THE EFFECT OF RESERVATIONS ON CASTE PERSISTENCE IN INDIA

A thesis
submitted to the Faculty of the
Georgetown Public Policy Institute
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Public Policy

By

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Washington, DC
April 15, 2010
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ABSTRACT

Reservation policy is an extremely contentious topic in Indian politics. Proponents claim that a policy of positive discrimination is the only way to rectify the past injustices against India’s poor. Opponents claim that reservation policy creates perverse incentives that strengthen traditional caste boundaries and encourage backwardness. Despite vocal advocates on both sides of the issue, there is little empirical data on the actual effects of reservation policy. This thesis provides theoretical and quantitative evidence on the unintended consequences of reservation policy. I develop and estimate a model of marriage choice in the presence of reservations to determine the effects of reservations on the persistence of caste identity. I conclude that different effects of reservations encourage both exogamy and endogamy along different dimensions, but the net impact of reservation policy favors exogamy.
ACKNOWLEDGMENTS

For my mom.
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Chapter 1

Introduction

Contrary to the expectations of some social theorists, India’s caste system has shown remarkable persistence in the face of industrialization.\(^1\) This is a stark contrast to the American experiences, where European immigrants relaxed the boundaries of their traditional social networks relatively quickly. Many explanations have been proposed for this persistence, including ongoing discrimination by upper castes\(^2\), benefits derived from social insurance groups, and caste based patronage from government programs. \(^{19}\) This thesis will examine the relationship between caste persistence and the primary government program responsible for allocating benefits to disadvantaged groups, the reservation system. The reservation system allots a certain percentage of government jobs and seats in higher education institutions to historically disadvantaged castes, tribal groups, and other classes identified by state and central governments. \(^{20}\) Reservations are similar in function to affirmative action in the United States or positive discrimination in the United Kingdom. The central question of this thesis is whether an individual is more likely to marry within his or her own

\(^{1}\)As expressed by Karl Marx, “Modern industry, resulting from the railway system, will dissolve the hereditary divisions of labor, upon which rest the Indian caste system.” \(^{25}\)

\(^{2}\)I will use caste to refer to sub-caste networks, or jati.
caste, strengthening the caste group, if that group is eligible for benefits through the reservation system.
Chapter 2

Background

2.1 History of Reservations

Reservations for the most depressed groups have existed in some form since the days of British rule. These groups are collectively referred to as Dalits, or untouchables, and Adivassi, or tribal groups, though they are actually composed of hundreds of distinct groups. After India achieved independence, the composition of these two groups was finalized into lists of Scheduled Castes and Scheduled Tribes, and their protection was enshrined in the Constitution. [17] The Constitution specifically prohibits discrimination on the basis of caste, and reserves 22.5% of seats in institutions of higher education and government employment. [17, 18]

The next major expansion of the reservation system was initiated on the recommendation of the Mandal commission of 1979, which was organized to address the problem of other socially and educationally backwards classes. [6] These groups, while not burdened with the stigma of untouchability, still suffered from a persistent lack of opportunity. The Mandal commission recommended the creation of a third category
2.1 History of Reservations

of groups eligible for reservations, Other Backwards Classes (OBC).\(^1\) The commission recommended an additional 1,257 groups that should be eligible for reservations, and estimated the population of these groups at 52% of the total population of India. The commission also recommended that the total number of seats subject to reservation be increased from 22.5% to 49.5%. These recommendations were quite controversial, but were all eventually implemented between 1990 and 2006. [28]

The commission’s recommendations reflect a common understanding of the caste system, as a natural and permanent feature of Indian society. In this view, caste is analogous to race, an immutable, biological fact. Caste classification in itself is morally neutral, and it is only the extreme inequality between castes that necessitates intervention. A British contemporary of Mandal commented on the empowering nature of caste solidarity, remarking that strong caste groups have the effect of “raising the status and prestige of the Caste as a whole and freeing its members from exploitation and victimization by other caste.” [3] The Mandal commission does not recognize persistent inequality as a natural result of caste stratification, but rather as a result of structural inconsistencies imposed by years of British rule. “The British rulers produced many structural disturbances in the Hindu caste structure, and these were contradictory in nature and impact.... Thus, the various impacts of the British rule on the Hindu caste system...set the stage for the caste conflicts in modern India.” [23]

The reservation system proposed by the Mandal commission was not intended to decrease the influence caste, but rather to restore the natural order of the caste system by counteracting the structural inequalities imposed by British rule. Far from denouncing the caste system, the report actually justifies the reservation system by

\(^1\)I will use eligible castes to refer to all backwards classes, though not all backwards classes are strictly defined along caste lines
citing its consistency with the historic functioning of the caste system, where certain jobs were reserved for certain castes. The report appeals to a popular legend, in which two characters were punished for abandoning their traditional occupations. “In fact the Hindu society has always operated a very rigorous scheme of reservations, which was internalized through caste system. Eklabya lost his thumb and Shambuk his neck for their breach of caste rules of reservation.” [23]

The idea that strong caste identification is not mutually exclusive with egalitarian principals was not unique to the Mandal commission. John Harris writes of the people of Tamil Nadu, that “social relationships are still structured hierarchically, but in the minds of individuals, it appears that a form of society can be envisaged in which hierarchy would disappear, and yet caste identities would still persist.” [15] The Mandal commission’s proposal for a system of positive discrimination, then was consistent with their underlying beliefs on the nature of the caste system. These beliefs, however, are not universal. Indeed, as shall be explored in the next section, much of the conflict surrounding reservation policy can be traced to different beliefs about the nature of the caste system, rather than simple disagreements on policy prescriptions.

