

SOCIAL CAPITAL AND POVERTY IN INDIA

Matthew Morris¹

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Summary

This paper is motivated by the need to expand research on social capital and its effects on poverty. Studies of social capital and its economic payoffs have tended to focus on industrialised countries, whilst those studies which have focused on developing countries have been based on micro level survey data. This paper therefore addresses the need to look at social capital at the wider macro level while examining the impact of social capital on poverty.

The paper focuses on poverty at the state level in India and asks the question: have those states with larger endowments of social capital been more successful at reducing poverty? In order to answer this question an econometric model of poverty is constructed that not only captures the effects of physical and human capital, but also includes social capital as a determinant of poverty. The paper concludes that there is some evidence to support the hypothesis that a state's endowment of social capital does affect the ability of that state to reduce poverty.

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INTRODUCTION

It is important for policy makers to understand the mechanisms through which poverty can be reduced. In the post war period, the development paradigm has been evolving from an almost exclusive focus on physical capital towards a people centred approach to sustainable development, emphasising the social dimensions of development, in particular the role of human and social capital. This paper picks up on some of the themes of contemporary interest; concentrating on the role of social capital in development and examining whether there are economic payoffs to enhancing social capital.

The literature on social capital has focused on problems of conceptualising and measuring social capital and studies of the economic payoffs to social capital have relied on large, detailed survey data to capture the effects of social capital. As a consequence these studies have tended to focus on industrialised countries and small scale studies in developing countries. This paper looks at the problems of analysing the economic payoffs to social capital, in particular their impact on poverty reduction, in developing countries. Whereas other empirical studies on social capital in developing countries have focused on micro level analysis, this paper analyses social capital at the macro level; at the state level in India.

India is a country of enormous ethnic, linguistic, and cultural diversity; consisting of a federation of 25 states; 13 states have populations in excess of 20 million people, six have more than 60 million, three have 80 million, and one has a population of 140 million. There is a great deal of variation in the ethnic composition, religious orientation, languages, natural resources, and economic and social performance of the states.

The population of India in 1994 was 913.5 million, the world's second largest. Its per capita income, in purchasing power parity terms, was US\$1,348². India has the world's largest concentration of poor people with about one-third of the population living below the official poverty line.

Poverty in India has been falling, on average, at a rate of 0.9 percent per annum over the last thirty years. However it can be seen that some states have been more successful than others at reducing poverty. This paper attempts to explain the reasons for differences among India states in reducing poverty. In particular this paper tests the hypothesis that those states which have been relatively well endowed with social capital have had greater success at reducing poverty. Panel data, at the state level is used and an econometric model is constructed which integrates social capital into a broader model of poverty.

The paper proceeds in 5 sections.

- Section One reviews the literature on social capital and looks at problem of conceptualising and measuring social capital.
- Section Two looks at poverty in India at the state level
- Section Three outlines a model of poverty and social capital
- Section Four considers the data used in this study, focusing on the availability and quality of data on social capital.

- Section Five applies the data to the econometric model and the results are reported.

1 CONCEPTUALISATION OF SOCIAL CAPITAL

The definition and measurement of social capital remain two issues which are yet to be resolved in the literature; there is a problem of mapping the concept of social capital into an operational measure which can be used to carry out systematic studies.

This section reviews some of the literature where attempts have been made to measure social capital. It will be seen that the difficulties in conceptualising social capital are mapped onto operationalising problems. There is a problem of discussing social capital in highly abstract terms, of building castles in the clouds, which leads to ambiguity surrounding what is meant by social capital.

Several studies have been carried out on the link between social capital and economic development [Helliwell and Putnam (1995), Putterman (1995), Knack and Keefer (1996)]. These focus on the link between culture and economy; the extent to which social factors determine economic success. They use a variety of approaches, conceptions and measures of social capital to address this issue. It can be seen that in most of these cases the analysis appears to be constrained by the availability of data. It is interesting to look at the way in which these studies have overcome the data limitations in analysing social capital.

