LAND REFORM, POVERTY REDUCTION, AND GROWTH: EVIDENCE FROM INDIA*

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In recent times there has been a renewed interest in relationships between redistribution, growth, and welfare. Land reforms in developing countries are often aimed at improving the poor's access to land, although their effectiveness has often been hindered by political constraints on implementation. In this paper we use panel data on the sixteen main Indian states from 1958 to 1992 to consider whether the large volume of legislated land reforms have had an appreciable impact on growth and poverty. We argue that such land reforms have been associated with poverty reduction.

I. INTRODUCTION

Finding effective means to relieve poverty is a defining mission for development economics. To this end, a wide range of policy alternatives has been implemented. However, the benefits of many such efforts have been questioned. Some argue that political constraints on implementation deny the poor the benefits of redistributive efforts. Others suggest that benefits to the poor are undermined by disincentives to generate income. Worse still, these disincentives can afflict the nonpoor who try to qualify for assistance. This in turn leads policy analysts to question the wisdom of implementing redistributive policies at all, focusing instead on policies that promote economic growth. Combatting such pessimism requires empirical evidence that some redistributive policies have achieved their stated goals.

This paper studies land reform as a redistributive policy. Throughout the postcolonial period, improvement in the asset base of the poor has been viewed as a central strategy to relieve endemic poverty [Chenery et al. 1970]. In a poor agrarian economy, typical of those in many less developed countries, this implies improving the terms on which the poor have access to land. Significant political changes, such as decolonization, have sometimes afforded the opportunity to undertake far-reaching land reforms that transfer property rights to the poor. However,

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such instances are rare, and more incremental measures are common. This is the case in India where land reforms have been on the policy agenda since independence. These reforms have involved only limited efforts at land redistribution, mostly through legislated ceilings on landholding. Legislation aimed at regulating tenancies, for example by improving tenurial security, and reducing the power of absentee landlords and intermediaries are more common. While the latter need not change the distribution of landholdings, they may improve tenants' claims to the returns from their land. This may also benefit the landless by raising agricultural wages.

India is an important case study of land reform. It is both home to a significant fraction of the poor in the developing world and in the postindependence period was subjected to the largest body of land reform legislation ever to have been passed in so short a period in any country [Thorner 1976]. The efficacy of this legislation has, however, been much debated. The conventional wisdom following the influential commentary of Bardhan [1970] is that, while land reform legislation abounds, the real impact on the conditions of the poor is muted by unenthusiastic implementation of proposed changes. However, broad-based quantitative testing of this notion does not appear to have been attempted previously. This paper takes advantage of the state level panel data available for the sixteen main Indian states from 1958 to 1992 to assess this. The state is the natural unit of analysis for land reform given that state governments have jurisdiction over land reform legislation. The relatively long time period covered by the data also allows respectable efforts to deal with some econometric concerns. Our principal finding is that land reforms do appear to have led to reductions in poverty in India. This finding is robust to a number of methods of estimation, and the inclusion/exclusion of many different controls.

We also use our data to investigate the relationship between land reform and growth. This relates to more general debates about how inequality and growth interact. Alesina and Rodrik [1994] and Persson and Tabellini [1995] have argued that *initial* inequality is bad for economic growth. The link is through the political system—greater inequality encourages redistributive activities that blunt accumulation incentives. However, Hoff and Lyon [1995], Banerjee and Newman [1993], and Bénabou [1996], among others, have emphasized that when markets are incomplete, then redistribution can alter the terms of agency problems

in credit markets and foster accumulation decisions, thus undermining the standard equity efficiency trade-off. If accumulation is enhanced by redistribution along the growth path, then we would expect to find a positive relationship between redistributive efforts and economic growth. The existing literature has focused predominantly on fiscal redistributions. By affecting access to land, land reform may have a more lasting effect on poverty. This view is consistent with the literature that points to early redistributions of land leading to relatively egalitarian access as being an important precondition for high growth in East Asia (see, for example, Rodrik [1995]).

Most existing empirical evidence on the links between redistribution and growth comes from cross-country data (see Perotti [1996] for a careful review). While informative, there are insurmountable problems of comparability of data across countries and dealing with concerns about endogeneity. The fact that our data come from one country with similar data collection strategies in each state, and the relatively long time period, allow us to make progress on this.

Empirical studies of the impact of land reform are rare since reliable estimation requires data from the pre- and postreform periods. In India there are numerous case studies of land reform (reviewed below), but few attempts to look at the overall picture. Discussion of the theoretical impact of land reform has been dominated by the frequently found inverse farm size-productivity relationship, whence small farmers are supposed to achieve higher yields (see Binswanger et al. [1995]). This suggests that finding means of evening the distribution of landholding should lead to productivity gains in addition to redistributive benefits. However, land reforms in India are rarely of a form that could directly exploit this possibility. Moreover, careful analyses, such as Banerjee and Ghatak [1997] show that the theoretical effects on productivity are inherently ambiguous when assessing the impact of tenancy reforms that allow tenants greater security.

Our main finding is that there is a robust link between land reform and poverty reduction. Closer scrutiny reveals that, in an Indian context, this is due primarily to land reforms that change the terms of land contracts rather than actually redistributing land. Consistent with the antipoverty impact, we find that land reform has raised agricultural wages. The impact of land reform on growth also depends upon the type of land reform. Overall, there is some evidence that the gain in poverty reduction did come

at the expense of lower income per capita. We show that all of these results are consistent with a simple model of agricultural contracting.

The remainder of the paper is organized as follows. The next section discusses background and data issues. Section III examines the impact that land reforms have had on poverty and deals with potential problems in interpreting the basic results. Section IV addresses the issue as to whether land reforms can have general equilibrium effects by examining their impact on agricultural wages. Section V then turns to the issue of how land reforms have affected economic growth. In Section VI we examine the extent to which land reforms have been redistributive in terms of their effect on the distribution of land and income. In Section VII we develop a theoretical framework that allows us to interpret our results in the light of the literature on agricultural contracting. Section VIII concludes. A Data Appendix details the construction and sources of the key variables used in the analysis.

II. Background and Data

Under the 1949 Indian Constitution, states were granted the powers to enact (and implement) land reforms. This autonomy ensures that there has been significant variation across states and time in terms of the number and types of land reforms that have been enacted (see Table I). We classify land reform acts into four main categories according to their main purpose (see Mearns [1998]). The first category is acts related to tenancy reform. These include attempts to regulate tenancy contracts both via registration and stipulation of contractual terms, such as shares in share tenancy contracts, as well as attempts to abolish tenancy and transfer ownership to tenants. The second category of land reform acts are attempts to abolish intermediaries. These intermediaries who worked under feudal lords (Zamandari) to collect rent for the British were reputed to allow a larger share of the surplus from the land to be extracted from tenants. Most states had passed legislation to abolish intermediaries prior to 1958. However, five (Gujarat, Kerala, Orissa, Rajasthan, and Uttar Pradesh) did so during our data period. The third category of land reform acts concerned efforts to implement ceilings on landholdings, with a view to redistributing surplus land to the landless. Finally, we have acts that attempted to allow consolidation of disparate landholdings. Although these reforms, in particular the latter,

TABLE I

SUMMARY OF MAIN VARIABLES

State	Rural poverty gap	Rural head count	Agricultural wages	State income per capita	Agricultural yield	Cumulative total land reform legislation	Cumulative tenancy reform legislation	Cumulative abolition intermediaries legislation	Cumulative land ceilings legislation	Cumulative land consolidation legislation
Andra Pradesh	14.87	50.59	4.53	1004	33.40	1.528	0.528	1.000	0	0
	(5.11)	(11.61)	(1.10)	(260)	(33.11)	(0.506)	(0.506)	(0)	(0)	(0)
Assam	10.69	48.91	5.35	903	50.54	2.000	0.611	0	0.472	0.916
	(2.67)	(9.16)	(1.04)	(196)	(37.59)	(1.069)	(0.494)	(0)	(0.506)	(0.280)
Bihar	20.88	64.65	4.07	633	42.64	4.305	2.639	0	1.667	0
	(4.67)	(6.40)	(1.01)	(110)	(39.95)	(1.924)	(0.930)	(0)	(1.042)	(0)
Gujarat	15.81	53.49	4.39	1176	25.21	3.056	1.472	0.667	0.917	0
	(4.94)	(9.99)	(0.78)	(272)	(23.84)	(1.264)	(0.654)	(0.478)	(0.280)	(0)
Haryana	7.11	30.00	—	1444	23.22	0	0	0	0	0
	(2.15)	(6.90)		(357)	(20.46)	(0)	(0)	(0)	(0)	(0)
Jammu and	7.20	34.55	—	1021	51.53	1.333	0.472	0	0	0.861
Kashmir	(2.59)	(8.13)		(228)	(43.28)	(0.717)	(0.506)	(0)	(0)	(0.351)
Karnataka	16.99	54.46	3.85	1037	25.26	2.833	1.417	0	1.417	0
	(3.86)	(8.08)	(0.66)	(216)	(24.26)	(1.384)	(0.692)	(0)	(0.692)	(0)
Kerala	19.70	56.92	6.24	864	65.75	5.444	2.417	1.972	1.056	0
	(7.98)	(14.53)	(1.56)	(182)	(60.26)	(3.376)	(1.556)	(1.000)	(0.860)	(0)
Madhya	18.03	57.26	3.81	843	17.01	2.806	0.944	0	0.917	0.944
Pradesh	(4.11)	(7.45)	(0.83)	(190)	(16.07)	(0.710)	(0.232)	(0)	(0.280)	(0.232)
Maharashtra	19.71	63.82	3.55	1288	20.84	1.861	0.972	0	0.889	0
	(4.38)	(9.64)	(0.71)	(331)	(20.57)	(0.424)	(1.667)	(0)	(0.319)	(0)
Orissa	17.42	56.63	4.07	873	25.06	5.056	1.944	0.583	1.944	0.583
	(4.62)	(9.53)	(0.85)	(186)	(20.23)	(3.116)	(1.093)	(0.500)	(1.093)	(0.500)
Punjab	6.14	26.22	8.16	1732	34.55	0.583	0.583	0	0	0
	(2.88)	(8.23)	(1.09)	(384)	(29.70)	(0.500)	(0.500)	(0)	(0)	(0)
Rajasthan	16.96	53.41	5.12	785	16.27	0.944	0	0.944	0	0
	(3.81)	(7.48)	(0.68)	(136)	(15.75)	(0.232)	(0)	(0.232)	(0)	(0)
Tamil Nadu	18.58	58.04	3.92	1015	36.59	4.917	4.028	0	0.889	0
	(4.40)	(8.56)	(0.52)	(272)	(32.66)	(2.545)	(2.336)	(0)	(0.319)	(0)
Uttar Pradesh	12.84	46.70	4.71	874	4.64	3.750	1.417	1.417	0.917	0
	(3.14)	(7.68)	(1.38)	(140)	(38.23)	(1.251)	(0.554)	(0.554)	(0.280)	(0)
West Bengal	14.92	51.48	6.12	1173	60.59	6.139	3.833	0	0.611	1.694
	(5.32)	(12.42)	(1.81)	(191)	(57.20)	(5.581)	(3.476)	(0)	(0.993)	(1.369)
TOTAL	15.01	50.79	4.799	1030	35.49	2.910	1.455	0.411	0.731	0.312
	(6.28)	(14.08)	(1.584)	(346)	(37.36)	(2.749)	(1.707)	(0.692)	(0.825)	(0.635)

Standard deviations are in parentheses. — denotes a missing variable. See the Data Appendix for details on construction and sources of variables. The data are for the sixteen main states. Haryana split from the state of Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. The exception is rural wages where there is no separate series for Haryana or for Jammu and Kashmir. State income per capita is obtained by expressing estimates of state domestic product in real per capita terms. Agricultural yield measures represent the ratio of real agricultural state domestic product to net sown area measured in thousands of hectares. The wage data refer to the daily wage rate for male agricultural laborers and is expressed in real terms.

were justified partly in terms of achieving efficiency gains in agriculture, it is clear from the acts themselves and from the political manifestos supporting the acts that the main impetus driving the first three reforms was poverty reduction. It is therefore interesting to assess whether these reforms were effective in achieving their stated aims.