2.2 Characterization of Caste

Many economic phenomena spring from path-dependent economic processes, which implies that it is necessary to make a careful study of the historical past of an economic phenomenon to help explain its present. In other words, we must be good economic historians to be good economic theorists. [7]

Any attempt to identify the complex interactions between reservations and caste
identity must begin with a strong conceptual understanding of caste. In the following section, I will present the major theories concerning the nature of the caste system and its source of its lasting influence in India.

**Horizontal Characterization**

In the years since the Mandal commission report, caste has been increasingly understood as a form of traditional social identity, separate and distinct from race. This view rejects the existence of any fundamental organizing principle, such as race, class, or hereditary occupation. Instead caste groups are defined by arbitrary symbols and rituals that exist primarily to define the identity of each caste relative to outside castes. Dipankar Gupta defines the caste system as “a form of differentiation wherein the constituent units of the system justify endogamy on the basis of putative biological differences which are semaphored by the ritualization of multiple social practices.” [13] The caste equilibrium is thus sustained by the loyalty of individuals to their own caste above all others, rather than through a fixed hierarchical power structure. This view of caste can be characterized as horizontal, as compliance is enforced through mutual threats by peers. An article from the Hindustan Times in 1961 illustrates this horizontal enforcement:

> Everyone of the hundreds of sections into which this nation is divided suffers from discrimination and every group practices discrimination against all others. [3]

**Vertical Characterization**

The vertical approach supposes a strict hierarchy with top-down enforcement, such as that found in a racially segregated society. Vertical theories of caste include the race-based theory of Chakraberty [4] or the purity-based theory of Louis Dumont
2.2 Characterization of Caste

[9]. Biological and anthropological evidence provide more support for the horizontal formulation of caste over the vertical formulation. The theory of a racial basis for caste has been thoroughly refuted by modern biological science. A recent study by Harvard Medical School [30] examined genetic markers across caste groups. The study found evidence of distinct biological markers from successive waves of immigrating groups, which is superficially consistent with a racial foundation of caste. The markers, however, were mixed across castes making identification of specific castes or tribes via genetic markers impossible. In other words, though distinct genetic groups could be identified, there was no correlation between these groups and observed caste groups. The authors concluded that the caste system evolved independently from the immigration of successive genetically-distinct groups. The same conclusion is reached by several other studies in Biology and Anthropology. [10,21,22]

One of the most influential [28] conceptualizations of the caste system was developed by Louis Dumont in the 1960s. [9] Dumont’s hierarchical characterization of caste is superficially consistent with the public manifestation of caste dynamics, but does not accurately reflect the views of non-dominant castes. According to Dumont, castes are aligned according to their relative purity or impurity, along a single axis. This alignment is known and accepted by all castes. The exact structure of Dumont’s hierarchy is never stated explicitly, though it is assumed that all those within the system are familiar with the structure and know their place within it. Brahmin, the traditional specialists in religious rituals, are at the top of Dumont’s hierarchy. The idea that Brahmin are the most pure caste is consistent with most publicly expressed views on the caste hierarchy, but this particular alignment is only fully accepted by Brahmin. Other castes generally subscribe to a set of beliefs in which they are as pure or purer than any other caste.

One low-caste, the Kuricchan of Malabar, will ritually purify their homes if it is
polluted by the entry of a Brahmin, and others refuse to eat with Brahmins. Even
the Meghavals or Dheds, whose traditional occupation is carrying carrion, and are
thus very low on the purity hierarchy, refuse to dine with castes that are publicly
considered more pure. Caste claims to superiority are often based on seemingly ar-
bitrary distinctions, with no clear appeal to purity. The Kaibartta, a traditional
fishing caste, consider themselves superior to the Malos, another fishing caste, on the
grounds that the Kaibartta “always pass the netting needle from the above down-
wards, working from left to right; while the Malo passes it from below upwards,
forming meshes from right to left.” [12] Sociologist Dipankar Gupta remarks, perhaps
with some hyperbole, that “there are probably as many hierarchies in practice as
there are castes.” [14] Typically, non-ruling castes attribute their depressed status to
historical misfortune or trickery on the part of the current ruling caste. According
to the dominant caste theory of M.N. Srinivas, dominant castes impose their private
beliefs on those within their territory. [33] The publicly accepted hierarchy, thus, is
determined by the ruling group, rather than the ruling group being determined by a
publicly accepted hierarchy as Dumont’s theory would suggest.

The horizontal view of caste, as a flexible system of self-differentiating groups
rather than a strict vertical hierarchy with a well-defined power structure, challenges
researchers to explain the persistence of the caste system in the face of industrial-
ization. A 1995 country report commissioned by the US Library of Congress, states,
“One irony of Indian politics is that its modern secular democracy has enhanced
rather than reduced the political salience of traditional forms of social identity such
as caste.” [16] Identifying the mechanisms that have sustained caste identification
through industrialization will clarify the theoretical relationship between reservations
and caste persistence. These mechanisms are explored in the next section.
2.3 The Persistence of Caste

One characteristic of caste groups observed by both Dumont and Gupta is the near universal condemnation of exogamy. Contrasting mixed-caste offspring with mixed-race offspring, which may enjoy some special privilege relative to the oppressed race of a racially segregated society, Gupta writes, “The miscegenes of such highly despised unions belonged to a different breed altogether, to a completely different caste. Mixed marriages, in such cases, do not result in mixed off-springs but in dangerous and impure outcastes.” [14] “The usual punishment for those who break this rule of endogamy is expulsion from the caste, i.e., social ostracism.” [3] The assumption that network affiliation is stripped from those who violate caste customs is essential to modern theories of caste persistence.