In his paper, 'Social capital and development capacity: the example of rural Tanzania' (1995), Putterman asks these questions: i) how and when do cultural conditions facilitate or retard economic development? and ii) are there any cultural preconditions for development? He argues that changes in attitudes, practices and knowledge, though not necessarily correlated with indicators of economic development, may contribute to the potential of such development. Putterman sees social capital as an expanded form of human capital; broadened to consider its social and cultural dimensions and the importance of informal learning. The dichotomous concept of modern and traditional is discarded in favour of a notion of varieties of social organisation and it is within this conceptual framework that Putterman analyses the case of rural Tanzania.

Putterman concludes that human capital needs to be understood as a socially embedded and multi-dimensional phenomenon that takes time to be reshaped and to be accumulated. It is argued that social capital augments human capital and facilitates economic development through increasing a country's capacity to absorb modern technologies and forms of organisation.

Helliwell and Putnam, Knack and Keefer and Rose, and have attempted to measure social capital. Knack and Keefer, following Solow (1995), argue that if social capital is to become more than just a "buzzword" then some form of measurement needs to be identified. Similarly Rose argues that the "the measurement challenge is to turn anecdotes about social networks into quantified data".

Rose, in his paper "Social capital: definition, measure and implications" (1996), criticises using the "number of formal institutions in a society" as a measure of social capital, because it ignores important informal social networks. It is stressed that far more people rely on informal social capital than on formal institutions of state and market resources to deal with their problems. Rose suggests using sample survey techniques to collect data about behaviour, including interaction with national institutions of civil society

² The source of this income and population data is the Human Development Report 1997.

and the state. The form of measure varies with the level of development of the society and Rose warns that in less developed societies there is likely to be greater problems associated with aggregating up to the national (state) level.

Rose uses survey data, from Russia, to illustrate his paper. Types of social capital are identified by asking the question: “on whose help do you rely in the first instance when having problems?”. The significance of social capital for coping in transition economies was measured by considering the “percentage able to get by in a year without spending savings or borrowing”. Social capital for social protection was measured by asking “whether a friend would loan as much as a week’s wages if your household was very short of money”. Rose gives two measures of trust: i) the percentage of workers who trusted/distrusted union officials, and ii) asking households who they would trust with their savings.

In their paper, ‘Does Social Capital Have an Economic Payoff? a cross country investigation’ (1996), Knack and Keefer, use data from the World Values Surveys³ and other sources to look at the relationship between interpersonal trust, norms of civic co-operation, and economic performance. In their study survey indicators are used which are “no doubt inexact - due to translation difficulties, sampling error, and response bias - but which produce values that are consistent with data from independent sources and with anecdotal evidence regarding differences among countries.” [Knack and Keefer (1996)]

Using the World Values Surveys, Knack and Keefer identify indicators for: i) trust, and ii) the strength of norms of civic co-operation. The measure of trust was the percentage of respondents who replied that “most people can be trusted”. The strength of norms of civic co-operation was measured by people’s attitudes, measured on a scale of 1 (always justifiable) to 10 (never justifiable), as recorded in the survey, to the following: i) “claiming benefits when you are not entitled to”, ii) “avoiding a fare on public transport”, iii) “cheating on taxes if you have the chance”, iv) “keeping money that you have found”, and v) “failing to report damage you have done accidentally to parked vehicle”⁴

In their paper, ‘Economic Growth and Social Capital in Italy’, Helliwell and Putnam, use Italian data on social capital to test the hypothesis that some Italian regions have been able to establish and maintain higher levels of output per capita by virtue of greater endowments of social capital. They outline three variables of principal interest; i) an index of civic community - made up of a measure of political behaviour of citizens (newspaper readership and the availability of sports and cultural associations) and a measure of breadth and depth of civic community (turnout in referenda and the incidence of preference voting); ii) an index of institutional performance - a composite measure on the comparative performance of regional governments. It covers 12 separate elements from timeliness of budgets to legislative innovation; and iii) an index of citizen satisfaction - the share of respondents who were “very” or “rather” satisfied with their regional government - based on large sample survey between 1977 and 1988. For more detail on the choice of indicators the reader should refer to Putnam (1993).

³ The World Values Survey was supervised by Ronald Inglehart of the University of Michigan and contains survey data on thousands of respondents from 29 countries.

⁴ The scales were reversed and the values summed over the five items. The average score (out of 50) was 39.4. India ranked highest with a score of 42.7. 34.5 was the lowest score.

