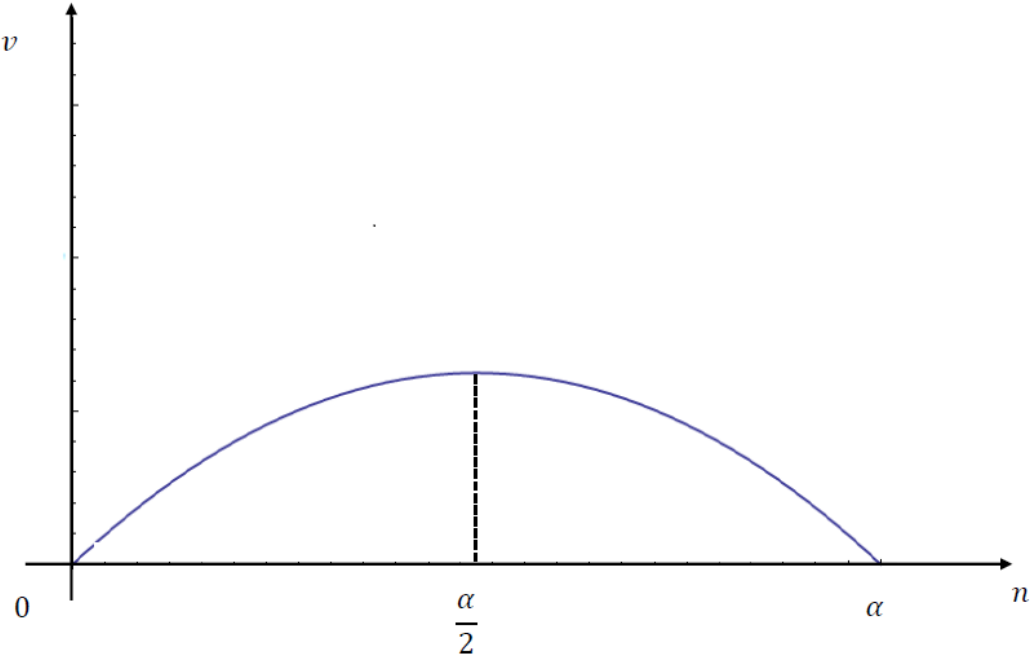
malignancy through a spiral of beliefs. There are indeed many different ways of conceptualizing and measuring group inequalities (see, for instance, Jayadev and Reddy 2011; Subramanian, 2010).

customer (this could be the person buying what she sells or the bank giving her a loan, which can equivalently be described as a customer buying a bond, and so on)  $v$ , depends on how many other customers she interacts with, in particular if she has  $n$  customers, the value she provides to each customer is supposed to be given by:

$$v = \alpha n - n^2. \tag{1}$$

It will be assumed that:  $\alpha > 1$ . **Figure 1** illustrates this function.

**Figure 1**



In other words, at least when  $n$  is small, as more customers reach out to work with her (i.e. as  $n$  rises), the value she offers to each customer,  $v$ , increases. This is where the O-ring structure comes into play. What you get from a service operator depends on how many other deals the operator gets. If she does not get any other demand for service, the value of service you get is minimal ( $\alpha - 1$ ). It does not collapse to zero as in the formal O-ring production function but the movement is in the same direction.



It is true that I am using a very simple functional form, which is also symmetric for all services. But this is purely for algebraic simplicity. Even though the  $n$  services may be different, the value to each of the  $n$  customers demanding the  $n$  services is, for simplicity, assumed to be given by  $\alpha n - n^2$ .

Hence, the total value of services,  $\Omega$ , generated by a service operator who provides  $n$  services is given by:

$$\Omega = nv = \alpha n^2 - n^3. \tag{2}$$

It is possible to think of two different conceptualizations behind the above equations, (1) and (2). The first is the way I have developed it, which is to think of each service operator doing many different kinds of services and tasks. The operator who mows your lawn also needs to get a loan from a bank and service the loan, and also buy mulch and weed-killers. The larger the number of services or tasks the operator manages to perform, the more effective she is in doing each one. (1) and (2) assume that all these services enter the “production function” symmetrically.