2.3.1 Exogenous Enforcement: Punishment for Deviation

One class of explanation posits that individuals remain within the boundaries of their caste network out of fear of punishment from society as a whole. An economic model employing this assumption was proposed by George Akerlof in 1976 and expanded on by James Scoville in 1996. [1, 32] These models demonstrate the existence of a stable caste equilibrium in the labor market, where deviators are completely excluded from the labor market. “Those who fail to follow, or even to enforce the caste customs do not gain the profits of the successful arbitrageur but instead suffer the stigma of the outcaste.” [1] This assumption implies a high degree of rigidity in the labor market, which is consistent with the long-term equilibrium that existed before India’s industrialization, but is difficult to justify in modern India.

The enforcement of caste customs generally takes place at the village level, through a local extra-judicial body known as the caste panchayat. [5] These punishments are
only enforceable within a single caste. Furthermore, caste identity is not linked to physical appearance outside of a given geographical region. [21,22] Punishments, then, that rely on the coordination of agents outside of a the violators network, are simply not credible. An outcaste individual will pay a price, but it is not complete exclusion from the labor market across India. Given the lack of an identifiable enforcement mechanism that fulfills the necessary assumptions, models based on exogenous enforcement alone are not sufficient to analyze the relationship between marriage and reservations. I will use the underlying structure of Akerlof’s model, assuming that agents weigh punishments and rewards when considering an exit from their traditional networks, but first a more realistic enforcement mechanism is required.

2.3.2 Endogenous Enforcement: Incentives to Membership

More recent work on caste persistence has focused on the benefits that individuals derive from their caste networks rather than outside punishments for deviation. The forfeiture of these benefits can be interpreted as the punishment an individual accepts for exiting his caste network, and rely only on the local caste network for enforcement. In industrialized India, an individual is not excluded from the work force, as in Akerlof’s model, but he does lose the benefits of his caste network. Thus, while the punishment is not as severe is in Akerlof’s model, it is significant and, more importantly, it is credible.

Kaivan Munshi of Brown University and Mark Rosenzweig of Harvard University have identified non-governmental benefits to caste membership, modeling caste networks as informal credit and insurance markets. [26, 31] This work implies that many Indians lack access to modern credit and insurance markets, and instead rely on informal caste networks. Munshi and Rosenzweig look at individuals who migrate from rural to urban areas for increased employment opportunities. These individuals
no longer have access to their traditional credit and insurance network. An important implication of this model is that caste networks are substituting for modern institutions to which members do not have access; caste networks are not providing any benefits that cannot be replaced by modern financial institutions. Given the implications of this model, it is reasonable to suppose that the influence of caste will fade as members gain access to modern financial institutions.

Another type of benefit from caste membership is identified by Evan Osborne of Wright State University who proposes a theory of political pressure groups. According to Osborne, caste networks serve as pre-existing, rent-seeking factions which alleviate the traditional collective action problems of free-riding and excludability. Osborne documents a wide range of behaviors that support the theory that caste groups are increasingly motivated by political rent-seeking, including shifting, non-traditional alliances between caste groups, increasing proportions of Indians entitled to reservations, and a disproportionate growth in benefits to more populous groups. [28] For the majority of Indians, the benefits that accrue to these political pressure groups cannot be duplicated by any other modern institution. Although political special interest groups exist in many modern democracies, they are not as efficient or accessible as caste based interest groups. The conceptualization of caste groups as political pressure groups provides no indication that caste identification will fade with time, and has given rise to concerns that the reservation system is actually strengthening caste identification. [3]

2.4 Policy Implications

An accurate understanding of the caste system is critical to understand the full implication of reservation policies. The conflation of race and caste, for example, changes
the ultimate goal of reservation policy.

Once we [apply] the language of race to the caste situation the emphasis shifts from removing the scourge of caste from Indian society to making one’s caste identity a fixed political resource. In which case, quite understandably, castes would tend to be viewed as permanent fixtures and caste identities as political assets. The task would then be not so much to eradicate castes but to give proportionate representation to different castes in educational institutions, in jobs, housing, and so on. [14]

Normative Considerations

While some Indians clearly favor eradication of caste over equalization, the actual intent of policy makers remains unclear. Members of the Mandal Commission, for example, were clearly more concerned with equalization than with eradication, but that was not true of all politicians of that time [34], nor is it true of all politicians today. The Supreme Court of India demonstrated the relevance of this question in a recent opinion:

There is another question which has been emphasized by learned counsel for the petitioners is that the policy of reservation cannot be and should not be intended to be permanent or perpetuate backwardness. [29]

These views express concern over the long-term implications of caste identification, but one must also account for the private benefits of caste membership before passing judgement on the system. Members receive the economic benefits identified by Munshi and Rosenzweig, but also derive non-tangible benefits from belonging to a dense kinship network. Although the inequalities created by the caste system are
universally condemned, it is not clear that public opinion supports the abolition of
the caste system.

Supposing that negative aspects of the caste system, such as inequality, discrim-
ination, and labor-market rigidity, could be neutralized, there are still reasons to
believe that the very existence of caste networks will have negative consequences for
the future of India. Caste networks are similar in many ways to Mancur Olson’s
“distributional coalitions” [27] or James Madison’s “factions.” [11] Both of these po-
litical theorists warn against the growth of groups, united in a common interest, that
organize with the intent of influencing the democratic process to favor their private
interest over the public good.