In their paper, 'Cents and Sociability: Household Income and Social Capital in Rural Tanzania' [Narayan and Pritchett (1997)], Narayan and Pritchett measure village level "social capital" in rural Tanzania using data from a household survey designed to measure trust and the extent and characteristics of associational activity⁵.

Their study shows that higher village social capital is associated with higher levels of individual's incomes, even after controlling for household education, physical assets, and village characteristics. They argue that the quantitative effect of social capital is surprisingly large: a one standard deviation increase in village social capital predicts expenditures per person (their proxy for income) increase by 20 to 30 percent for each household in the village. This impact is as large as tripling either the level of education or stock of non-farming physical assets. Three strands of evidence are suggested for a link between social capital and income: i) only the social capital of the household's village, not of the household itself is related to incomes, ii) instrumental variables estimates are used to purge the potential joint endogeneity of incomes and social capital: iii) proximate mechanisms are identified through which social capital affects incomes. These include better publicly provided services, greater use of modern agricultural inputs, more community activity on roads, greater use of credit in agriculture.

It can be seen that there are considerable problems in conceptualising and measuring social capital. Here a parallel can be drawn between poverty and social capital. The debate on poverty has focused on narrow versus broad ("vulnerability", "dignity" and "assets") conceptions of poverty⁶ [Baulch (1996), HDR (1997)]. The former focuses on income/consumption poverty, whilst the latter incorporate "vulnerability", "dignity", "assets" and "autonomy". Similarly social capital, the extent of social networks, can be conceptualised at various levels. A narrow approach would be to view social capital as the extent of civil society. A broader approach would include aspects of trust, informal networks of relations and ideas of kinship.

In conceptualising social capital a distinction can be made between formal and informal social capital. Formal social capital refers to formally defined patterns of behaviour, norms of exchange, networks and institutions. Informal social capital refers to those networks which operate outside of this formal system; it refers to things such as kinship, informal networks between individuals, families and groups. It is useful to make this distinction, because it illustrates the difficulties in operationalising the concept of social capital. Whilst measures of the first kind of social capital can be found: e.g. the extent of civil society (measured by the number/membership of NGOs in economy). The second kind is more problematic, requiring surveys of household to be carried out. The collection of such data is expensive, and in the absence of this data, presents problems for the study in hand.

A distinction can be drawn between the extent of social networks and the quality of social networks. It is into the latter that the concept of trust is important. A good introduction to trust is given by Furlong in his paper "The conceptualisation of trust in economic thought" [Furlong (1996)]. Here, Furlong reviews the

⁵ They use membership and characteristics of various groups in Tanzania as a measure of social capital. The groups used were: church, political party, burial society, women's group, muslim group, and farmer's group.

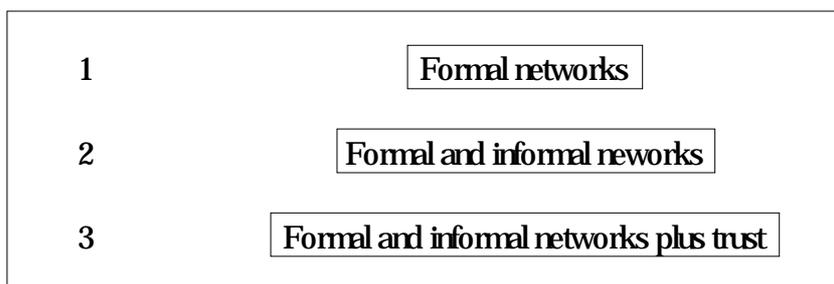
⁶ The 1997 Human Development Report contains an excellent review of the conceptual issues surrounding the definition of poverty and the limitations of using income based measures of poverty. Crucial to the view of poverty in the HDR is the idea of expanding people's choices. Social capital does this in two ways. The first is direct, through increasing the choices open to people. The second is indirect, through increasing incomes, which increases choices. This paper focuses on the latter, whilst recognising the former.

array of definitions of trust in the social sciences. It can be seen that trust is closely related to economic performance; Furlong cites Arrow (1975)

[V]irtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of economic backwardness in the world can be explained by the lack of mutual confidence.

The diagram below shows narrow and broad conceptions of social capital.