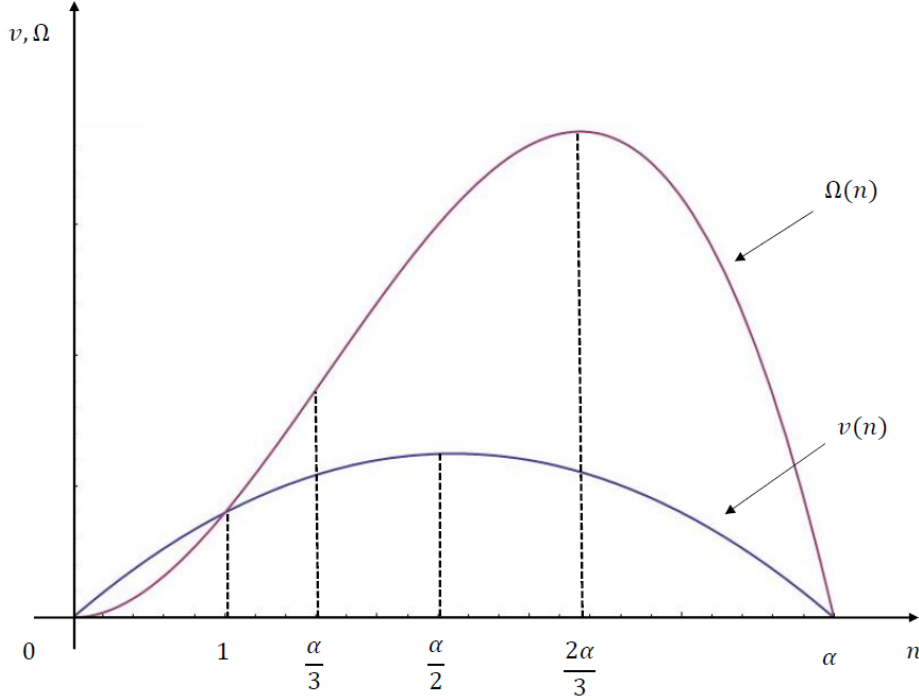
An alternative assumption is that each service operator provides one kind of services; but there is learning by doing involved. As described by Arrow (1962)<sup>7</sup>, this is quite a realistic description of work. This means that as the operator provides more services (that is, as  $n$  increases), he or she becomes better at it. This idea has seen a revival in the analysis of optimum savings and endogenous growth (Dixit, Mirrlees, and Stern, 1975; Romer, 1986; Lucas, 1988). In that sense the model developed here shows the implications of these features for group discrimination and the emergence of identity.

**Figure 2** shows the graph of  $\Omega$ , superimposed on the graph of  $v$ .

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<sup>7</sup>This has a long intellectual history, going back to Young (1928) and Smith (1776).

**Figure 2**



It is easy to check,  $\Omega$  peaks at  $\frac{2\alpha}{3}$ ; its first derivative is increasing up to  $\frac{\alpha}{3}$  and declining thereafter. These are facts that will be of some use later.

It will be assumed that each service provider has a limit to how many services she can provide. In particular, the maximum number of services she can provide is given by  $\bar{t}$ , where

$$\bar{t} \leq \frac{\alpha}{2}.$$

Apart from the service operators, this economy also has customers or consumers. They are the people who demand services from the service operators. As already pointed out, in reality the same people will demand services and provide service. But for simplicity I assume that the economy consists of two kinds of agents, those who are service operators and those who are customers. The service operators were described above. The customers are fairly non-descript persons. They simply demand services from the service operators. The minimal features that we will need of the customers will be described as we move along developing the model.

## 2.2 Partial Equilibrium

I shall assume that there are  $m$  service operators, half of whom are blacks and half whites. Apart from race there is nothing to distinguish between service operators.

In this sub-section it will be assumed that the customers demand  $t$  services. This is given exogenously.