Existing assessments of the effectiveness of these different reforms are highly mixed. Although promoted by the center in various Five Year Plans, the fact that land reforms were a state subject under the 1949 Constitution meant that enactment and implementation was dependent on the political will of state governments [Bandyopadhyay 1986; Radhakrishnan 1990; Appu 1996; Behuria 1997; Mearns 1998]. The perceived oppressive character of the Zamandari (and their intermediaries) and their close alliance with the British galvanized broad political support for the abolition of intermediaries and led to widespread implementation of these reforms most of which were complete by the early 1960s [Appu 1996; Mearns 1998].[1] Centre-state alignment on the issue of tenancy reforms was much less pronounced.[2] With many state legislatures controlled by the landlord class, reforms that harmed this class tended to be blocked, although where tenants had substantial political representation, notable successes in implementation were recorded. Despite the considerable publicity attached to their enactment, political failure to implement was most complete in the case of land ceiling legislation. Here ambivalence in the formulation of policy and numerous loopholes allowed the bulk of landowners to avoid expropriation by distributing surplus land to relations, friends and dependents [Appu 1996; Mearns 1998]. As a result of these problems, implementation of both tenancy reform and land ceiling legislation tended to lag well behind the targets set in the Five Year Plans [Bandyopadhyay 1986; Radhakrishnan 1990].[3] Land consolidation legislation was enacted less than the other reforms and, owing partly

1. There were nonetheless some major design flaws, most notably the failure to limit the size of home farms of Zamindars or to protect short-term tenants.

2. Warriner [1969] commented that the Congress party (the main political force for most of our period) "provided both the motivation for land reform and the opposition to it, as a socialist head with a conservative body."

3. The Fifth Plan gives a frank assessment of the situation which is directly in line with that of Bardhan [1970]: "A broad assessment of the programme of land reform adopted since Independence is that the laws for the abolition of intermediary tenures have been implemented fairly efficiently whilst in the fields of tenancy reforms and ceilings on holdings, legislation has fallen short of the desired objectives, and implementation of the enacted laws has been inadequate" [Fifth Five Year Plan, 1974–79, 2: 43].

to the sparseness of land records, implementation has been considered to be both sporadic and patchy only affecting a few states in any significant way [Radhakrishnan 1990; Appu 1996; Behuria 1997; Mearns 1998].

Village level studies also offer a very mixed assessment of the poverty impact of different land reforms (see Jayaraman and Lanjouw [1997]). Similar reforms seemed to have produced different effects in different areas leaving overall impact indeterminate. There is some consensus that the abolition of intermediaries achieved a limited and variable success both in redistributing land toward the poor and increasing the security of smallholders (see, e.g., Wadley and Derr [1990]). For tenancy reform, however, whereas successes have been recorded, in particular, where tenants are well organized, there has also been a range of documented cases of imminent legislation prompting landlords to engage in mass evictions of tenants and of the de jure banning of landlord-tenant relationships pushing tenancy underground and therefore, paradoxically, reducing tenurial security (see, e.g., Gough [1989]). Land ceiling legislation, in a variety of village studies, is also perceived to have had neutral or negative effects on poverty by inducing landowners from joint families to evict their tenants and to separate their holdings into smaller proprietary units among family members as a means of avoiding expropriation (see, e.g., Chattopadhyay [1994]). Land consolidation is also on the whole judged not to have been progressive in its redistributive impact given that richer farmers tend to use their power to obtain improved holdings (see, e.g., Drèze, Lanjouw, and Sharma [1998]).

Table II gives a complete picture of land reform legislation, and its classification, during our data period. Our empirical analysis aggregates reforms within each category. If land reforms have any effect, then we doubt that this would be instantaneous. Thus, we cumulate land reforms over time, generating a variable that aggregates the number of legislative reforms to date in any particular state. While crude, we believe that it provides a sensible first pass at analyzing the quantitative effects of land reform. The mean of that variable aggregated across the four categories of land reform is given in column 6 of Table I. Similar means for the different categories of reform are given in columns 7–10. The table demonstrates considerable variation in overall land reform activity across states with states such as Uttar

TABLE II

IMPORTANT EVENTS IN LAND REFORMS IN INDIAN STATES SINCE 1950

State	Year	Title	Description	Class
Andhra Pradesh	1950 (amended 1954)	(Telengana Area) Tenancy and Agricultural Lands Act	Tenants received protected tenancy status; tenants to have minimum term of lease; right of purchase of nonresumable lands; transfer of ownership to protected tenants in respect of nonresumable lands; as a result 13,611 protected tenants declared owners.	1
	1952	Hyderabad Abolition of Cash Grants Act	Abolition of all the 975 jagirs in Telengana.	2
	1954	Inam Abolition Act (absorbed) enclaves	Abolition of inams (with few exceptions).	2
	1955	(Hyderabad Jagirdars) Act	Abolition of all the 975 jagirs in Talengana.	2
	1956	Inam (Abolition and Conversion into Ryotwari) Act	Acquisition of 11,137 estates; abolition of 1.06 million minor inams.	2
	1956 (amended 1974)	Tenancy Act	Tenancy continues up to 2/3 of ceiling area; law does not provide for conferment of ownership right on tenants except through right to purchase; confers continuous right of resumption on landowners.	1
	1957	Inam Abolition Act	Abolition of inams (with few exceptions), struck down by the High Court in 1970.	2
Assam	1951	State Acquisition of Zamindari Act	Abolition of intermediary rights involving 0.67 million hectares.	2
	1954	Lushai Hills District (Acquisition of Chiefs Rights) Act	Same as above.	2
	1956 (amended 1976)	Fixation of Ceiling on Land Holdings Act	Self-explanatory.	3
	1960	Consolidation of Holdings Act	Introduction of compulsory consolidation.	4
	1971	Tenancy Act	Classifies tenants into occupancy and nonoccupancy tenants; former has security of tenure, may acquire landlord's right of holding by paying 50 times the land revenue; subletting is disallowed.	1

Bihar	1950	Land Reforms Act	Abolition of zamindari; implementation of this act very slow.	2
	1957	Homestead Tenancy Act	Confers rights of permanent tenancy in homestead lands on persons holding less than one acre of land.	1
	1961 (amended 1973)	Land Reforms Act	Prohibits subletting, preventing sublessee from acquiring right of occupancy.	1
	1961	Land Ceiling Act	Imposition of ceiling on landholdings of 9.71–29.14 hectares (1960–1972) and of 6.07–18.21 hectare (after 1972).	3
	1973 (amended 1982)	Act 12 (amendment to Land Reforms Act)	Introduced provisions relating to the voluntary surrender of surplus land.	3
	1976	Act 55	Provided for the substitution of legal heir; ceiling area shall be redetermined when classification of land changes; ordered that the landholder necessarily retain land transferred in contravention of the Act.	3
	1986	Tenancy (Amendment) Act	Provides definition of personal cultivation; provides for acquisition of occupancy rights by underraiyats.	1
Gujarat	1948 (amended 1955 and 1960)	Bombay Tenancy and Agricultural Lands Act	Tenants entitled to acquire right of ownership after expiry of one year up to ceiling area; confers ownership right on tenants in possession of dwelling site on payment of 20 times annual rent; law does not confer any rights on subtenants.	1
	1960	Agricultural Lands Ceiling Act	Imposed ceiling on landholdings of 4.05–53.14 hectares (1960–1972) and of 4.05–21.85 hectares (after 1972).	3
	1969	Devasthan Inams Abolition Act	Abolishes all grades of intermediary tenures, but law was partially injuncted from implementation by order of Supreme Court.	2
	1973	Amending Act	Provides opportunity to acquire ownership of holdings but largely overridden by numerous provisions.	1
Haryana	1953	Punjab Security of Land Tenures Act	Provides complete security of tenure for tenants in continuous possession of land (<15 acres) for 12 years; grants tenants optional right of purchase of ownership of nonresumable land; no bar on future leasing.	1
	1955	Pepsu Tenancy and Agricultural Land Act	Same as above.	1

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TABLE II
(CONTINUED)

State	Year	Title	Description	Class
Jammu and Kashmir	1962	Consolidation of Holdings Act	Introduction of compulsory consolidation.	4
	1976	Agrarian Reforms Act	All rights, titles, and interests in land of any person not cultivating it personally in 1971 are extinguished and transferred to the state; provides for conferment of ownership rights on tenants after allowing resident landlord to resume land for personal cultivation.	1
Karnataka	1954	Mysore (Personal and Miscellaneous) Inams Abolition Act	Abolished all the large inamdari intermediaries; process of implementation very slow.	2
	1955	Mysore (Religious and Charitable) Inams Abolition Act	Same as above.	2
	1961	Land Reforms Act	Provides for fixity of tenure subject to landlord's right to resume 1/2 leased area; grants tenants optional right to purchase ownership on payment of 15–20 times the net rent; imposition of ceiling on landholdings.	1, 3
	1974	Land Reforms (Amendment) Act	Imposition of ceiling on landholdings of 4.05–21.85 hectares (after 1972); removal of all but one of the exemptions from tenancy legislation.	1, 3
Kerala	1960	Agrarian Relations Act	Abolishes intermediaries, but law struck down by Supreme Court.	2
	1963	Land Reforms Act	Concedes tenant's right to purchase the land from landowners.	1
	1969 (amended 1979)	Land Reforms (Amendment) Act	Conferment of full ownership rights on tenants; 2.5 million tenants could become landowners; right of resumption expires; although far-reaching on paper, law "not conducive to social justice" because of concealed tenancy; imposition of ceiling on landholdings of 6.07–15.18 hectares (1960–1972) and of 4.86–6.07 hectares (after 1972); abolition of intermediary rights.	1, 2, 3
	1974	Agricultural Workers Act	Called for employment security, fixed hours, minimum wages, etc.	1
Madhya Pradesh	1950	Abolition of Proprietary Rights (Estates, Mahals, Alienated Lands) Act	Abolition of intermediary rights.	2
	1951	United States of Gwalior, Indore, and Malwa Zamindari Abolition Act	Same as above.	2