Figure 1: Pyramid of social capital concepts



It should also be noted that with regard to poverty, social capital might be considered a component of a broader conception of poverty; with lack of social capital itself being a facet of poverty. In the context of poverty, social capital can be seen as either a means to an end, or as an end in itself, depending on the definition of poverty. For the purposes of this paper narrow conceptions poverty and social capital are used; poverty is defined in terms of income and social capital in terms of the extent of civil society. The rationale for this is that whilst recognising the broader conceptual issues, the modelling of poverty and social capital at the macro level is constrained by the availability of good, reliable data. Broader issues related to social capital and poverty are more effectively captured in specific case studies.

Heller's paper 'Social capital as a product of class mobilisation and state intervention: industrial workers in Kerala, India' provides a good example of the way in which qualitative data on social capital can be used to augment quantitative studies in order to gain a greater understanding of social capital in a specific area. In his paper, Heller argues that state intervention and class mobilisation in the state of Kerala have produced two forms of social capital. Kerala's high level of social development and successful redistributive reforms can be interpreted as a direct result of mutually reinforcing interactions between a programmatic labour movement and a democratic state. This synergy between state and labour has also created the institutional forms and political processes required for negotiating the class compromises through which redistribution and growth can be reconciled. These dynamics are explored through a close examination of both the organised factory sector and the unorganised (informal) sector.

In concluding this section on conceptualising social capital, it can be seen that a positivistic parallel can be drawn between social capital and chemistry. Any student of basic thermodynamics will be able to tell you that the effect of applying heat to a reacting solution is that it speeds up the rate of the reaction. There are

two reasons for this: i) the particles become more excited and therefore move around more, increasing the probability of collision with other particles; and ii) by having more energy, once particles are brought into contact, there is a greater probability that they will react. Similarly social capital affects the economic system in two principal ways: i) through increased social networks, there is greater probability of contact between agents, making transactions more likely (this can be thought of as a kind of multiplier effect); and ii) through the enhanced quality of the relationships between agents, which makes transactions between agents more efficient and more probable (this part acts to reduce the transactions cost of exchanges). Like heat in the chemistry experiment, social capital speeds up the rate of reaction, making the system run faster and more smoothly.

The studies reviewed here illustrate some of the main problems associated with measuring social capital, and the divergent approaches to overcoming these. Within the context of the study of social capital in the states of India, these problems are exacerbated for two reasons: i) comparable data is required at the state level, and ii) the less developed nature of India vis-à-vis the countries in the studies reviewed above, creates problems of generalising up to the state level.

2 POVERTY REDUCTION IN THE STATES OF INDIA

This paper uses the dataset prepared by Datt and Ravallion, which they allowed us to use and from which they produced their papers on poverty in India [Datt and Ravallion (1996a, 1996b)].

What are the patterns in poverty reduction in the states of India? Following Datt and Ravallion, the poverty line used is based on a nutritional norm of 2400 calories per person per day, and is defined as the level of average per capita expenditure at which this norm is typically attained [Planning Commission (1979, 1993)]. The poverty line was thus determined at a per capital monthly expenditure of Rs. 49 at October 1973-June 1974 all-India prices.

Mean consumption and three poverty measures (P) are considered [Foster, Greer and

Thorbecke (1984)]⁷: i) mean consumption (MEAN), ii) the headcount index (H), which measures the incidence of poverty, iii) the poverty gap index (PG), which measures the depth of poverty, and iv) the squared poverty gap index (SPG), which measures the severity of poverty.

The table below shows that some states have been more successful than others at reducing poverty⁸.

⁷ The P_a measure of poverty was introduced by Foster, Greer and Thorbecke in 1981.

$$P_a = 1/n \sum [(z-y_i)/z]^a$$

where

z = the poverty line

y_i = the income of the i th household

a = is a given weight depending on the policy consideration: if $a=0$, then $P_a=H$; if $a=1$, then $P_a=PG$; and if $a=2$, then $P_a=SPG$.

⁸ The trend rates of change were calculated using the following regression for each of the states

$$\ln P_t = \text{TREND} * t + \eta + \epsilon_t$$

where P_t is the measure of poverty and ϵ_t is the error term, which follows an AR(1) process.