If  $t$  services are demanded from a random selection of  $m$  operators, it will be assumed that each operator gets to provide  $\frac{t}{m}$  services.

Since race is the only visible trait of the operator, in buying a service a customer can make either a color-blind choice in picking an operator or specify a first preference for a black operator or a white operator. In the spirit of the large competitive market and price-taking behavior on the part of individuals, it is assumed that customers are aware of the productivity of black and white operators and take these as given. That is, a single customer does not take into account that his own choice can change the productivity of a service operator.

To start with, suppose all customers make a color-blind choice. I shall assume, since that is the interesting case:

$$\bar{t} > \frac{t}{m}. \tag{3}$$

If the customers believe that race does not affect productivity, each operator will face a demand of  $\frac{t}{m}$  services.<sup>8</sup> Since this is less than  $\bar{t}$ , the value (per customer) produced by an operator, irrespective of race, is:

$$\bar{v} \equiv \alpha \frac{t}{m} - \frac{t^2}{m^2}. \tag{4}$$

This is clearly an equilibrium. The equilibrium concept being used in this paper is what is natural in this setting—that of rational expectations competitive equilibrium. Individual customers believe that their behavior does not change values produced by operators and they form beliefs of race productivity and then they take their own decisions. If the belief is then borne out, that constitutes an equilibrium, since no one has any reason to change his or her decision.

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<sup>8</sup>It is being assumed that services are bought at some very low price, maybe even zero.

Suppose now that everybody believes that whites provide better services than blacks. So they first look for a white service operator and go to a black operator only if a white operator is unavailable. It is easy to show that this is also an equilibrium.

If everyone believes whites are more productive, total service demanded from each white operator is  $\frac{2t}{m}$ . Consider first the case where  $\frac{2t}{m} > \bar{t}$ . Then whites will be fully employed and the value provided by each white will be

$$v_W \equiv \alpha \bar{t} - \bar{t}^2.$$

Each black, on the other hand, will get a total demand of  $(t - \bar{t}\frac{m}{2}) / \frac{m}{2} = (\frac{2t}{m} - \bar{t}) \geq 0$ . Hence, the value produced by each black operator is:

$$v_B \equiv \alpha \left[ \frac{2t}{m} - \bar{t} \right] - \left[ \frac{2t}{m} - \bar{t} \right]^2.$$

It is easy to check

$$v_W > v_B.$$

To prove this, note

$$\begin{aligned} \frac{2t}{m} - \bar{t} &= \frac{t}{m} - \left( \bar{t} - \frac{t}{m} \right) \\ &< \bar{t}, \text{ by (3).} \end{aligned}$$

Since  $t < \frac{\alpha}{2}$ , it follows

$$v_W > v_B.$$

This is also obvious from an inspection of Figure 1.

Next consider the case where  $\frac{2t}{m} \leq \bar{t}$ . Clearly, now, the entire demand for services,  $t$ , will be met by white operators, who have a capacity of  $\bar{t}\frac{m}{2}$ . Hence, the demand for services from black operators will be zero. This means anyone who gets a service from a black operator will get a value of  $\alpha - 1$ . If he instead got the service from a white operator, the expected value would be greater

than this, since it is likely that such an operator has other customers and hence would be able to provide greater value.

Hence, what we have proved is that a shared belief in the productive supremacy of one group gets confirmed by the outcome. Indeed, had everybody believed in black supremacy, that would get borne out in practice. There is no *a priori* difference between the two groups. It is as though a focal point is needed by the customers and race fills this void by serving as a focal point.<sup>9</sup>

The market does not help remove this discrimination. Indeed it is the market with individuals seeking atomistically to find greater value that leads to herd mentality and this equilibrium. Many of the discriminations we see in real life are probably similar. It is not so much mendacity as the search for getting better value that inadvertently gives rise to an urge to discriminate that is self-fulfilling.<sup>10</sup> No doubt history plays a role in creating some of the focal points.