	1951	Abolition of Jagir Act	Same as above.	2
	1952	Vindhya Pradesh Abolition of Jagirs and Land Reforms Act	Same as above.	2
	1959	Land Revenue Code	Leasing prohibited; entitles occupancy tenants to ownership rights of nonresumable area on payment of 15 times the land revenue; implementation of reform inefficient, one reason being that sharecroppers and tenants are not recorded.	1
	1959	Consolidation of Holdings Act	Introduction of compulsory consolidation.	4
	1960	Ceiling on Agricultural Holdings Act	Imposed ceiling on landholdings of 10.12 hectares (1960–1972) and of 4.05–21.85 hectares (after 1972).	3
Maharashtra	1950	Hyderabad Tenancy and Agricultural Lands Act	Provides for suo motto transfer of ownership to tenants of nonresumable lands (applies to Marathawada region).	1
	1958	Bombay Tenancy and Agricultural Land Act	Provides for transfer of ownership to tenants with nonresumable lands (with effect from 1-4-96).	1
	1961	Agricultural Land (Ceiling on Holdings) Act	Imposition of ceiling on landholdings.	3
Orissa	1951	Estate Abolition Act	Aimed at abolishing all intermediary interests.	2
	1972	Land Reforms Act	Entitled tenants to acquire ryoti rights over entire land held by them.	2
	1960 (amended 1973 and 1976)	Land Reforms Act	Provides for fixity of tenure of nonresumable area; prohibits subletting; implementation poor; financial help for purchase of ownership right lacking; most leases in form of sharecropping but sharecroppers not recorded as tenants; imposition of ceiling on landholdings of 8.09–32.37 hectares (1960–1972) and of 4.05–18.21 hectares (after 1972).	1, 3
	1972	Consolidation of Holdings and Prevention of Fragmentation of Land Act	Introduction of compulsory consolidation.	4
Punjab	1953	Punjab Security of Land Tenures Act	Provides complete security of tenure for tenants in continuous possession of land (<15 acres) for 12 years; grants tenants optional right of purchase of ownership of nonresumable land; no bar on future leasing.	1

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TABLE II
(CONTINUED)

State	Year	Title	Description	Class
	1955	Pepsu Tenancy and Agricultural Land Act	Same as above.	1
	1972	Land Reforms Act	Permissible limit (ceiling) is 7 hectares; 5 acres of land are secured, the rest may be resumed; optional right of purchase of ownership; share-cropping not considered tenancy; tenants often coerced to "voluntarily surrender" land; land leases not registered under provision of tenancy laws.	1
Rajasthan	1952	Land Reforms and Resumption of Jagir Act	Abolishes all intermediary rights.	2
	1953	Bombay Merged Territories and Area (Jagir Abolition) Act	Same as above.	2
	1954	Holdings (Consolidation and Prevention of Fragmentation) Act	Introduction of compulsory consolidation.	4
	1955	Ajmer Abolition of Intermediaries and Land Reforms Act	Abolishes intermediary interests in other areas.	2
	1955	Tenancy Act	Confers security of tenure to tenants and subtenants; ownership rights can be transferred; provisions of voluntary surrender made legislation "mere farce."	1
	1959	Zamindari and Biswedari Abolition Act	Abolishes intermediary interests in other areas.	2
Tamil Nadu	1948	Estates (Abolition and Conversion into Ryotwari) Act XXVI	A series of laws enacted (through long intervals) for the abolition of various types of intermediaries.	2
	1952	Thanjavur Tenants and Pannaiyal Protection Act	Provides greater security of tenure.	1
	1955 (amended. 1965)	Madras Cultivating Tenants Protection Act	Prohibits any cultivating tenant from being evicted but allows for resumption up to 1/2 of lands leased out to tenant.	1
	1956	Cultivating Tenants (Payment of Fair Rent) Act	Abolishes usury and rack-renting.	1

	1961 (am. 71)	Public Tenants Act	Provides that no public trust can evict its cultivating tenants.	1
	1961	Land Reforms (Fixation of Ceiling on Land) Act	Imposition of ceiling on landholdings of 12.14–48.56 hectares (1960–1972) and of 4.86–24.28 hectares (after 1972).	3
	1969	Agricultural Land-Records of Tenancy Right Act	Provides for preparation and maintenance of complete record of tenancy rights.	1
	1971	Occupants of Kudiyiruppu Act	Provides for acquisition and conferment of ownership rights on agriculturists, agricultural laborers, and rural artisans.	1
	1976	Rural Artisans (Conferment of Ownership of Kudiyiruppu) Act	Same as above.	1
Uttar Pradesh	1950 (amended 1952, 1954, 1956, 1958, 1977)	Zamindari Abolition and Land Reforms Act	All tenants are given complete security of tenure without any right of resumption for the landowner; leases, in general, are banned; law provided for transferring and vesting of all zamindari estates; zamindari was abolished over 60.2 million acres (out of total state area of 72.6 million acres).	1, 2
	1953	Consolidation of Holdings Act	Introduction of compulsory consolidation.	4
	1960	Imposition of Ceilings on Landholdings Act	Imposition of ceiling on landholdings of 16.19–32.37 hectares (1960–1972) and of 7.30–18.25 hectares (after 1972).	3
West Bengal	1950	Bargadars Act	Stipulated that the bargadar and the landowner could choose any proportion acceptable to them.	1
	1953	Estates Acquisition Act	Landholders limited to a ceiling; provided for abolition of all intermediary tenures.	1, 2, 3
	1955 (amended 1970, 1971, 1977)	Land Reforms Act	Provides that landowner can resume land for personal cultivation such that tenant is left with at least 1 hectare; sharecropping not considered tenancy (in West Bengal most tenants are sharecroppers); provides for land consolidation if two or more landowners agree.	1, 4
	1972	Acquisition and Settlement of Homestead Land (Amendment) Act	Tenants of homestead lands are given full rights.	1
	1975	Acquisition of Homestead Land for Agricultural Laborers, Artisans and Fishermen Act	Over 250,000 people were given homestead land (about eight cents each) up to January 1991.	1

(continued on next page)

TABLE II
(CONTINUED)

State	Year	Title	Description	Class
West Bengal (cont.)	1977	Land Reforms (Amendment) Act	"Raises presumption in favor of sharecroppers" [Yugandhar and Iyer 1993, p. 48].	1
	1981	Land Reforms (Amendment) Act	Designed to plug the loopholes in the earlier Acts relating to the ceiling of landholdings.	3
	1986	Land Reforms (Amendment) Act	Sought to bring all classes of land under the ceiling provisions by withdrawing previous exemptions; provided for regulatory measures to check indiscriminate conversion of land from one use to another; law not yet fully implemented.	3
	1990	Land Reforms (Amendment) Act	Same as above.	3

The content of land reform acts are classified into four categories (1 = tenancy reform, 2 = abolition of intermediaries, 3 = ceilings on landholdings, 4 = consolidation of landholdings), where it is possible for a given act to belong to more than one category. In the zamandari land tenure system, which covered 56 percent of privately owned land in British India, the land was vested in the landlord known as Zamindar. Between him and the real cultivator there were several layers of rent receiving intermediaries. Jagirs and inams were free grants of subgrants from the state with the right to collect and appropriate land revenue, though with the passage of time, jagirdars and inamdars became the virtual owners. In their conception the ryotwari and mahalwari land tenure systems did not recognize any intermediary between the state and the cultivator (though ryots and mahals did have full rights to sale, leasing and transfer of land). Infiltration of moneylenders and traders into agriculture and the lease of them to tenants led to creation of an intermediary class even in areas typified by these land tenure systems.

Pradesh, Kerala, and Tamil Nadu having a lot of activity while Punjab and Rajasthan have very little.

Our poverty data come from a consistent set of figures for the rural and urban areas of India's sixteen major states spanning the period 1958–1992 compiled by Ozler, Datt, and Ravallion [1996]. The measures are based on consumption distributions from 22 rounds of the National Sample Survey (NSS) spanning this period. The poverty line is based on a nutritional norm of 2400 calories per day and is defined as the level of average per capita total expenditure at which this norm is typically attained. Two poverty measures are considered: the headcount index and the poverty gap.[4] Given that NSS surveys are not annual, weighted interpolation has been used to obtain values between surveys.[5] Our study should be seen in the context of a significant overall reduction in poverty throughout our data period—the all-India rural headcount measure has fallen from around 55 percent to 40 percent, and the rural poverty gap from 19 percent to around 10 percent. That said, there is considerable cross-sectional variation in performance across states.[6] Agricultural wage data were also collected to enable us to examine whether land reforms had general equilibrium effects and were thus capable of reaching groups of the poor (e.g., landless laborers) who did not directly benefit from the reforms.

Real values of per capita agricultural, nonagricultural, and combined state domestic product are also available to examine the determinants of growth. Agricultural state domestic product was deflated using the Consumer Price Index for Agricultural Laborers while the Consumer Price Index for Industrial Workers was used to deflate the nonagricultural state domestic product. We also constructed a variable to measure agricultural yields. This was defined as real agricultural state domestic product divided by the net sown area. This crudely captures technological changes in agriculture.

Public finance data at the state level were also collected chiefly as a means to control for other government interventions besides land reform. On the expenditure side, the main classifica-

4. The headcount index is the proportion of the population living below the poverty line. The poverty gap is the average distance below the line expressed as a proportion of the poverty line, where the average is formed over the whole population (counting the nonpoor as having zero distance below the line).