While these arguments certainly have merit, it is not clear how well they apply to
India. Madison’s prescription against faction was a large and diverse republic, where a
single faction would be unable to capture political power. India is nothing if not large
and diverse, so it may be protected from capture by a single caste or caste coalition.
Olson’s argument, too, leaves hope for India even under the continued influence of
caste. Olson writes that his theory of collective action is consistent with the observed
stagnation of India, though he cautions that there may be too little sound data to
draw conclusions about the effects of the caste system. [27] Olson was wise to include
this qualification, as India has become one of the fastest growing global economies
since his manuscript was published in 1982.

Ultimately, the distinction between equalization and elimination is normative,
and should be made by the people of India. There is not enough evidence to make
a positive judgement on a theoretical caste system where opportunities have been
equalized between castes. Caste networks could simply evolve to resemble large,
closely-knit extended families. The purpose of this thesis, then, is not to recommend
one strategy over the other as a solution to caste inequality, but only to clarify the
actual impacts of reservations.

**Implications of Theory**

The models presented above provide a framework to identify the effects, both intended and unintended, of the reservation system, but provide no evidence as to the magnitude of the effects. As they relate to the persistence of the caste system, the arguments for and against reservations are both theoretically consistent with these models.

Proponents of reservations, argue that non-governmental benefits, such as those identified by Munshi and Rosenzweig, are sufficient to sustain the caste system and its accompanying inequalities. Individuals from rural, backwards classes will lose access to their traditional savings and insurance networks if they pursue education or work in an urban area. They must be given priority access to educational and employment opportunities to reduce the risk associated with this migration. Proponents may acknowledge the drawbacks of the reservation system, but argue that reservations are the only feasible mechanism to reduce inequality in the short-run. A system based on some other measure of inequality, such as income, is simply not practical.

Opponents of reservations may recognize the historic inequalities imposed by the caste system, but argue that reservations are actually counter-productive. While they may decrease inequality for select individuals from disadvantaged castes, they also serve to perpetuate caste identity and caste based discrimination. Reservations perpetuate caste identity by providing incentives for caste groups to organize into political pressure groups. [28] They fuel discrimination by giving priority access to individuals from disadvantaged groups, who may be judged as undeserving or less competent than their peers. [3]
Fitting Theory to Reality

Both of these arguments are consistent with the current social theory surrounding the caste system, but there is no empirical evidence supporting one view over the other. Quantitative studies have generally focused on the effect of reservations on inequality. These studies investigate whether the reservation system is meeting its stated goals, that of reducing inequality. Empirical work has shown that reservations do reduce inequality, but no empirical studies have been done on the unintended consequences of the reservation system. This thesis provides quantitative evidence concerning the effect of reservations on the intergenerational continuity of the caste system. This evidence will contribute to the on-going debate concerning how best to address the inequalities of the caste system.
Chapter 3

Analysis

3.1 Data

This thesis uses data from the India Human Development Survey of 2005 (IHDS). The survey gathered responses from 41,554 rural and urban households across India. Each household completed two one-hour interviews covering a wide range of topics. The first interview focused on the socio-economic status of the household, and was typically completed by the head of the household. The second interview covered issues related to the health and education of household members, and was completed by an ever-married woman of the household. This interview was not conducted if there was no ever-married woman in the household. The respondent was typically the wife of the head of the household, but responses were also given by other married women in the household such as daughters, mothers, or in-laws. The unit of observation for this analysis is the husband of the respondent to this questionnaire. All individual characteristics, such as age, age at marriage, and education level, are in regard to the husband of the respondent. Household characteristics such as income and social contacts refer to the shared household of the respondent and her husband.
The full sample was restricted according to the respondent of the health and education interview. First, households with no married females were not included. Second, households in which the respondent was not in her first marriage were dropped, under the assumption that the problem of remarriage differs significantly from the problem of the initial marriage.

3.2 Model

3.2.1 Model Overview

I will estimate a multi-variate logistic model based on data from the India Human Development Survey of 2005 (IHDS). The model will consist of a dependent variable measuring caste network persistence and an independent variable indicating eligibility for caste based reservations. Other independent variables will control for network, household, and individual effects. The specification for this model relies on previous studies using IHDS data and other models of caste persistence. \[24, 26, 35\] Summary statistics for all variables are presented in table A.1.

3.2.2 Variable Descriptions

Caste Persistence

Outcaste $= 1$ if interviewed woman is part of a mixed-caste marriage, 0 otherwise

Caste networks are perpetuated through arranged marriages within a given caste. \[9\] Because the organizing principle is that of purity and impurity rather than a fixed hierarchical system, an out-of-caste marriage can be interpreted as an exit from the caste system, rather than a move within the system. Traditionally, a mixed-caste child was considered impure and banished from both the mother’s and the father’s
3.2 Model

caste network. The customs governing caste inclusion have become more relaxed in modern times, and mixed-caste children are no longer completely excluded from network benefits. In the case of reservations, a child is eligible if his father is eligible, regardless of his mother’s caste. As the data do not provide the original caste of the woman of a mixed-caste marriage, I cannot directly observe when progeny lose Other Backwards Class status as a direct result of exogamy. Instead this model will consider any mixed-caste marriage as a weakening of caste identification.

Thus far in describing caste customs, I have only described the punishments for exogamy, and have not given any justification for why an individual may choose to marry out of caste despite the resulting punishments. An appeal to status-seeking is problematic, as exogamy does not imply movement up a caste hierarchy (hypergamy). The private beliefs of each caste place it at the top of the true status-hierarchy, so exogamy can only lower one’s status. Instead I will assume that, absent the threat of network exclusion, some fraction of the population would choose to marry out of caste based on exogenous preferences. Given the strength of their preferences and the cost of network exclusion, individuals will either marry their first-best choice, accepting the cost of network exclusion, or choose an alternative match within their network. Eligibility for reservations will either increase or decrease the cost of exclusion, and causing fewer or more individuals to choose exogamy. The direction of the change in exogamy will imply that reservations either increase the cost of exclusion, strengthening caste boundaries, or decrease the cost of exclusion, weakening caste boundaries.