For a long time, and this continues even now, women have been discriminated against in markets, being viewed as less productive. If all players in the market make such an assumption and hesitate to entrust women with important tasks, they will be less productive since to deliver well on one task people need access to others to get other complementary tasks done. The belief that individuals belonging to one group are less or more productive then becomes a self-fulfilling belief. If everyone maintains this, everyone behaves in a way that makes it reasonable for you to hold onto the belief, as happens in all situations requiring coordination<sup>11</sup>. All this is not to deny that racism, gender discrimination and other kinds of innately discriminatory behavior is possibly still a part of life in many societies. The point that is being made is in some ways more troubling, to wit, that even if

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<sup>9</sup>Interestingly, this is an imprecise focal “point.” In case there is a narrower identity, for instance, white men, instead of just whites, which becomes a matter of focus, this group’s productivity may be even higher. To enter into this discourse formally would require some use of focal “sets,” which may be embedded within one another providing the possibility of sharper gains with smaller sets. The analysis of institutions and focal sets is however rather rudimentary at this stage (see, for instance, Myerson, 2009; see also Basu and Weibull, 1991), so this will entail conceptual advance.

<sup>10</sup>Economic and social life is replete with the need for focal points or sets to coordinate behavior. The law, norms and discrimination, as this paper shows, can be devices for creating focal points (see Basu, 2015; Mailath, Morris and Postlewaite, 2001; McAdams, 2015; Posner, 2000; Dixit, 2007).

<sup>11</sup>A very different and innovative theory, but also one of self-fulfilling expectations, which explains gender discrimination occurs in Francois (1998).

innate racisms were absent and even if all groups were innately identical, market outcomes could be discriminatory, favoring some groups over others.

It is worth digressing for a moment and considering the case where the charge for service from an operator is not the low uniform rate assumed above (see footnote 9). Instead, blacks and whites (since those are the only visible features of operators) can charge different rates. Depending on the underlying assumptions made, we can get to other kinds of equilibrium. But both color-blind cases and the discriminatory equilibrium remain possible outcomes. If the amount charged for the same service could be made race-dependent, it is obvious that the more productive group would be paid more for providing the service. Hence, in equilibrium two pieces would come into existence, one for white operators and another for black operators.<sup>12</sup> One consequence of this is that, in equilibrium, customers will be indifferent between finding a white and a black operator, because the productivity difference will be matched by price difference. Hence, the equilibrium will be an unstable one.

I shall, however, continue to work with the assumption that group-based price discrimination is not possible.

### **2.3 The Productivity of Big and Small Groups**

The model just described, whereby group identity serves as a coordination device, can shed interesting light on group size, engineered identity and productivity. Note that in a market characterized by strategic complementarity, people have a vested interest in promoting the idea that the group they belong to is especially productive. The reason is that once such a belief begins to settle in, it becomes self-fulfilling. If you can make people believe that graduates of Ivy League colleges offer higher value than others, then students who have graduated from an Ivy League college will in fact turn out to be more productive. If you hire such a student and ask her to do a task, she will find

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<sup>12</sup>For an interesting argument where the inability to use one strategy creates the scope for spurious discrimination against one group, see Holden and Rosén (2014). In their paper, with employment protection, employers will not want to employ any member of a group that is “discriminated against” because it will be harder to dismiss such a worker, thereby ensuring that the group is discriminated against.

it easier to attract others with whom she will need to interact in doing the task. We just have to look around to see that colleges make a lot of effort to spread such beliefs. And they cannot be faulted because, once it has been spread, it ceases to be a rumor. The same can be done for other groups—from race and caste to religion and gender.

This leads to an interesting question: what is the optimal size of a group for getting such benefits? At the first level, the answer is easy, think of a smaller and smaller group that is believed to be especially productive. As soon as the group becomes small enough for all operators of that group to be fully employed, that is, each is providing  $\bar{t}$  services, its productivity hits an all possible high. Smaller groups are just as productive as this and as the group becomes larger its members become less productive. It follows that, ideally, an engineered group has an interest in keeping itself small. An Ivy League college that has too many students may not be able to reap the benefit of group identity as much as a smaller college. Likewise, instead of making people believe that Europeans are more productive, it might be more rewarding to make them believe that European males are more productive. By this argument, however, it is best to go down to the individual. If an individual is widely believed to be highly productive, this will be true. The reason why we do not see singleton groups is that this will cause a cacophony of beliefs that we may be unable to carry in our heads. To remember that this caste group or this race is more productive is easier than a catalogue of productivity of each individual in society. Information to keep in one's head. This may explain why these group beliefs do not, typically, become too atomistic.