5. Below, we check that our results are robust to including only those years where there was an NSS survey round.

6. See Datt and Ravallion [1998] for further discussion.

tion available for our data period is into development and nondevelopment expenditure. While development expenditure does include expenditure on economic and social services, there is no particular connection between this category and government's efforts to develop the population or infrastructure in their states.[7] Development expenditures are therefore further disaggregated into health and education expenditures that we might expect to have appreciable impacts on poverty. We put these in real per capita terms. We also collected total state taxes as a share of state domestic product as a crude measure of the size of state governments and state redistributive taxes per capita[8] to capture the effort of state governments to redistribute from rich to poor. Population estimates from the five censuses for 1951, 1961, 1971, 1981, and 1991 were used as additional controls. Between any two censuses these were assumed to grow at a constant (compound) rate of growth, derived from the respective population totals.

III. Land Reform and Poverty Reduction

A. Basic Results

The empirical approach is to run panel data regressions of the form,

$$x_{st} = \alpha_s + \beta_t + \gamma y_{st} + \psi l_{st-4} + \epsilon_{st}, \tag{1}$$

where x_{st} is some measure of poverty in state s at time t, α_s is a state fixed effect, β_t is a year dummy variable, y_{st} is a vector of variables that we treat as exogenous (detailed below), l_{st-4} is the stock of past land reforms four periods previously, and ϵ_{st} is an error term which we model as AR(1) process where the degree of autocorrelation is state-specific; i.e., $\epsilon_{st} = \rho_s \epsilon_{st-1} + u_{st}$. Estimation via generalized least squares will also allow for heteroskedasticity in the error structure with each state having its own error variance.

Equation (1) is a reduced-form model of the impact of land reform. Thus, any effect of land reform on poverty is picked up by

7. Economic services include agriculture and allied activities, rural development, special area programs, irrigation and flood control, energy, industry and minerals, transport and communications, science, technology, and environment. Social services include education, medical and public health, family welfare, water supply and sanitation, housing, urban development, labor, and labor welfare, social security and welfare, nutrition, and relief on account of natural calamities.

8. These include land tax, agricultural income tax, and property tax all of which are under the control of state governments.

that variable along with other effects that change the claims that tenants have to land. The land reform variable will also pick up any general equilibrium effects of land reform through changes in wages and prices. Below, we discuss what kind of theoretical model is consistent with our empirical findings.

The approach is also reduced form because land reform *legislation* is used as regressor—we are unable to measure whether land reforms are actually implemented. We cannot distinguish, therefore, between ineffective and unimplemented land reforms. Even though we have no measure of this, there is anecdotal evidence that some land reforms were not fully implemented. Hence, the coefficient on land reform in (1) is likely to provide a lower bound on the true effect of an implemented land reform. We have lagged the land reform variable four periods for two main reasons.[9] First, because even effective legislation will take time to be implemented and to have an impact. Second, it may help to allay concerns that shocks to poverty will be correlated with land reform efforts, an issue to which we return below. Fixed effects at the state level control for the usual array of cross-state differences in history and economic structure that have been constant over our sample period, while the year effects cover for macro-shocks and policies enacted by the central government that affect poverty and growth.

Table III gives the basic picture from our data. In column (1) we control for other factors affecting poverty only by using state and year effects. Land reform is represented only by the cumulative land reform variable where all types of land reforms are aggregated. The negative and significant association between land reform and the rural poverty gap measure is clear from this. Column (2) confirms that this result is not sensitive to using the interpolated years when there were no NSS rounds. In column (3) land reforms are disaggregated into their component types, also lagged four periods. This suggests that tenancy reforms and the abolition of intermediaries are driving the aggregate effects, while land ceiling legislation and consolidation of landholdings have a negligible impact on rural poverty. Below, we will suggest a theoretical interpretation of the results that is consistent with this finding. The fact that land ceiling legislation is unimportant confirms anecdotal accounts of the failure to implement these reform measures in any serious way [Bardhan 1970; Appu 1996;

9. The results are not sensitive to the exact lag specification chosen here.

TABLE III
LAND REFORM AND POVERTY IN INDIA: BASIC RESULTS

Model	Rural poverty gap (1) GLS AR(1)	Rural poverty gap (2) GLS AR(1)	Rural poverty gap (3) GLS AR(1)	Rural head count (4) GLS AR(1)	Urban poverty gap (5) GLS AR(1)	Poverty gap difference (6) GLS AR(1)	Poverty gap difference (7) GLS AR(1)	Head-count difference (8) GLS AR(1)
Four-year lagged cumulative land reform legislation	−0.281 (2.18)	−0.443 (3.21)			0.085 (1.05)	−0.534 (5.24)		
Four-year lagged cumulative tenancy reform legislation			−0.604 (2.52)	−1.378 (3.13)			−0.736 (3.27)	−1.916 (4.37)
Four-year lagged cumulative *abolition of* intermediaries legislation			−2.165 (4.08)	−4.354 (4.11)			−1.327 (2.59)	−3.364 (3.73)
Four-year lagged cumulative land ceiling legislation			0.089 (0.11)	0.734 (0.86)			0.230 (0.61)	0.888 (1.14)
Four-year lagged cumulative land consolidation legislation			0.456 (0.82)	−0.208 (0.19)			−0.210 (0.42)	−1.737 (1.62)
State effects	YES	YES	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES	YES	YES
Number observations	507	300	507	507	507	507	507	507

z-statistics are in parentheses. See the Data Appendix for details on construction and sources of the variables. The data are for the sixteen main states. We use data 1961–1992 for fourteen states. For Haryana which split from the Punjab in 1965, we use data 1965–1995 and for Jammu and Kashmir we use data 1961–1991 as there was no NSS survey in 1992. This gives us a sample size of 507. The sample size in column (2) is smaller as it is only run for years when NSS surveys were carried out. Poverty measures in other regressions have been interpolated between survey years. The GLS AR(1) model allows a state-specific AR(1) process—see equation (1) in the text for details. In columns (6) and (7) the poverty gap difference is the difference between the rural and urban poverty gap. In column (5) the headcount difference is the difference between the rural and urban head-count index.

Behuria 1997; Mearns 1998]. Column (4) checks the sensitivity of the findings to using an alternative measure of poverty—the head-count index. A similar negative impact of tenancy reform and the abolition of intermediaries on poverty is found here.

If land reform is really responsible for these results (rather than some omitted variable that is correlated with land reform),

then we would not expect to see such effects on urban poverty. There is no good reason to think production and distribution decisions in the urban sector would be affected (apart from some complex general equilibrium reasons). This is confirmed in column (5) of Table III which finds no significant negative association between land reform and urban poverty as measured by the same NSS data. This adds credence to the idea that our land reform variable is picking up something peculiar to the rural sector.

Columns (6)–(8) use the difference between rural and urban poverty as the left-hand-side variable. As we observed from column (5), urban poverty does not respond to land reform. This helps to control for any omitted variables that have common effects on poverty in both places.[10] Column (6) confirms our finding that aggregate cumulative land reforms lagged four periods are negatively associated with a reduction in rural-urban poverty difference. Results broken out by type of land reform are consistent with those for rural poverty: tenancy reforms and the abolition of intermediaries have had a significant impact in closing rural-urban poverty gap while the impact of the other two types of land reform are insignificant (column (7)). Using the gap between rural and urban head-count index yields similar findings (column (8)).

Taken together, these results demonstrate a consistent picture.[11] Land reform in general appears to be associated with reductions in rural poverty, with these effects most strongly

10. Unlike poverty *levels,* it is also a variable that does not trend downward overtime. In the levels regression the cumulative nature of our land reform variable makes it difficult to identify its effect separately from a state-specific time trend. Indeed, including state-specific time trends as regressors in a poverty levels regression leads to the land reform variable becoming less significant. However, when the poverty difference is included as the left-hand-side variable, the effect of land reforms remains significant even when state-specific time trends are included.

11. These results assume that the effects of each land reform work independently from one another. To reflect the possibility that packaging of certain reforms is important, we ran our basic specifications including interactions between the different types of land reforms. No general pattern emerges from this exercise, although there is some suggestive evidence that undertaking both tenancy reform and abolition of intermediaries together enhances the impact of land reform further. However, this finding is somewhat sensitive to the exact measure of poverty used and the inclusion of particular control variables. We also considered whether there was a difference between land reforms enacted recently compared with those more than ten years ago. To this end, we reran the main results separating out a variable cumulating recent land reforms and those more than ten years old. We found that both enter negatively and significantly in the poverty regressions, with the older land reforms frequently taking an (absolutely) large coefficient. Following Moene [1992], we also investigated whether land reforms in more densely populated states appeared to have a larger impact on poverty. For most of the specifications that we looked at, this was indeed the case.

associated with land reforms that seek to abolish intermediaries and reform the conditions of tenancies.

B. Robustness

While these results are clean, they leave two significant concerns unmet. First, they make no effort to allow for other policies that affect poverty—land reform may be proxying for other policies that are correlated with poverty reduction. Second, land reform could be endogenous and responding to the same forces that drive poverty. We now address both of these concerns.

Table IV reports results that include an array of additional controls. All regressions now include the population growth rate and agricultural yield lagged four periods. The latter may proxy for other policies that could have enhanced agricultural productivity and are correlated with land reform. It may also pick up exogenous technological change. Our policy measures are in two categories: reflecting the expenditure and tax policies of state governments. Our expenditure variables are health expenditures per capita, education expenditures per capita, and other expenditures per capita.[12] The former two might be thought to be important determinants of poverty reduction efforts. On the tax side, we have two rather crude measures that give a picture of the general policy stance of the government in office. State taxes expressed as a share of state domestic product crudely serve to measure the size of the state government. We can also measure how much the government is intent on designing a tax system that is geared toward taxing the better off. We create a measure of the progressiveness of the tax system under state control. This is the sum of land taxes, agricultural income taxes, and property taxes expressed in real per capita terms. All policy variables are lagged four periods to give the same timing structure as the land reform variables and to minimize concerns about the possible endogeneity of these policy variables.

In columns (1)–(6) of Table IV we replicate the regressions of land reform on poverty including these other policies.[13] Irrespective of the specification, state redistributive taxes and state tax share exert significant negative impacts on rural poverty whereas

12. That is total expenditure excluding health and education.

13. We experimented with an array of specifications that included a larger array of controls for government expenditure including those on food security, famine relief, rural infrastructure, and other social services and finer disaggregations of taxes. Including these variables did not affect our key results in any significant way so we have decided to use a more parsimonious specification.