Justification for this assumption is provided by assortative matching models, which postulate a marriage market where utility from a given match is based on the characteristics of both the male and female of the match. Stable matches are identified through an iterative process of offers and responses on the part of utility
maximizing participants on both sides of the labor market. Eventually all participants will be matched if the market is balanced.\(^1\) My model looks at only one side of the marriage market, assuming participants have been matched in the absence of exclusion costs. Note that this matching process considers individual preferences on exogamy, excluding only the additional punishments imposed by caste networks. For some participants, their utility-maximizing, stable match is not within their network, and they will incur a cost if they choose that match. If this cost decreases, we should observe an increase in exogamy, as more individuals choose their first-best match.

**Independent Variable of Interest**

**Eligible** = 1 if household is eligible for reservations (ST/SC/OBC), 0 otherwise

The primary independent variable of interest is whether a household is eligible for reservations. This will be the case if the household’s caste is classified as a Scheduled Tribe, Scheduled Caste, or Other Backwards Class(ST/SC/OBC). I have no strong expectation about the sign of the coefficient on this variable. As described above, theoretical evidence attributes both negative and positive effects to this variable.

**Network Controls**

**Average Income** = \(\log(\text{average caste network income})\)

Caste networks provide informal credit and insurance mechanisms through loans exchanged between member households. The availability of these loans is tied to the financial resources of member households, so average network income will be used as one control for non-reservation network benefits. I expect the co-efficient to be negative, as a member of a wealthier network will be more likely to remain within that network.

\(^1\)A model of this type is presented by Banerjee, et. al. [2]
3.2 Model

**Average network contacts** = network average of number of sectors in which member households have contacts through the caste network.

Member households benefit from their connections to well-placed individuals. A second control for network strength is the number of network connections that a household has to individuals in government, educational, or medical positions. This variable is not based on the number of connections, but rather the number of sectors in which the households have one or more connections. Only connections through the caste network are considered. The measure of connectivity is estimated at the network level rather than at the household level in order to better capture the benefits available to households through network membership. I assume that households in a given network have access to all the connections of that network.

As with the coefficient on average income, I expect the coefficient on average network contacts to be negative. Households in well-connected networks are more likely to remain within their network. A negative co-efficient could also reflect that a well-connected household will have more opportunity to find a suitable spouse within that network.

**Household Controls**

**Relative household income** = \( \frac{\log(\text{household inc.})}{\log(\text{average network inc.})} \)

Intracaste loans are generally made at lower-than-market interest rates. In effect, net loaners subsidize net borrowers through these loans. In a given network, those at the top of the income distribution have a greater incentive to exit than those at the lower end of the income distribution. An individual household’s benefit from its caste network is then a function of its income relative to the average income of its caste network. [26] I expect the coefficient to be positive, as a household at the top of the income distribution of its network has less incentive to remain within the network.
3.2 Model

Individual Controls

**Age at marriage** = husband’s age at time of marriage

I expect the coefficient to be positive. An individual who marries at a younger age is more likely to have a traditional, parentally arranged marriage. An individual who marries at an older age will have more control over the marriage decision, and will have greater ability to choose a spouse from outside his or her caste.

**Year of marriage** = year of marriage

I expect this coefficient to be positive. Traditional values surrounding marriage are very resilient in India, but they have relaxed with time to some degree. A marriage that occurred in the 1990s is more likely to be mixed-caste than a marriage that occurred in the 1960s.

**Education** = years of education completed by husband

I expect the coefficient to be positive. An individual with more education will have a higher degree of autonomy within the household, and thus will have more discretion in the choice of a spouse. An individual with more education will also have more opportunities outside the caste network, so losing the benefits of the network will be less costly.

Regional Controls

**Urban**

The binary variable urban indicates the urban/rural designation of the household. Urban/rural boundaries are those used in the census of 2001. I expect the coefficient to be positive. Caste networks are generally more influential in rural areas. Individuals
in urban areas have greater access to modern credit and insurance institutions that typically replace traditional networks. Urban residents also have greater opportunity outside of their caste network through the modern labor market.

**State Indicators**

The influence of traditional caste networks varies tremendously between the states of India. “Differences across states are a recurring theme in IHDS results often overwhelming differences by class and social group.” [8] This analysis uses the regional classification system developed by IDHS researchers. This classification corresponds roughly to the states and union territories of India, with some modifications as described below:

Some of the union territories and states have samples too small to reliably report separate results. Therefore, these smaller samples should be combined with neighbouring areas for reporting purposes (e.g. Goa with Maharashtra). All the smaller North-eastern states (Arunachal Pradesh, Manipur, Meghalaya, Tripura, etc.) are typically reported as a single entity. These states share some common features but are quite heterogeneous on many other dimensions. The other smaller states and territories were combined with larger neighbours: Chandigarh with Punjab; Daman and Diu and Dadra and Nagar Haveli with Gujarat; Goa with Maharashtra; and, Pondicherry with Tamil Nadu. The Delhi sample is large enough to report separately for most purposes, but the rural sample in Delhi is based on only 7 semi-urban villages so Delhi. This organization leaves 22 states that are compared in many analyses based on the IHDS data. [8]
3.2 Model

3.2.3 Network Identification

Network controls were computed by grouping households into caste networks and computing the group means for specified variables. When computing network averages, the full sample from IHDS was used, including households with no ever-married females and respondents who were married more than once. Identification was carried out using jati name as recorded by the interviewer and several categorical variables.