One way to formalize this is to assume that group characteristics (real or assumed) are easier to remember when the group is large. Men are strong, women are weak (I shall leave to the reader to create other politically unacceptable examples) is easier to remember than Mr. I is strong, Mrs. J is weak, Mr. L is weak, Mrs. K is strong. One way to formalize this is to assume that the larger the group with a certain characteristic is, the greater the number of customers who will be aware of this. If a very small group tries to engineer the belief that it is cleverer than others, only some customers will know this. So while such customers will reach out to members of this small group, others will not, since they will not even be aware of this belief. Writing such a model up formally will enable us to create a theory of optimal, engineered group size.

My reason for this brief and incomplete foray into this subject is to point out that engineered group beliefs is an important subject and deserves analysis. The model developed in this paper may provide a template for this.

## 2.4 A Contentious Claim

Given the model described above, a rather contentious result can occur. This happens if  $\bar{t}$  is not just less than  $\frac{\alpha}{2}$  but less than  $\frac{\alpha}{3}$ . In addition, let us assume, as before, that (3) holds.

Starting from a color-blind equilibrium if people begin to discriminate and move to an equilibrium in which one group, say the blacks, are discriminated against, as in the second equilibrium described in Section 2.2, the economy could actually be larger, in the sense of total value produced.

This is easy to see. The total value produced in the color-blind equilibrium is clearly given by:

$$\Omega^c \equiv \left[ \alpha \frac{t^2}{m^2} - \frac{t^3}{m^3} \right] m. \quad (5)$$

This is derived from (2) by taking  $n = \frac{t}{m}$  and then multiplying by  $m$ , since there are  $m$  such operators.

From (2), note that

$$\frac{\partial^2 \Omega}{\partial n^2} = 2\alpha - 6n. \quad (6)$$

It follows that  $\frac{\partial^2 \Omega}{\partial n^2} \geq 0$  if and only if  $n < \frac{\alpha}{3}$ .

Hence, in the color-blind equilibrium the economy is located so that each service operator is on the increasing returns stretch of the aggregate value function. As we move from here to the equilibrium with discrimination, customers move from black service operators to white service operators. With each such switch, aggregate output rises. Hence the total value produced in the economy is greater as discrimination increases.

In other words, in this economy, identity-based discrimination turns out to be good in terms of aggregate value production and growth. This is what I refer to as the nasty result.

I am glad though that this odious equilibrium occurs, for it compels to us to confront a moral dilemma that most public commentators tend to look away from. They do this by pretending that



all normatively good outcomes move in tandem as is evident from popular slogans like “gender equality is smart economics” or “greater equality is also good for growth”.

The odious equilibrium demonstrates that under reasonable assumptions this may not be so. We may have to contend with the dilemma that gender equality may not move in tandem with other desirable aims and we may have to agree that we will go for gender equality even though it is not good economics and that we may want greater equality even though it may slow down growth.

### 3 A Generalization

The analysis thus far has been confined to a rather partial equilibrium structure. It is beyond the scope of this paper to describe a full general equilibrium. In this section I shall take a step to describe a *more* general equilibrium and how that leaves the main results intact.

Thus far I worked with the assumption of total demand,  $t$ , being exogenously given. It seems reasonable to assert that as a society produces more value and gets richer it will consume more. I shall capture this as follows.

Let the total value produced in this society be called gross value produced (*GVP*) and be denoted by  $V$ .