TABLE IV

LAND REFORM AND POVERTY IN INDIA: CONTROLLING FOR OMITTED POLICY EFFECTS

	Rural poverty gap	Rural poverty gap	Rural head count	Urban poverty gap	Poverty gap difference	Head count difference
	(1)	(2)	(3)	(4)	(5)	(6)
Model	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)
Four-year lagged cumulative land reform legislation	−0.378			0.037	−0.539	−1.298
	(3.78)			(0.042)	(4.63)	(5.04)
Four-year lagged cumulative tenancy reform legislation		−0.565	−0.897			
		(2.32)	(1.98)			
Four-year lagged cumulative abolition intermediaries legislation		−1.790	−3.14			
		(2.81)	(2.48)			
Four-year lagged cumulative land ceiling legislation		−0.352	−0.121			
		(0.82)	(0.14)			
Four-year lagged cumulative land consolidation legislation		0.164	−1.000			
		(0.32)	(1.02)			
Population growth rate	−90.61	−97.99	−87.59	−74.32	74.81	−145.05
	(1.14)	(1.21)	(0.50)	(1.22)	(0.91)	(0.90)
Four-year lagged per capita education expenditure	0.063	0.070	0.076	0.041	0.077	0.034
	(2.04)	(2.24)	(1.10)	(1.73)	(2.18)	(0.42)
Four-year lagged per capita health expenditure	0.038	0.041	0.072	−0.003	0.042	0.218
	(0.88)	(0.91)	(0.76)	(0.09)	(0.83)	(1.76)
Four-year lagged per capita other expenditure	0.020	0.017	0.026	0.012	0.0009	−0.008
	(2.69)	(2.31)	(1.56)	(2.40)	(0.12)	(0.40)
Four-year lagged per capita redistributive state taxes	−0.130	−0.142	−0.364	−0.045	−0.182	−0.422
	(2.70)	(2.92)	(3.25)	(1.25)	(3.53)	(3.21)
Four-year lagged state taxes as a percentage of state domestic product	−49.59	−49.11	−87.33	−27.70	16.43	4.790
	(2.99)	(2.94)	(2.46)	(2.23)	(0.97)	(0.13)
Four-year lagged agricultural yield	0.001	−0.003	−0.507	−0.006	0.031	−0.013
	(0.05)	(0.02)	(1.19)	(0.42)	(1.45)	(0.30)
State effects	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES
Number of observations	436	436	436	436	436	436

z-statistics are in parentheses. See the Data Appendix for details on construction and sources of the variables. The data are for the sixteen main states. We have data 1964–1992 for nine states. For Punjab we have data 1969–1992, for Haryana which split from the Punjab in 1965 we have data 1970–1975 and 1978–1992, for Jammu and Kashmir 1968–1991, for Bihar and Gujarat 1964–1975 and 1977–1992, for Tamil Nadu 1964–1975 and 1978–1992 and for Bihar 1964, 1969 and 1972–1977. This gives us a total sample size of 436. In column (5) the poverty gap difference is the difference between the rural and urban poverty gap. In column (6) the head-count difference is the difference between the rural and urban head-count index. The GLS AR(1) model allows a state-specific AR(1) process—see equation (1) in the text for details. Redistributive taxes are agricultural income taxes, land taxes, and property taxes.

education and health expenditure, per capita yield, and population growth are generally insignificant at conventional levels.[14] In column (1) we include the full set of policy control variables in the basic regression of cumulative land reform on the rural poverty gap measure. Despite controlling for these many dimensions of state activity, cumulative land reform continues to exert a negative and significant impact on rural poverty. In column (2) we run the same regression while disaggregating the land reform variable. We continue to find that tenancy reforms and the abolition of intermediaries exert a negative and significant impact on the rural poverty gap measure whereas land ceiling and land consolidation legislation exert no significant influence. Replacing the poverty gap measure with the head-count index as is done in column (3) produces a similar set of results. When we examine the urban poverty regression (column (4)), we find that, in common with the rural poverty regressions, health and education expenditure and yield have no significant impact and tax share has a significant impact. State redistributive taxes are insignificant in this regression suggesting that their impact is restricted to the rural sector. Inclusion of these extra variables has no effect on the insignificant impact of cumulative land reform on urban poverty.

Columns (5) and (6) regress the difference between rural and urban poverty on cumulative land reform and the full set of control variables. Note that compared with column (1) of this table, only the land reform variable and state redistributive taxes remain significant in this specification.[15] Other policy effects appear to be common to both rural and urban sectors, becoming insignificant in this regression. Contrasting columns (5) and (6) confirms that results are robust to the type of poverty measure being used. Taken together, the results presented in Table IV offer further confirmation of our initial finding of a significant negative association between lagged land reform and rural poverty.

A further concern with the specification in equation (1) is the potential endogeneity of the land reform variable. It is not possible to ascertain the direction of bias due to this a priori. If

14. The expenditure results are interesting given the priority attached, in current debates, to expansion of expenditures on education and health as a key means of reducing poverty (see Drèze and Sen [1995]). If anything, education expenditures per capita seem to exert a positive influence on the rural poverty gap (columns (1) and (2)) but not on the rural head-count ratio (column (3)). However, it is possible that we would need finer measures of the ways in which particular programs are prioritized to make progress on this.

15. An exception is education expenditure per capita in the poverty gap specification (see column (5)).

land reform is purposefully aimed at poverty reduction, then we would expect policy effort to focus on where poverty is highest, leading to downward bias. However, if responsiveness to land reform is greater where poverty is highest, then the effect may go in the other direction. While lagging land reform as we have in (1) goes some way toward minimizing concerns about this, there is some residual worry that long-lived shocks to poverty that affect antipoverty legislation could bias the results.

To fix this problem requires an instrument for land reform.[16] To this end, we exploit the fact that land reform is intensely political, with different groupings in state legislatures (the *Vidhan Sabha*) being more likely to enact land reform legislation. However, this can be problematic if, as seems likely, shocks to poverty affect who is elected. To mitigate this problem, we propose using long lags of the political variables as instruments for land reform. Specifically, political variables from four periods prior to the land reform (eight periods before the poverty observation) are used as an instrument for land reform. This is legitimate provided that contemporaneous shocks to poverty are uncorrelated with shocks that lead to particular groups being elected eight years previously. Such an assumption seems defensible given both the frequency of elections and policy shifts in India and because it is difficult to think of long-lasting shocks affecting both current poverty and political structure eight years ago.

This strategy implies a first-stage equation for land reform:

$$l_{st} = \mu l_{st-4} + a_s + b_t + cy_{it} + dz_{st-4} + \eta_{st}, \tag{2}$$

where l_{st} is the cumulative land reform variable, a_s is a state fixed effect, b_t is a year dummy variable, y_{st} is a vector of variables that we treat as exogenous, and the variables z_{st-4} are political variables reflecting the seat shares of different political groups, each lagged by four years. These are constructed from records of the number of seats won by different national parties at each of the state elections under four broad groupings. (The parties contained in the relevant group are given in parentheses after the name of the grouping.) These are (i) Congress Party (Indian National Congress + Indian Congress Socialist + Indian National Congress Urs + Indian National Congress Organization), (ii) a *hard left* grouping (Communist Party of India + Communist

16. This will also help to deal with measurement error which is a concern given that we measure only *legislated* land reforms.

Party of India Marxist), (iii) a *soft left* grouping (Socialist Party + Praja Socialist Party), and (iv) Hindu parties (Bhartiya Janata Party + Bhartiya Jana Sangh). We express these as a share of total seats in the legislature. Congress has tended to dominate the assemblies over the period, although hard left parties have also recorded majorities in Kerala and West Bengal. Over time there has been a decline in the importance of Congress and a rise in the importance of religious and regional parties.

Table V presents estimates of equation (2) for the different kinds of land reforms. As we would expect, all cases find lagged land reforms to be strongly significant. The political variables also matter for land reform legislation, and are jointly significant in all columns. In column (1) we see that, relative to the omitted "other" category, which is composed of a amalgam of regional, independent, and Janata parties, Congress and soft left decrease the probability of enacting land reform legislation, while hard left exerts a positive influence and Hindu parties are insignificant. Looking across columns (2) to (5), we see that the negative influence of Congress is spread across all types of land reform, but it is particularly pronounced for tenancy reforms and abolition of intermediaries. The negative influence of soft left parties is also spread across the board with the exception of land consolidation. The overall positive influence of hard left parties, however, seems to originate principally through a strong positive effect on the passage of land ceiling legislation. This is interesting given our failure to find evidence that such reforms reduce poverty. Hindu party representation appears to exert no influence on the passage of tenancy reforms or the abolition of intermediaries. However, they exert a significant positive influence on land ceiling and a significant negative influence on land consolidation.

Table VI presents our results from instrumental variables estimation. Column (1), which uses political variables and lagged land reforms as instruments, continues to find a negative and significant impact of land reform on the rural poverty gap. We find a similar result when we use the head-count poverty measure in place of the poverty gap measure in column (2). Columns (3) and (4) follow a similar instrumentation procedure but break out total land reforms into constituent types. This confirms our earlier results; both tenancy reforms and abolition of intermediaries remain negative and significant while other types of land reform

TABLE V
LAND POLICY DETERMINATION

	Cumulative total land reform legislation	Cumulative tenancy reform legislation	Cumulative abolition of intermediaries legislation	Cumulative land ceiling legislation	Cumulative land consolidation legislation
	(1)	(2)	(3)	(4)	(5)
Model	OLS	OLS	OLS	OLS	OLS
Four-year lagged cumulative land reform legislation	0.406 (12.23)				
Four-year lagged cumulative tenancy reform legislation		0.693 (16.26)	−0.002 (0.16)	−0.009 (0.38)	0.021 (1.13)
Four-year lagged cumulative abolition of intermediaries legislation		0.041 (0.53)	0.664 (14.21)	0.109 (1.51)	−0.029 (1.06)
Four-year lagged cumulative land ceiling legislation		−0.131 (2.11)	−0.172 (0.65)	0.631 (15.60)	−0.045 (1.44)
Four-year lagged cumulative land consolidation legislation		0.694 (5.06)	−0.038 (1.14)	0.174 (2.93)	0.772 (7.85)
Four-year lagged congress party share of seats	−0.460 (2.81)	−0.472 (4.78)	−0.098 (2.37)	−0.066 (1.85)	−0.075 (1.85)
Four-year lagged hard left share of seats	2.837 (2.95)	0.476 (0.72)	0.149 (0.97)	1.437 (5.46)	−0.302 (0.73)
Four-year lagged soft left share of seats	−3.921 (3.09)	−2.363 (3.25)	−1.101 (2.60)	−1.990 (3.63)	−0.426 (1.06)
Four-year lagged hindu parties share of seats	0.270 (0.33)	−0.089 (0.19)	−0.045 (0.15)	0.556 (2.01)	−0.410 (2.08)
State effects	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES
Number of observations	474	474	474	474	474

t-statistics are in parentheses. All regressions are reported with robust standard errors. All monetary variables are in real terms. See the Data Appendix for details on construction and sources of the variables. The data are for the sixteen main states. We have data 1962–1992 for eight states. Punjab and Haryana split into separate states in 1965. For Punjab we have data 1962–1989 while for Haryana we have data 1969–1991. For Jammu and Kashmir we have data 1965–1991, for Kerala and West Bengal 1962–1991, for Gujarat and Maharashtra 1963–1992 and for Bihar 1962–1989. This gives us a total sample size of 474. The parties contained in the relevant group are given in parentheses after the name of the grouping. These are (i) Congress Party (Indian National Congress + Indian Congress Socialist + Indian National Congress Urs + Indian National Congress Organization), (ii) a hard left grouping (Communist Party of India + Communist Party of India Marxist), (iii) a soft left grouping (Socialist Party + Praja Socialist Party), and (v) Hindu parties (Bhartiya Janata Party + Bhartiya Jana Sangh).