In the original data set, individual jati names are captured as string variables. There is a great deal of variation in sub-caste names, hinting at either data entry errors or lack of standardized spelling for some caste names. For example, there are 14 unique spellings of Brahmin, possibly the most widely known caste name. Identification at the sub-caste level is necessary for the computation of average network income, but exact identification based only on jati name is not necessary. The data contain several precise categorical variables which are used to limit misidentification.

Network identification was first bounded by state, as caste networks are more influential in close geographical proximity. [14] Limiting network boundaries by state not only limits the error from misidentification, but also increases the relevance of the calculated control. Within each state, networks were bounded according to categorical caste and religion identifiers. Respondents were asked to identify both their religion and their caste category. The categories for religion are Hindu, Muslim, Christian, Sikh, Buddhist, Jain, Tribal, Other, and None. Categories for caste are Brahmin, Other (high castes), OBC, SC, and ST. Network members were identified by jati name only within these categories, limiting the potential for misidentifications.

Even with categorical restrictions in place, it is likely that some network identification error exists. In order to estimate the impact of misidentification errors, two schemes for jati-name identification were used. Descriptive statistics and regression estimates are presented under both assumptions.
Passive Identification (P)

The first method uses the jati names as given by the survey with minimal cleaning. No attempt was made to match jati names that may have been misspelled or abbreviated. Using this method, it is likely that network controls did not capture the entire sample from each population. In other words, for a given network population, more than one estimate was calculated and applied to different subgroups of that population. The estimates are less precise than they could be, but should still approximate the population mean. Estimates calculated using this identification scheme are identified as Passive or (P).

Active Identification (A)

The second method uses a more aggressive approach to identify caste networks. Under the active identification scheme, all jati names are truncated after the first three letters, reducing the impact of misspellings and abbreviations. Estimates are potentially more precise due to the higher sample sizes, but the possibility exists that observations from different network populations are included in the same sample. Estimates calculated using this identification scheme are identified as Active or (A).

Table 3.1 Network Size Summary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Size (P)</td>
<td>65.1</td>
<td>137.6</td>
<td>1</td>
<td>846</td>
<td>29455</td>
</tr>
<tr>
<td>Network Size (A)</td>
<td>87.8</td>
<td>152.7</td>
<td>1</td>
<td>875</td>
<td>29455</td>
</tr>
</tbody>
</table>

²Non-alphanumeric characters were eliminated.
3.3 Results

3.3.1 Full Sample

Simple Regression

Estimates for the first specification are presented in column (1) of table A.3. The first specification estimates the effect of reservation eligibility without controlling for any other factors. This result, while analytically weak, reveals a possible cause for the belief that reservations increase caste identification. The reported odds-ratio indicates that, in the absence of individual, household, network, and geographic controls, individuals who are eligible for reservations are 0.59 times as likely to marry out of their own caste compared to individuals who are not eligible.

Household Controls

The second specification examines the impact of network control variables by presenting regression results using only household controls and results with household and network controls. Household estimates are presented in column (2) of table A.3. A notable impact of this change is that the coefficient on reservation eligibility becomes insignificant. The coefficient on household contacts is similar to the coefficient on average network contacts, suggesting that the difference is primarily due to network income controls. The specifications with network controls suggests that a change in relative income is much more significant in a household’s marriage decision than a change in absolute income.

Full Specification

The odd-ratios of the primary specification are reported in columns (3) and (4) of table A.3. The coefficients on average and relative income are both positive and
highly significant. The coefficient on relative income has the expected positive sign, indicating that the wealthier members of a given network are more likely to marry out of the network. I expected average network income to have a negative coefficient, but it is actually positive. One explanation is that, due to small network sample sizes for many groups, network averages are not fully isolating network effects from household effects. If household income has too large an impact on the calculated network average, the coefficient for average network income could be biased by household effects. A second explanation is that punishments for exogamy are not strictly enforced in modern India. If an mixed-caste couple retains some access to network resources, higher network income could enable an exogamous marriage for those with such preferences.

The estimated coefficient on the eligibility for reservations is positive and significant at the 10% level under active network identification. The reported odds-ratio indicates that the probability of exogamy is 1.113 times as likely for individuals who are eligible reservations. Using passive network identification, the coefficient is positive, of smaller magnitude, and less significant. These coefficients suggest that reservations are not promoting endogamy, and may be enabling a higher degree of exogamy. While these results do not definitively demonstrate causality (as explored below), there is at least one definitive result; the true relationship between marriage and reservations is much more complex than the simplistic comparison made in the first specification.

3.3.2 Restricted Sample: OBC and High Caste

Unobserved Network Effects

In order to attribute a direct causal effect to observed relationship between reservations and marriage, it must be the case that there are no unobserved variables
that affect both a group’s eligibility for reservations and the marriage decisions of
group members. Given the current model, this would be difficult, if not impossible,
to prove conclusively. An individual’s caste membership is exogenous at birth, but
many potential sources of bias remain. I cannot rule out the possibility that OBCs are
systematically different from non-OBCs, independent of income and network connec-
tions. It could be the case that OBCs are more conservative and enforce punishments
for exogamy more strictly, which would imply the magnitude of the estimated coeffi-
cient is underestimated. The bias could be in the opposite direction if OBCs have a
higher incidence of gender-specific abortion, creating larger gender imbalances. Some
percentage of males in these groups would necessarily have to marry exogamously or
not at all. This would imply that the coefficient on reservation eligibility is biased
upwards, and the true coefficient is smaller in magnitude or negative.