Table 1: Trend rates of change in rural living standards, 1957-58 to 1991-1992

State	Mean consumption	Headcount index	Poverty gap index	Squared poverty gap index
		(Incidence)	(Depth)	(Severity)
Percent per year				
(Pooled)	(0.41406)	(-0.88731)	(-1.68873)	(-2.32514)
Andhra Pradesh	0.98655	-1.84732	-3.19518	-4.22719
Assam	-0.42454	0.55639	0.57843	0.65803
Bihar	-0.00408	-0.0087	-0.84586	-1.56561
Gujarat	0.67011	-1.35348	-2.47739	-3.38126
Haryana	0.72957	-2.49105	-2.90517	-3.28239
Jammu and Kashmir	0.27986	-0.48026	-0.97417	-1.42312
Karnataka	-0.10782	-0.34482	-0.70595	-1.02348
Kerala	1.65314	-2.26899	-3.91682	-5.10138
Madyha Pradesh	0.39002	-0.44853	-1.5417	-2.37474
Mararashtra	0.72521	-0.89435	-1.47214	-1.89022
Orissa	0.8012	-1.5241	-2.73323	-3.83885
Punjab	0.61311	-2.6872	-4.66962	-6.42747
Rajasthan	0.10656	-0.46839	-0.92812	-1.31608
Tamil Nadu	0.99757	-1.33711	-2.25434	-2.98289
Uttar Pradesh	0.35863	-0.69506	-1.27927	-1.79855
West Bengal	0.87655	-1.85013	-2.96017	-3.91729

Source: These results correspond to those of Datt and Ravallion (1996b) and were reproduced using their dataset

Poverty in Punjab, Haryana and Kerala (measured by the headcount index) fell by 2.7%, 2.5% and 2.3% per annum respectively. In comparison the rates of poverty reduction in Madyha Pradesh, Karnataka and Bihar were less than half of one percent (0.4%, 0.3% and 0% respectively). In one case, Assam, the incidence of poverty actually increased at a rate of 0.6% per annum. Hypothesis tests found these four cases to be not significantly different to zero.

There is clearly a very divergent experience among the states of India in reducing the incidence, depth and severity of poverty. It is therefore important to look at the reasons why some states have been more successful than others at reducing poverty.

3 MODELLING POVERTY AND SOCIAL CAPITAL

This paper builds upon the model of poverty reduction used by Datt and Ravallion (1996)⁹. In this section the model is explained, its limitations discussed and modified to include the effects of different endowments of social capital.

The model contains three main components: i) the dependent variables - which consist of various measures of poverty, ii) the time-dependent explanatory variables, and iii) the initial conditions. The model therefore captures the way in which the evolution of poverty over time is a function of certain time specific

⁹ For a more detailed exposition of this econometric model the reader should refer to the Datt and Ravallion paper. In particular problems associated with the unevenly spaced data are discussed.