TABLE VI
LAND REFORM AND POVERTY IN INDIA: INSTRUMENTATION

	Rural poverty gap	Rural head count	Rural poverty gap	Rural head count	Poverty gap difference	Rural poverty gap	Rural head count	Rural head count	Rural poverty gap	Rural head count
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Model	IV1	IV1	IV1	IV1	IV1	IV2	IV2	IV2	IV3	IV3
Four-year lagged cumulative land reform legislation	−0.732	−1.360			−0.438	−0.659	−1.192		−0.599	−1.263
	(6.02)	(5.68)			(3.60)	(4.09)	(3.67)		(3.18)	(3.24)
Four-year lagged cumulative tenancy reform legislation			−0.998	−2.404				−4.595		
			(3.16)	(3.67)				(4.69)		
Four-year lagged cumulative abolition of intermediaries legislation			−2.271	−5.701				−7.408		
			(2.58)	(3.64)				(4.10)		
Four-year lagged cumulative land ceiling legislation			−1.372	0.432				−1.998		
			(2.34)	(0.38)				(1.89)		
Four-year lagged cumulative land consolidation legislation			1.624	1.969				−4.027		
			(1.72)	(1.00)				(1.45)		
Overidentification test p-value	0.93	0.98	0.99	0.98	0.99	0.93	0.98	0.98	0.92	0.96
State effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	410	410	410	410	410	410	410	410	410	410

t-statistics are in parentheses. All regressions are reported with robust standard errors. See the Data Appendix for details on construction and sources of the variables. The data are for the sixteen main states. We have data 1966–1992 for twelve states. For Haryana, which split from Punjab in 1965, we have data 1973–1992, for Jammu and Kashmir 1969–1992, and for Gujarat and Maharashtra 1967–1992. This gives us a total sample size of 410. In column (5) poverty gap difference is the difference between rural and urban poverty. IV1: Instruments for the endogenous policy variable (cumulative land reforms lagged four periods) are share of seats in state assembly occupied by Congress, hard left, soft left, and Hindu parties lagged eight periods plus land reform variables lagged eight periods. IV2: Instruments for the endogenous policy variable (cumulative land reforms lagged four periods) are share of seats in state assembly occupied by Congress, hard left, soft left, and Hindu parties lagged eight periods plus cumulative land reforms passed in geographically contiguous states lagged eight periods. IV3: Instruments for the endogenous policy variable (cumulative land reforms lagged four periods) are shares of seats in state assembly occupied by Congress, hard left and soft left parties lagged eight periods (lagged land reform variables are excluded here). The overidentification test we employ is due to Sargan [1958]. The number of observations times the R^2 from the regression of the state 2 residuals on the instruments is distributed $\chi^2(T + 1)$, where T is the number of instruments.

are insignificant.[17] Column (5) confirms that land reform still has a significant impact in closing the gaps between rural and urban poverty. We also report tests of our overidentifying restrictions for the instrumental variables regressions. The political and lagged land reform variables pass standard statistical tests of overidentification and therefore, at least on econometric grounds, would appear to be suitable instruments for land reforms.[18] Thus, when the instrument set includes political variables and lagged land reforms, the picture is consistent with the patterns of results shown in Tables III and IV.

The remainder of Table VI experiments with alternatives to using lagged land reforms as instruments. In columns (6)–(8) we use cumulative land reforms passed in geographically neighboring states (lagged eight periods) in our instrument set in place of cumulative land reforms lagged eight periods. These neighboring land reforms could proxy for regional waves of support for land reform. Using these, together with the political variables as instruments, yields robust results. Aggregate land reforms continue to exert a negative and significant impact on the rural poverty gap (column (6)) or rural head count (column (7)). When we break out land reforms by type, we again find tenancy reforms and abolition of intermediaries exerting the strongest negative influences on the head-count index (column (8)). The overidentification tests are also passed. In columns (9) and (10) of Table VI, we drop lagged land reforms completely from the instrument set. We continue to obtain a negative impact of land reforms on the rural poverty gap (column (9)) or the rural headcount (column (10)) for aggregate land reforms.[19]

Taken together, Table VI finds a pattern of results that is consistent with those presented in Tables III and IV.[20] It is also reassuring that the magnitude of coefficients remains roughly

17. With the exception of land ceilings in column (3).

18. The test we employ is due to Sargan [1958] and tests whether the instruments are correlated with residuals from the second-stage (poverty) regression. See notes to Table VI.

19. We did not obtain significant effects for disaggregated land reforms in this specification.

20. We also experimented with a fourth instrumentation procedure where the endogenous policy variable (cumulative land reforms lagged four periods) is instrumented using a "simulated" cumulative land index created by cumulating values from a linear probability model which predicts whether a land reform takes place in a given year based on political composition of the state parliament (lagged four periods) and year and state effects. As with the three other procedures, we found that instrumented aggregate land reform had a significant negative impact on the rural poverty gap.

constant across the different instrumentation procedures. On the whole, the instrumented coefficients on land reform are larger than the baseline results of Tables III and IV. Overall, these results are best thought of as a robustness check on our earlier findings rather than trying to present a carefully thought out structural model.

IV. Land Reform and Agricultural Wages

It would be surprising if land reforms that affected poverty did not impact on other aspects of the rural economy. We now consider whether such reforms have an effect on agricultural wages. The wage data are for the daily agricultural wages of male laborers expressed in real terms.[21] Agricultural wages are a robust indicator of the welfare of landless laborers who comprise a significant fraction of the poor in rural India (see World Bank [1997]). If land reform pushes up agricultural wages, this represents an additional mechanism through which these reforms can reduce rural poverty.

The results using the agricultural wage as a left-hand-side variable are in Table VII. Column (1) contains results for the aggregate land reform variable. This demonstrates a positive and significant impact of land reform on wages. In column (2) this effect is disaggregated across types of land reform and shows that this effect is primarily attributable to legislation to abolish intermediaries. These results confirm the impact of land reforms on the rural economy. They also illustrate an indirect route through which land reform may positively affect the welfare of landless laborers even if they do not benefit directly from the reforms. In Section VII we discuss why such effects might be present in theory.

V. Land Reform and Growth

Even if land reform does help the poor, it could do so at a cost to economic performance. We turn now, therefore, to exploring whether land reform has a positive or negative effect on agricultural output per capita. In this case, we use the log of real state income per capita as the left-hand-side variable with the right-hand side augmented by lagged log real state income per capita to

21. See the Data Appendix for details.

TABLE VII
LAND REFORM AND AGRICULTURAL WAGES

Model	Real agricultural wages (1) GLS AR(1)	Real agricultural wages (2) GLS AR(1)
Four-year lagged cumulative land reform legislation	0.081 (2.71)	
Four-year lagged cumulative tenancy reform legislation		0.049 (0.88)
Four year lagged cumulative abolition of intermediaries legislation		0.339 (2.61)
Four-year lagged cumulative land ceiling legislation		0.069 (0.09)
Four-year lagged cumulative consolidation of land holdings legislation		0.018 (0.13)
State effects	YES	YES
Year effects	YES	YES
Number of observations	441	441

z-statistics are in parentheses. The wage data refer to the daily wage rate for male agricultural laborers expressed in real terms. See the Data Appendix for details on construction and sources of the variables. The data are for fourteen states—data for Haryana and Jammu and Kashmir are not available. For thirteen of these states we have data 1961–1992 and for Rajasthan we have 1967–1991. This gives a sample size of 441. GLS AR(1) model allows a state-specific AR(1) process—see equation (1) in the text for details.

model dynamics in a very simple way and to allow for convergence over time.[22] We therefore have a regression of the form,

$$x_{st} = \lambda x_{st-1} + \alpha_s + \beta_t + \gamma y_{st} + \psi l_{st-4} + \epsilon_{st}. \quad (3)$$

This is basically the same form of regression that has become popular in the cross-country growth literature summarized in Barro [1997], although our panel data allow us to use fixed effects and year effects. We will also continue to allow for a state-specific AR(1) error specification with heteroskedasticity.

Table VIII presents the main results for the regression of state income per capita on cumulative land reform. In column (1) we present results for a *GLS* model of total state income per capita on land reform containing only state fixed effects and year effects as controls. We find that the disaggregated land reform variables

22. Statewise estimates of total and agricultural state domestic product are available for the 1960–1992 period. See the Data Appendix. These state domestic product estimates are used as our proxy of state income.

TABLE VIII

LAND REFORM AND GROWTH IN INDIA

Model	Log of state income per capita	Log of agricultural state income per capita	Log of agricultural state income per capita	Log of agricultural yield	Log of agricultural yield
	(1)	(2)	(3)	(4)	(5)
	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)	GLS AR(1)
One-year lagged log of state income per capita	0.497				
	(12.53)				
One-year lagged log of agricultural state income per capita		0.195	0.167		
		(4.17)	(3.29)		
Four-year lagged cumulative tenancy reforms	−0.002	−0.037	−0.033	−0.050	−0.038
	(0.43)	(4.54)	(2.94)	(6.55)	(3.92)
Four-year lagged cumulative abolition of intermediaries	−0.005	0.005	−0.016	−0.002	−0.013
	(0.54)	(0.27)	(0.76)	(0.12)	(0.49)
Four-year lagged cumulative land ceiling legislation	−0.002	0.019	0.012	0.015	0.015
	(0.22)	(1.26)	(0.64)	(0.95)	(0.88)
Four-year lagged land consolidation legislation	−0.013	0.065	0.057	0.074	0.054
	(1.29)	(3.31)	(2.12)	(3.87)	(2.15)
Population growth rate			−2.567		4.166
			(0.75)		(1.11)
Four-year lagged per capita education expenditures			0.003		0.003
			(1.48)		(1.67)
Four-year lagged per capita health expenditures			−0.005		−0.002
			(1.97)		(0.77)
Four-year lagged per capita other expenditures			−0.0004		−0.0002
			(0.99)		(0.40)
Four-year lagged per capita tax revenue from redistributive taxes			−0.004		−0.003
			(1.51)		(1.05)
Four-year lagged state taxes as a percentage of state domestic product			0.474		0.278
			(0.54)		(0.31)
Four-year lagged log of agricultural yield			0.010		−0.018
			(0.17)		(0.32)
State effects	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES
Number of observations	484	484	433	488	433

z-statistics are in parentheses. State income per capita is obtained by expressing estimates of state domestic product in real per capita terms. Agricultural yield measures represent the ratio of real agricultural state domestic product to net sown area. Redistributive taxes are agricultural income taxes land taxes, and property taxes. See the Data Appendix for details on construction and sources of the variables. The data are for the sixteen main states. For columns (1) and (2) we have data 1961–1992 for twelve states, for Punjab and Haryana, which split in 1965, we have data 1966–1992; for Jammu and Kashmir 1965–1992; and for Bihar 1961, 1966, and 1969–1992. This gives a sample size of 484. The sample size in column (4) is slightly larger as it does not contain a lagged dependent variable as regressor. For columns (3) and (5) we have data 1964–1992 for nine states, for Punjab 1969–1992, for Haryana 1970–1975 and 1978–1992, for Jammu and Kashmir 1968–1992, for Bihar and Gujarat 1964–1975 and 1977–1992, for Assam 1969 and 1972–1992 and for Tamil Nadu 1964–1975 and 1978–1992. This gives a sample size of 433. GLS AR(1) model allows a state-specific AR(1) process—see equation (1) in the text for details.