I cannot rule out biases related to unobservable network characteristics, but there
is suggestive evidence regarding the direction of the bias. By estimating coefficients
over only those groups that are most similar in terms of unobservable network char-
acteristics, the potential sources of bias can be reduced, and the resulting change in
coefficients will give an estimate of the direction of the bias. I claim that the closest
groups of networks are OBCs and high castes, based on the traditional structure of
Hindu caste system. Historically, the Hindu caste system has five major groups: the
four official varnas described in religious texts, and those outside the system, com-
monly referred to as untouchables or Dalit. After eliminating the groups said to be
most pure and most polluted, Brahmin and scheduled groups (Dalit/Adivasi), the
middle three varna remain, classified as OBC and high caste. Summary statistics for
all variables over the restricted sample are presented in table A.2.
Table 3.2 Network Size Summary: OBC and High Castes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Size (P)</td>
<td>75.5</td>
<td>163.4</td>
<td>1</td>
<td>846</td>
<td>19502</td>
</tr>
<tr>
<td>Network Size (A)</td>
<td>99.6</td>
<td>179.4</td>
<td>1</td>
<td>875</td>
<td>19502</td>
</tr>
</tbody>
</table>

Results

Results from the model estimation over OBC and high caste groups only are presented in table A.4. The coefficient on reservation eligibility shows a significant increase, indicating that relative to other high castes, OBCs are 1.213 times as likely to marry out of caste as high castes, all other things equal. This is an increase from the previous coefficient estimate of 1.113 when comparing all eligible groups against high and Brahmin castes. This result suggests that the bias due to unobserved network characteristics is negative, supporting the hypothesis that reservations enable exogamy.

Sample Selection Bias

I claim that this sample restriction has reduced one type of bias, but it may have intensified bias due to sample selection. While individual caste membership is exogenous, a caste’s eligibility for reservations is not. New groups can and do lobby for backwards classification, gaining eligibility for reservations. This raises the possibility for self-selection bias, as groups with certain unobservable characteristics elect to pursue OBC classification. The bias may greater in the reduced sample, because there is no clear distinction between high castes and OBCs. In the state of Uttar Pradesh, for example, all non-Brahmin castes are eligible for some type of reservation, indicating no distinction between high castes and OBCs. [3] A subset of classes were originally identified as OBC by the Mandal commission, arguably independent of any self-selection by caste networks. Since that time, however, new classes have been
steadily added to the list. OBC classification is often the result of an intensive lobbying effort, of which only certain groups are capable. This lack of clear demarcation does not apply to scheduled groups or Brahmin, where the characteristics necessary for membership, while perhaps not explicitly defined, are broadly understood and accepted.

While this sample selection bias almost certainly exists, the probable sign of the bias suggests that direction of the coefficient on reservation eligibility is correct, and the magnitude of the estimate is underestimated. This claim follows from the well-supported assumption that stronger networks are less-likely to exhibit exogamy. If a network is able to mount a successful lobbying effort to obtain OBC classification, it is likely that the network exhibits a high degree of cohesion, and thus a low level of exogamy. Self-selection implies that highly cohesive networks will be overrepresented within the group of all eligible networks, causing a bias towards endogamy among eligible networks, and a negative bias on the coefficient on reservation eligibility.
Chapter 4

Conclusion

Reservation policy is an extremely contentious issue in India. The argument that reservations perpetuate caste affiliation is one of many made against reservations. Proponents of reservations either do not recognize caste affiliation as inherently negative or argue that the benefits of reservations outweigh the drawbacks. The analytical results presented in this thesis support the latter argument, that caste based reservations help members of historically depressed castes to advance socially and transcend their historic positions in society, with some caveats.

The first caveat concerns the effects of unobserved caste network characteristics. According to the observable evidence, individuals eligible for reservations are more likely to marry out of their caste than individuals who are not eligible for reservations, all other things equal. The direction of the effect is well-supported, given reasonable assumptions about the nature of unobserved characteristics of caste networks.

The second caveat is related to the assumption of exogenous preferences such that some proportion of individuals will prefer to marry out of their own caste. While this assumption is borne out by current research, it may not hold as the composition of caste networks evolve. If individuals who are more ambitious, less caste conscious,
and of higher ability (high-types) consistently renounce their caste affiliation, average caste characteristics will become more caste conscious, less ambitious, and of lower ability (low-types). In the absence of reservations, networks subject to these pressures would dissolve as the benefits of network membership decline. With reservations, however, it is conceivable that a new, stable caste equilibrium could emerge, in which primarily low-type caste networks persist indefinitely.

The existence of an equilibrium of this type would imply that the effect of reservations on exogamy, while currently positive, would gradually decrease and become negative. Thus while this analysis suggests that reservations are currently helping individuals transcend their hereditary station, it does not imply that reservations will always have this effect. Arguments against reservation policy based on the perceived retrenchment of caste networks may not be valid given the current composition of caste networks, but they have the potential to gain relevance with time.