We shall here assume that total demand for services,  $t$ , is positively related to  $V$  as follows:

$$t = \beta V, \text{ where } \beta > 0. \tag{7}$$

Let us first consider a non-discrimination equilibrium. People believe blacks and whites are equally productive and this is borne out in equilibrium, so we have a rational expectation equilibrium with no discrimination.

Consider first the partial equilibrium described by (4). The *GVP* of this society is given by  $\bar{v}t$  or

$$V = \alpha \frac{t^2}{m} - \frac{t^3}{m^2}. \tag{8}$$

By (7) we know that the total services demanded will be

$$t_D \equiv \beta V = \beta \alpha \frac{t^2}{m} - \beta \frac{t^3}{m^2}. \quad (9)$$

Since demand has to be equal to supply in equilibrium,  $t$  is an equilibrium if

$$t = \beta \alpha \frac{t^2}{m} - \beta \frac{t^3}{m^2}. \quad (10)$$

As in the partial equilibrium case, there can also be a general equilibrium with discrimination.

If everybody believes that whites are more productive than blacks, then in equilibrium whites will find more work than blacks and indeed be more productive than blacks.

Further, as in the partial equilibrium analysis, it is entirely possible that equilibrium with discrimination against one group may result in a more productive economy with higher gross value product.

## 4 Open Questions

This paper developed a theory of discrimination as a coordination device. Discrimination in favor of a particular group is akin to a focal point. When others make this conjecture it pays for you to make this conjecture. A free market is no guarantee against such discrimination. In fact, the free market facilitates such discrimination, since atomistic players do need to coordinate with a sub-group of people from whom they demand services to make sure that they are more productive. By this model, when people discriminate between people of two races or genders, purely on the basis of race or gender, even if these individuals are identical in other ways, this does not necessarily have to be a sign of innate race or gender preference.

The paper shows that there are situations where we have to take on certain moral conflicts head on. We might have to argue that ending discrimination is worthwhile on its own. Indeed we may have to be prepared to forgo some overall benefit to achieve a non-discriminatory equilibrium.

The theoretical model developed in this paper was a simplistic exercise to illustrate the above claims. But by opening up an avenue of analysis whereby discrimination is simply a coordination device it creates room for further developments and also the scope for interventions by the state

and the engineering of group identities.

Engineered identities play a big role in our economic lives. Colleges and universities project their alumni as special. Caste groups, sects, and races often do the same, at times deliberately and at times unwittingly. This paper provides a model for analyzing this.

In the present paper one's productivity is positively related to the demand for one's services. But there are other routes through which a person's self-esteem and thereby productivity may be affected (see Akerlof 2015; Hoff and Pandey, 2006; World Bank, 2015). These can create opportunities for related models of self-fulfilling beliefs about productivity differences across groups.

A different field, where this kind of analysis could yield new insights, is the increasingly popular activity of providing rankings and ratings. We have, for long, had ratings agencies advising investors how safe or risky it is to invest in different companies or sovereigns.<sup>13</sup> I have written about the large impact of S&P's downgrading of the U.S. in August 2011 (Basu, 2015a). The World Bank produces each year the Doing Business Report, which ranks economies in terms of the ease of doing business there. This publication commands great interest among individuals, the media, corporations and governments.

What the model in the paper makes it possible to argue is that what these ratings and rankings measures are not critical innate differences across sovereigns or corporations, but differences that become significant by prompting behavior among investors. If it is worthwhile for you to send FDI to a country where others send their FDI, then a rating or a ranking can simply be a signal for creating a focal point or set. It should be possible to formalize and develop this idea more fully.

The basic idea is that group discrimination can at times be simply a device for coordinating choice among people. A particular instance of this is modelled in this paper but, hopefully, the paper opens up the possibility of pursuing this basic idea in other areas of economics, finance, and society.

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<sup>13</sup>For an excellent pithy history of credit rating from John Moody's first such exercise in 1909, when he published bond ratings, focused on railway bonds, to current time, see White (2010). There are many studies which show how sovereign credit ratings, whether one likes them or not, have important implications for the sovereign (see for instance, Cantor and Packer, 1996).

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