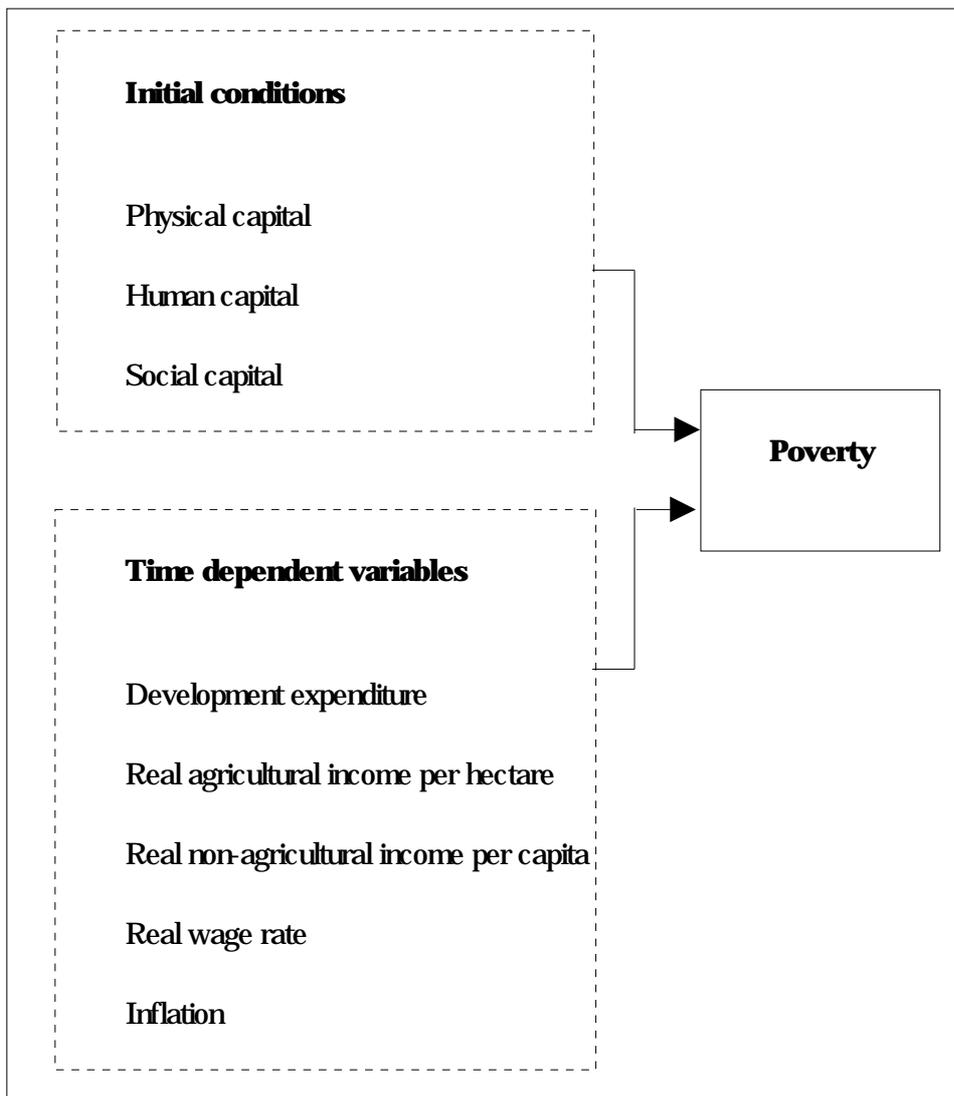
factors (income, inflation, the real wage etc.) and also the states' initial endowments of physical, human capital. It is the object of this paper to extend this model to examine the effect of social capital as a determinant of poverty reduction. The diagram below shows an expanded model structure, where social capital is included.

The following econometric model is estimated for measured poverty in region i at date t (P_{it}).

$$(1) \ln P_{it} = \pi \ln Y_{it} + \gamma' X_{it} + \eta_i + \varepsilon_{it}$$

where Y_{it} is a matrix of time dependent variables, X_i is a matrix of the initial conditions, η_i are the time-invariant state-specific fixed effects and ε_{it} is an error term which is assumed to follow an AR(1) process. The model is estimated using a Least Squares Dummy Variable (LSDV) approach [Greene (1993), Maddala (1992)]. This, fixed effects approach, assumes that differences across units can be captured in the intercept term. In the formulation above, each η_i is an unknown parameter to be estimated.

Figure 2: Model structure



4 DESCRIPTION OF THE DATA

This section outlines indicators of social capital and reviews the data used by Datt and Ravallion (1996). The data come from various rounds of the Indian NSS.

Annex One (A1) shows the variables used in the model; the first section of the table show the variables used by Datt and Ravallion and the third shows variables indicating social capital.

Variables which affect the consumption/income of a person on or near the poverty line will also affect the evolution of the poverty measure. Datt and Ravallion (1996a and 1996b) suggest important roles for agricultural yield, non-farm income, inflation and the real wage rate. In addition to this, development expenditure is included to examine the impact on poverty of government spending.

The data on time dependent variables comes from NSS rounds¹⁰. Datt and Ravallion (1996a) make the following points about the time-dependent explanatory variables: i) the data on some of the time dependent variables contains gaps, ii) the data is spaced ($0.9 < \tau < 5$) and the NSS rounds do not cover a full 12 month period. To overcome the first problem rounds 13, 14, 15 and 46 are excluded from the dataset. The second problem is overcome by log-linearly interpolating the annual data to the midpoint of each NSS round

The initial conditions, summarised in Annex One (A1), reflect initial stocks of physical and human capital, adopted by Datt and Ravallion. These variables come from a range of data sources and correspond to values around the year 1960. The variables cover: i) **infrastructure** - ELCT, ROAD and IRR, ii) **landlessness** - NOLAND, iii) **education** - LITM, LITF, iv) **health/demography** -GFR, and v) **urban-rural disparity** - MCR.