While it is always useful to learn more about the effects of a given policy, this analysis and others like it will have little impact unless the actual goal of reservation policy is clarified. Is the intent of reservations to equalize the opportunities between castes, or to leave caste behind completely? If the reservations are intended to equalize opportunity between castes, then they should be expanded to include all caste groups according to their share of the total population. If the goal instead is the eventual elimination of caste boundaries, then the reservation system may have to be phased out or transitioned to a non-caste system of benefit allocation. Without this change, it is likely that the caste system will maintain its highly influential role in Indian society.
Appendix A

Tables
Table A.1 Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marriage</td>
<td>0.1</td>
<td>0.2</td>
<td>0</td>
<td>1</td>
<td>29455</td>
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<tr>
<td>Eligible</td>
<td>0.7</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
<td>29455</td>
</tr>
<tr>
<td>Income</td>
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<td>1</td>
<td>2.8</td>
<td>15.7</td>
<td>29092</td>
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<tr>
<td>Rel. Income (P)</td>
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<tr>
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<td>29408</td>
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</tr>
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<td>2.8</td>
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<td>29434</td>
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<tr>
<td>Contacts</td>
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<td>0</td>
<td>3</td>
<td>29455</td>
</tr>
<tr>
<td>Ave. Contacts (P)</td>
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<td>0</td>
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<td>29455</td>
</tr>
<tr>
<td>Ave. Contacts (A)</td>
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<td>0.5</td>
<td>0</td>
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<td>29455</td>
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<td>Education</td>
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<td>29455</td>
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<tr>
<td>Marriage age</td>
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<td>1</td>
<td>84</td>
<td>29422</td>
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<td>Marriage year</td>
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<td>1958</td>
<td>2005</td>
<td>29375</td>
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<td>0.4</td>
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<td>0</td>
<td>1</td>
<td>29455</td>
</tr>
</tbody>
</table>
Table A.2 Summary Statistics: OBC and High Castes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marriage</td>
<td>0.1</td>
<td>0.2</td>
<td>0</td>
<td>1</td>
<td>19502</td>
</tr>
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<td>Eligible</td>
<td>0.6</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
<td>19502</td>
</tr>
<tr>
<td>Income</td>
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<td>3.6</td>
<td>15.7</td>
<td>19225</td>
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<td>Rel. Income (P)</td>
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<td>15.7</td>
<td>19465</td>
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<td>0.1</td>
<td>0.3</td>
<td>2</td>
<td>19487</td>
</tr>
<tr>
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<td>0.5</td>
<td>5</td>
<td>15.7</td>
<td>19487</td>
</tr>
<tr>
<td>Contacts</td>
<td>0.6</td>
<td>0.9</td>
<td>0</td>
<td>3</td>
<td>19502</td>
</tr>
<tr>
<td>Ave. Contacts (P)</td>
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<td>0.5</td>
<td>0</td>
<td>3</td>
<td>19502</td>
</tr>
<tr>
<td>Ave. Contacts (A)</td>
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<td>0</td>
<td>3</td>
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</tr>
<tr>
<td>Education</td>
<td>7.2</td>
<td>4.8</td>
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<td>15</td>
<td>19502</td>
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<tr>
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<td>84</td>
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<td>0</td>
<td>1</td>
<td>19502</td>
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Table A.3 Results for All Groups

<table>
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<tr>
<th>VARIABLES</th>
<th>(1) simple outcaste</th>
<th>(2) household outcaste</th>
<th>(3) passive outcaste</th>
<th>(4) active outcaste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible</td>
<td>0.587*** (0)</td>
<td>1.052 (0.417)</td>
<td>1.100 (0.133)</td>
<td>1.113* (0.0962)</td>
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<tr>
<td>Income</td>
<td>1.165*** (2.06e-05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rel. Income</td>
<td></td>
<td>2.363** (0.040)</td>
<td>2.585** (0.0187)</td>
<td></td>
</tr>
<tr>
<td>Ave. Income</td>
<td></td>
<td>1.339*** (5.65e-07)</td>
<td>1.389*** (2.85e-07)</td>
<td></td>
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<tr>
<td>Contacts</td>
<td>0.924** (0.0273)</td>
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<td></td>
</tr>
<tr>
<td>Ave. Contacts</td>
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<td>0.878** (0.0285)</td>
<td>0.871** (0.0400)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.984** (0.0181)</td>
<td>0.981*** (0.00485)</td>
<td>0.980*** (0.00436)</td>
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<td>Marriage age</td>
<td>1.011* (0.0885)</td>
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<td>1.010 (0.132)</td>
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</tr>
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<td>Marriage year</td>
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<td>1.007** (0.0317)</td>
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<td>Observations</td>
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<td>29330</td>
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Robust in parentheses

*** p<0.01, ** p<0.05, * p<0.1

State indicator variables for (2)-(4) ommitted
Table A.4 Results for OBC and High Castes

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) Odds-Ratios Reported</th>
<th>(2) Odds-Ratios Reported</th>
<th>(3) Odds-Ratios Reported</th>
<th>(4) Odds-Ratios Reported</th>
</tr>
</thead>
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<tr>
<td></td>
<td>simple outcaste</td>
<td>household outcaste</td>
<td>passive outcaste</td>
<td>active outcaste</td>
</tr>
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<td>1.213**</td>
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<td>(0.0990)</td>
<td>(0.0309)</td>
<td>(0.0210)</td>
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<td>Income</td>
<td>1.096**</td>
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<tr>
<td></td>
<td>(0.0402)</td>
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<td>(0.485)</td>
<td>(0.332)</td>
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<td>(0.00231)</td>
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<td></td>
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<td>(0.680)</td>
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<tr>
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<td>(0.326)</td>
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<td>1.005</td>
<td>1.005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.189)</td>
<td>(0.217)</td>
<td>(0.221)</td>
<td></td>
</tr>
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<td>1.177**</td>
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</tr>
<tr>
<td></td>
<td>(0.0169)</td>
<td>(0.0372)</td>
<td>(0.0326)</td>
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</tr>
</tbody>
</table>

Observations: 19502 19181 19421 19442

Robust in parentheses

*** p<0.01, ** p<0.05, * p<0.1

State indicator variables for (2)-(4) ommitted
Bibliography


[34] M.N. Srinivas. There is a Vested Interest in Backwardness, 1961.