lagged four periods have no significant impact on total state income per capita. In column (2) we look only at agricultural state income per capita. This makes sense given that land reform is predominantly concerned with affecting production relations in agriculture. This suggests that tenancy reform has a negative effect on agricultural output with land consolidation having the opposite effect. No effect is observed for the other kinds of land reform. Column (3) shows that both the tenancy reform and land consolidation effects are robust to including our other policy variables lagged four years. In column (4) we show that these effects remain when agricultural yields rather than income per capita is the left-hand-side variable.[23] In column (5) we show that this effect of tenancy reform is robust to including other policy variables.

VI. Land Reform and Land Inequality

Taken together, our results hint at an equity-efficiency trade-off for tenancy reforms—both poverty and output per capita are lower after such reforms are enacted. No such trade-off emerges for abolition of intermediaries. Ceilings on landholdings do not seem to have an effect on either output measures or poverty, while land consolidation promotes output increases in agriculture without affecting poverty. The failure of land ceiling legislation to show any significant impact on poverty reduction or output levels is consistent with Bardhan's [1970] claim that such reforms have rarely been implemented with any degree of seriousness.

Overall, these results suggest that the impact on poverty comes mainly through reforms that affect production relations, rather than by altering the distribution of land. This interpretation is underlined by looking at the limited evidence available on the relationship between land reforms and land distribution over our data period. Data on land distribution has only been gathered by NSS special surveys at four points; 1953–1954, 1961–1962, 1971–1972, and 1982 (see Sharma [1994]). We classify states as high or low land reform depending on whether they had more or less than a total of three land reforms (of any type) during the 1958–1992 period.[24] We then investigate whether high land

23. Our measure of yield is real agricultural state domestic product divided by net sown area. See the Data Appendix for details.

24. Under this system Andra Pradesh, Assam, Haryana, Jammu and Kashmir, Madya Pradesh, Maharashtra, Punjab, and Rajasthan are low land reform

reform states classified in this way experienced the largest drop in the gini for land operated and proportion of landless households over the period.[25] The overall impression that we have from this crude exercise, is of persistent inequalities in land operated within both groups of states (see also Sharma [1994]). Thus, the idea that the major impact of land reform on poverty must come mainly through mechanisms that did not involve land redistribution gains further support. In further confirmation of this, we failed to find a significant effect of aggregate land reform on the gini coefficient for rural per capita consumption.[26]

Thus, in making sense of the results, it is imperative to think about land reforms that have changed production relations in agriculture rather than altering the pattern of landholdings. All of this notwithstanding, there is evidence that the impact of land reforms on poverty is greatest in those states where land inequality was greatest in 1953–1954. To test this, we interacted the percentage of landless individuals and the land gini coefficient with our land reform variable. This interaction term was negative and significant in every case when we looked at aggregate land reform activity.[27]

VII. Making Sense of the Results

Our empirical analysis suggests that poverty reduction is associated with land reform and this is primarily attributable to legislation that has abolished intermediaries and reformed the terms of tenancies. The role of land redistribution per se seems to have been of limited importance in the Indian context. The empirical analysis also uncovers some evidence of general equilibrium effects on wages. Our theoretical model focuses on two things: a model of agricultural contracting and a model of labor

states, while Bihar, Gujarat, Karnataka, Kerala, Orissa, Tamil Nadu, Uttar Pradesh, and West Bengal are high land reform states.

25. For high land reform states the land gini falls from 0.686 in 1953/54 to 0.669 in 1982 (a fall of 0.017), whereas the drop in low land reform states is from 0.653 to 0.643 (a drop of 0.010). For high land reform states the average drop in the proportion landless is from 14.97 percent to 12.03 percent (a fall of 2.94 percent), whereas for low land reform states the drop is from 12.40 percent to 10.91 percent (a fall of 1.49 percent).

26. To look at this issue, we ran the basic regression shown in column (1) of Table III but replaced the rural poverty gap with the gini coefficient for rural per capita consumption. Our inability to find a significant impact on rural inequality could be explained by the fact that land reform may be shifting income from the middle income groups to the poor rather than from the rich to the poor.

27. The results are available from the authors on request.

supply by tenants. The former focuses on how rents to tenants shift in response to land reforms, and the latter gives rise to effects on agricultural wages. This focus on contractual problems captures the spirit of recent models of the inequality-growth relationship that emphasize agency problems, particularly in credit markets. (See Bénabou [1996] for a survey.) Here, we emphasize agency problems in tenancy contracts and how they can be altered by land reform, even if the ownership pattern is unchanged.

There are three groups: landlords who rent out land as well as farming some of the land themselves, tenants who rent land, and landless laborers. The poor are made up predominantly of the latter two groups. Tenants and landless laborers supply labor to the labor market where it is demanded by landlords who choose to be owner-cultivators. Tenants and landless laborers care about consumption c and labor supply l. Their preferences are $u(c) - \phi(l)$, where $u(\cdot)$ is increasing and concave and $\phi(\cdot)$ is increasing and convex. Suppose that the agricultural wage is ω. Then, an individual with nonlabor income x, has optimal labor supply of

$$l^*(x,\omega) = \arg\max_l \{u(x + \omega l) - \phi(l)\}.$$

It is straightforward to check that labor supply is decreasing in x. Now define $v(x,\omega) = u(x + \omega l^*(x,\omega)) - \phi(l^*(x,\omega))$ as the indirect utility of a tenant with nonlabor income x. Hence, we expect landless laborers to supply $l^*(0,\omega)$, while for tenants x is equal to the value of their tenancy. As the value of tenancy increases as a result of land reform, we would expect tenants to reduce labor supply to the market.

We now consider the agricultural contracting problem of a tenant and landlord. Suppose that the output on a given piece of land under tenancy is given by $R(e)$ where e denotes effort applied to the land by the tenant. We suppose that the cost of this effort is separable from labor supply and is measured in units of disutility. Effort is also committed before the labor supply decision is made. We assume that $R(\cdot)$ is smooth, increasing, and concave.

We suppose that tenants need to be monitored in order to put in effort on the land. Specifically, we imagine that a contract specifies an effort level of e. However, the tenant may choose to "shirk," putting in zero effort, in which case the landlord catches him with probability p and he is fired, becoming a landless laborer and receiving a payoff of $v(0,\omega)$. The tenant can now only be induced to supply effort if the threat of eviction is sufficiently strong and some rents are earned from being a tenant. Suppose,

then, that the tenant receives a payment of w to farm the land, which he receives only if he is not caught shirking. Thus, a tenant is willing to put in an effort level e at payment w if and only the incentive constraint $(1 - p)v(w,\omega) + pv(0,\omega) \leq v(w,\omega) - e$ is satisfied. Solving this as an equality gives the payment schedule $w(e,\omega)$ needed to induce effort level e as

$$w(e,\omega) = v^{-1}(v(0,\omega) + e/p).$$

The contract must now specify a payment/effort pair consistent with this schedule. The optimal effort that the landlord chooses to induce is given by

$$e(p,\omega) = \arg\max_{e} = [R(e) - w(e,\omega)].$$

It is easy to verify that $e(p,\omega)$ is increasing in p. The tenant's equilibrium payoff is $V(p,\omega) = v(0,\omega) + e(p,\omega)\,(1 - p)/p$ which is larger than the payoff from being a landless laborer.

It is straightforward to calculate the impact of changes in p on output and the tenant's payoff. An increase in p will increase net-output since $e(p,\omega)$ is increasing. The effect on the tenant's payoff (and hence poverty) is given by

$$\frac{\partial V(p,\omega)}{\partial p} = \frac{\partial e(p,\omega)}{\partial p}\left(\frac{1-p}{p}\right) - e(p,\omega)\left(\frac{1}{p^2}\right).$$

The first term is positive—an increase in the eviction probability elicits higher effort and hence raises the tenant's rent. The second effect works in the opposite direction. For a given effort level, the tenant's rent is lower since he must be paid less now to prevent him from shirking. We are interested in cases where the tenant enjoys a more secure right to the land so that p falls. In this case, the tenant will benefit from a tenancy reform that reduces the probability that he will be evicted if caught shirking if the elasticity of effort with respect to the probability of eviction $(\partial e(p,\omega)/\partial p \cdot p/e(p,\omega))$ is less than $1/[(1 - p)p^2]$. If tenants' rents increase from receiving higher tenure security, then this will lead them to reduce their labor supply to the market, and we would predict that such a tightening of the labor market would lead to increased agricultural wages.[28]

This framework can be applied to the cases of abolition of intermediaries and tenancy reform. To include an intermediary in

28. These changes in wages would also be expected to reinforce reductions in output on farms that hire in labor.

the analysis, we suppose that there are three parties to the agricultural contract: a tenant, landlord, and an intermediary. We begin by making the strong assumption that intermediaries have a very strong bargaining position can make take-it-or-leave-it offers to the landlord and tenant. This is very much in line with the view that intermediaries captured the surplus from the land. In this world the tenant will receive a payoff of $V(p,\omega)$, and the landlord will receive his reservation payoff which we denote by v_L. The intermediary receives the surplus $[R(e(p,\omega)) - e(p,\omega)] - V(p,\omega) - v_L$.