Datt and Ravallion do not include these physical and human capital indicators at time dependent explanatory variables for two reasons: i) times series data is unavailable, and ii) including these indicators as time dependent variables would raise problems of endogeneity due to the development expenditure variable - refer to Annex Two (A2) for the composition of development expenditure.

This ability of this model to overcome the lack of data on physical and human is attractive in that it allows us to overcome some of the problems of deficient social capital data. The social capital data comes from a variety of sources and corresponds to values around the year 1960. Data on social capital is at best scarce, so in order to measure the stock of social capital indirect measures have been used; measures of the extent of the press, local organisations, social demographics, rural-rural linkages and voting patterns. These indicators are summarised in Annex One (A1) and the values reported in Annex Three (A3). The following variables (all in log form) were chosen for describing the initial conditions of social capital:

i) **Extent of the press:** Here, the number of newspaper per state (NOPAP), the circulation of newspapers in hundreds of thousands (CIRC) and the average circulation of papers (AVCIRC) were used [Nair (1995)].

ii) **Local organisations:** The indicators here correspond to the numbers of youth clubs and women's groups for each state. Specifically the indicators were: i) the average number of youth clubs functioning per block

(YC), ii) membership of youth clubs functioning per block (MYC), iii) average number of membership in youth clubs functioning per 100 youths (MYC100), iv) the average number of Mahila Samitas (women's groups) functioning per block (MS), v) average membership of Mahila Samitas per block (MMS), vi) average number of Balwadis/nurseries functioning per block (NURS), and vii) average membership of Balwadis/nurseries per block (MNURS) [Government of India (1966)].

iii) **Social demographics:** here the indicators used were: i) the endogamy rate - the percentage of births in rural areas occurring at the child's mother's village (ENDOG), ii) the marriage distance (MARDIST), and iii) the percentage of the rural population widowed, divorced or separated (FEM) [Sopher et al.(1980)].

iv) **Rural-Rural linkages:** where member of the family (village) migrate from one rural location to another, migration may act as a proxy for linkages between villages in rural areas. The variables used are: i) net female rural to rural migration (MIGF), and ii) net male rural to rural migration (MIGM) [Sopher et al.(1980)].

v) **Voting patterns:** voting patterns indicate the extent to which people are included within and linked into networks of the democratic process. The variables used are: i) the turnout at the 1962 general election as a percentage of the electorate (TURN), ii) the number of spoilt papers as a percentage of the total electorate (SPOILT), and iii) the number of candidates per seat (CAND) [Butler et al. (1991)]

These measures are far from ideal and do not convey fully the multidimensional nature social capital. In particular they capture some aspects of the strength of civic community, however they fail to capture any of the effects of trust.

The ability to disentangle the effects of the various initial conditions is related to there degree of correlation with one another; high levels of correlation indicate multicollinearity within the model and lead to inefficient estimators. Annex Four (A4) shows the correlation matrix for the initial endowments of social capital. The table shows that in most cases there is only weak correlation. There are a few cases of strong correlation but these present no serious problems; for example strong correlation between male and female literacy rates, between the number of papers and circulation, between number of organisations and membership etc. The implication of this is that where there is strong correlation between similar variables (e.g. number and circulation of newspapers) a decision has to me made to drop one or the other.

5 ESTIMATION OF THE ECONOMETRIC MODEL AND RESULTS

Does social capital have an economic payoff in terms of reduced poverty and do differences in social capital help to explain the differing performances amongst states at raising rural living standards? This question is dealt with in two ways: i) by comparing social capital and poverty reduction performance for each state, and

¹⁰ The reader should refer to Ozler, Datt and Ravallion (1996) for details of the dataset used in this study.

ii) running an econometric model to assess the poverty reducing impact of social capital, whilst holding other factors constant.