After the intermediary is abolished, this surplus is now available for distribution provided that p remains the same. Only if the tenant obtains no bargaining power at all with his landlord, would we expect to observe no effect on the tenant's payoff. Otherwise, we would expect to see the tenant's payoff rise. Assuming that tenants are a significant group of poor in India, this is consistent with our finding that poverty is reduced by the abolition of intermediaries. We would not expect to see any change in effort and hence output unless p were different when landlords and intermediaries negotiated contracts. Rent increases for tenants also would be associated with higher agricultural wages, by the general equilibrium mechanism we have identified.

We now turn to the impact of tenancy reforms. Such reforms are multifarious which make it difficult to offer a definitive theoretical account. This would require much more institutional content as in the analysis of West Bengal's land reforms by Banerjee and Ghatak [1997]. Nonetheless, it is still useful to think through a simple model in order to check that our empirical findings conform to the predictions of the theory laid out above. Suppose therefore that the landlord has all the bargaining power and can make take-it-or-leave-it offers to tenants before and after the tenancy reform. We shall model the effect of a tenancy reform as making it more difficult to evict tenants if they shirk. In terms of our model this is equivalent to a fall in p. As we have already argued, this has two effects. First, we expect effort, and therefore, output to fall. Second, we expect a change in the payoff to the tenant as his rent could go up or down. We showed that this is positive under reasonable conditions, and thus we would expect poverty to be reduced which is what we found in the data. This is also consistent with higher agricultural wages if increased rents to tenants lead them to reduce their labor supply.

To summarize, the empirical findings are consistent with a

stylized model of agricultural contracting and labor supply by tenants. While many complicating features could be added to the theory, the general thrust of the trade-off captured here is relevant.[29] It is well-known that in a variety of contexts, rents are used to motivate tenants. Thus, land reforms that affect how agency problems are solved will typically generate both output and distributional effects. We would expect these rents to affect labor supply and result in changes to agricultural wages.

VIII. Concluding Remarks

The main contribution of this paper is to test whether land reform legislation is associated with poverty reductions using state-level data from India. The high incidence of poverty and the large volume of land reforms enacted to counter this problem in the post-Independence period make this an issue of considerable interest. We show that there is robust evidence of a link between poverty reduction and two kinds of land reform legislation—tenancy reform and abolition of intermediaries. Another important finding is that land reform can benefit the landless by raising agricultural wages. Although the effects on poverty are likely to have been greater if large-scale redistribution of land had been achieved, our results are nonetheless interesting as they suggest that partial, second-best reforms which mainly affect production relations in agriculture can play a significant role in reducing rural poverty.

As well as being important to policy debates in India, such findings may help to diffuse the more general pessimism that can undermine redistributive effort in developing countries. In a recent study [World Bank 1997], much emphasis was placed on the role of economic growth in explaining the decline of poverty in India. While our results are consistent with this finding, they emphasize that redistributive effort has also played its part. Using the average number of land reforms implemented, our first coefficient in Table III implies that a reduction of the all-India poverty gap of 1 percent can be explained by land reform. This is one-tenth of the actual reduction in poverty over the period of our data. This remains true even after factoring in the possibility that output per capita is reduced by some kinds of land reform (Table

29. Following Banerjee and Ghatak [1997], it would be possible to introduce investment into the model. In general, we would expect increased tenurial security to increase investment.

VIII). To put this in perspective, we compared the effect of land reforms on poverty with the effect of changes in per capita income. This comparison suggests that implementing a land reform has a similar effect on poverty reduction to a 10 percent increase in per capita income, or around four to five years growth at the all-India average growth rate over this period.[30]

Since the effects of redistributive intervention on poverty and growth are not known a priori, a significant literature has tested these links using cross-country data. Bénabou [1996] reviews this literature and emphasizes the diverse findings. While adding to our general understanding, the difficulties of finding reliable cross-country measures of redistribution is a significant drawback in this research agenda. There seems little doubt, therefore, that exploiting policy variation due to the federal structure of some developing countries may be an important additional source of evidence on policy incidence. It will also help to get behind broad brush policy categories such as education or health expenditures that mask important policy variations. Our study underlines that, even within a particular area of government intervention (i.e., land reform), the empirical effects may vary depending on the exact form that the intervention takes. This is true, moreover, even though our policy measures are themselves fairly broad. Future efforts to quantify the empirical relationship between growth, poverty, and redistribution will doubtless benefit even more from a detailed specification of how particular policy interventions are structured and implemented across space and time.

DATA APPENDIX

The data used in the paper come from a wide variety of sources.[31] They come from the sixteen main states listed in Table I. Haryana split from the state of Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana.

30. Thus, we regressed poverty on per capita income (along with state effects and year effects) and compared the coefficient on per capita income with that obtained on land reform. (It made essentially no difference whether we did this by including both land reform *and* per capita income in one regression, or ran separate regressions in one case including only land reform and in the other only income per capita.) Results are available from the authors on request.

31. Our analysis has been aided by Ozler, Datt, and Ravallion [1996] which collects published data on poverty, output, wages, prices indices, and population to construct a consistent panel data set on Indian states for the period 1958 to 1992. We are grateful to Martin Ravallion for providing us with these data, to which we have added information on land reform, public finance, and political representation.

Land Reform

To construct the land reform variable used in the regressions, we begin by recording all land reform acts that were passed in a given state and year. By examining the content of each land reform, we then classify each land reform act into four categories (1 = tenancy reform, 2 = abolition of intermediaries, 3 = ceilings on landholdings, 4 = consolidation of landholdings) where a single land reform can belong to several types (see Table II). For each land reform type this gives us a variable that is 0 or 1 in given state s and year t. We cumulate these variables over time to give us four cumulative land reform variables that capture the stock of land reforms passed to date in each of the four categories. We also aggregate across all four land reform categories to give us an aggregate cumulative land reform variable that gives us a measure of the total stock of land reforms passed in state s by year t. Amendments to acts are treated as new pieces of legislation. The Index to Central and State Enactments (Ministry of Law and Justice, Government of India) was used to identify Acts pertaining to land reform in different states. To examine the exact content of these acts, we mainly used Haque and Sirohi [1986] and Zaidi [1985], although a range of secondary sources were used to double-check the correctness of the information provided by these two books and to fill in and update the detail regarding specific legislations. The secondary sources included Appu [1996], Behuria [1997], Bonner [1987], Borgohain [1992], Kurien [1981], Mearns [1998], Pani [1983], Singh and Misra [1964], and Yugandhar and Iyer [1993].

Poverty Data

We use the poverty measures for the rural and urban areas of India's sixteen major states, spanning 1957–1958 to 1991–1992 put together by Ozler, Datt, and Ravallion [1996]. These measures are based on 22 rounds of the National Sample Survey (NSS) which span this period. Not all 22 rounds of the survey can be covered for each of the 22 rounds for each of the 16 states.[32] The NSS rounds are also not evenly spaced: the average interval

32. For 11 states (Andra Pradesh, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal), all 22 rounds have been covered. Because Haryana only appears as a separate state from Punjab in 1965, we have adopted including separate series for these two states from this date onward. For Gujarat and Maharashtra, twenty rounds are included, beginning with the sixteenth round in 1958–1959 (before 1958–1959, separate distributions are not available for these two states as they were merged under the

between the midpoints of the surveys ranges from 0.9 to 5.5 years. Surveys were carried out in the following years: 1958, 1959, 1960, 1961, 1962, 1963, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1973, 1974, 1978, 1983, 1987, 1988, 1990, 1991, and 1992. Because other data are typically available on a yearly basis, weighted interpolation has been used to generate poverty measures for years where there was no NSS survey. The poverty lines used are those recommended by the Planning Commission [1993] and are as follows. The rural poverty line is given by a per capita monthly expenditure of Rs. 49 at October 1973–June 1974 all-India rural prices. The urban poverty line is given by a per capita monthly expenditure of Rs. 57 at October 1973–June 1974 all-India urban prices. See Datt [1995] for more details on the rural and urban cost of living indices and on the estimation of the poverty measures. The headcount index and poverty gap measures are estimated from the grouped distributions of per capita expenditure published by the NSS,[33] using parameterized Lorenz curves using a methodology detailed in Datt and Ravallion [1992].

Agricultural Wages

The primary source for the data is Agricultural Wages in India (Ministry of Agriculture, Government of India). Nominal wage data from this series have been deflated using the Consumer Price Index for Agricultural Laborers to obtain real agricultural wages. No agricultural wage data are available for the state of Jammu and Kashmir, and no separate wage data are available for the state of Haryana.

Income Data

The primary source for data on state income is an annual government publication Estimates of State Domestic Product (Department of Statistics, Department of Statistics, Ministry of Planning). The primary source for the Consumer Price Index for Agricultural Laborers (CPIAL) and Consumer Price Index for Industrial Workers (CPIIW) which are used to deflate agricultural and nonagricultural state domestic product respectively is a number of Government of India publications which include *In-*

state of Bombay). For Jammu and Kashmir, only eighteen rounds can be included, beginning with the sixteenth round for 1960–1961, due to a lack of data.

33. Reports from the National Sample Survey Organisation, Department of Statistics, Ministry of Planning, Government of India and Sarvekshena, Journal of the National Sample Survey Organisation, Department of Statistics, Ministry of Planning, Government of India.

dian Labour Handbook, the *Indian Labour Journal,* the *Indian Labour Gazette,* and the *Reserve Bank of India Report on Currency and Finance.* Ozler, Datt and Ravallion [1996] have further corrected CPIAL and CPIIW to take account of interstate cost-of-living differentials and have also adjusted CPIAL to take account of rising firewood prices. Using their data allows us to put together a consistent and complete series on real total, agricultural, and nonagricultural state income for the period 1960 to 1992. Our measure of agricultural yield is obtained by dividing real agricultural state domestic product by net sown area for all crops which is obtained from a government publication Area and Production of *Principal Crops in India (Directorate of Economics* and Statistics, Ministry of Agriculture).

Public Finance Data

The primary source for state level information on taxes and expenditures is an annual publication, Public Finance Statistics (Ministry of Finance, Government of India). This information is also collated in the Reserve Bank of India's annual publication Report on Currency and Finance.

Population Data

The population estimates are constructed using Census data from the five censuses for 1951, 1961, 1971, 1981, and 1991 (Census of India, Registrar General and Census Commissioner, Government of India). Between any two successive censuses, the state-sectoral populations are assumed to grow at a constant (compound) rate of growth, derived from the respective population totals.

Political Variables

Political variables are the main instruments used in the paper. Data on the number of seats won by different national parties at each of the state elections are from Butler, Lahiri, and Roy [1991]. These primary data are aggregated into four political groupings which are defined in the text and expressed as shares of the total number of seats in state legislatures. State political configurations are held constant between elections.

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