The maps in Annex Five (A5) and Annex Six (A6) show the distribution of poverty reduction and social capital among states. This pictorial representation shows that there is a strong correlation between poverty reduction and social capital. In particular five states experienced both high levels of poverty reduction and high levels of social capital: i) Punjab, ii) Gujarat, iii) Kerala, iv) Tamil Nadu, and v) Andhra Pradesh. These crude results indicate that there is a relationship between social capital and poverty, however to confirm this result the econometric model identified in equation (1) is estimated

The initial specification of the model consisted of the time dependent variables (Y_{it}) which comprise current and lagged values of the $\ln YPH$, $\ln NSA$, $\ln YNA$, $\ln CPIAL$ and $\ln DEVEX$. This is further refined so that the matrix of time dependent variables is made up of: i) the sum of current and lagged $\ln YPH$, the sum of current and lagged $\ln YNA$, Inflation [given by $(\ln CPIAL_{it} - \ln CPIAL_{it-\tau}) / \tau_i$], and lagged $\ln DEVEX$. In addition to these time dependent variables, the log of the real wage rate ($\ln RWAGE$) is also included

This equation was used as the starting point

$$(2) \ln P_{it} = \pi_1 \ln Y_{it} + \pi_2 Y_{it-1} + \gamma^* X_{it} + \eta_i + \varepsilon_{it}$$

Hypothesis tests were carried out and it was found that many of the social capital variables were not significant; many of them were highly correlated with one another.

Refining the regression, the following two models were developed. The first considers the effect of social capital in the form of civil society on poverty reduction. The second considers social capital in the form of political participation.

Regression 1

$$(3) \ln P_{it} = \alpha_1 * (\ln YPH_{it} + \ln YPH_{it-1}) + \alpha_2 * (\ln YNA_{it} + \ln YNA_{it-1}) + \alpha_3 * \ln DEVEX_{it-1} + \alpha_4 * \ln INFLN_{it} + \alpha_5 * RWAGE_{it} + \beta_1 * (\ln IRR_i * T) + \beta_2 * (\ln IMR_i * T) + \beta_3 * (\ln CIRC_i * T) + \beta_4 * (\ln MEMMS_i * T) + \beta_5 * (\ln ENDOG_i * T) + \varepsilon_{it}$$

	Mean Consumption (MEAN)	Headcount (H)	Poverty Gap (PG)	Squared Poverty Gap (SPG)
Current plus lagged real agricultural income per hectare	.0712045 (4.102839)	-.0922870 (-3.445566)	-.1693907 (-4.073990)	-.2313947 (-4.144099)
Current plus lagged real non-agricultural income per capita	.1649921 (7.048567)	-.2662435 (-7.583751)	-.4113088 (-7.593044)	-.5295225 (-7.288048)
Lagged real development expenditure per capita	.1058163 (2.341506)	-.0796295 (-1.151763)	-.1712729 (-1.598803)	-.2409388 (-1.675416)
Inflation	-.2407043 (-4.082778)	.2383762 (2.581373)	.3664703 (2.547842)	.4298837 (2.223975)
Real wage	.0139750 (2.185411)	-.0305250 (-3.143060)	-.0475678 (-3.166259)	-.0609144 (-3.021415)
Irrigated area	.0026983 (2.587833)	-.0043792 (-2.880096)	-.0069992 (-3.000324)	-.0093713 (-2.998434)
Infant mortality rate	-.0077190 (-6.537553)	.0110940 (6.443801)	.0167290 (6.332754)	.0208307 (5.885591)
Newspaper circulation	.0008207 (1.253445)	-.0024886 (-2.591962)	-.0023269 (-1.577814)	-.0019742 (-.998912)
Members of Mahila Samatis	.0024495 (2.625545)	-.0031346 (-2.304417)	-.0052108 (-2.496620)	-.0070561 (-2.523341)
Endogamy rate	-.0010792 (-.684542)	.0037415 (1.624446)	.0036682 (1.037609)	.0042789 (.903335)
AR1	.3561547 (5.149219)	.2984314 (4.053561)	.2857672 (3.863551)	.2831833 (3.842683)

Figures in parentheses are t-ratios

Regression 2

$$(4) \ln P_{it} = \alpha_1 * (\ln YPH_{it} + \ln YPH_{it-1}) + \alpha_2 * (\ln YNA_{it} + \ln YNA_{it-1}) + \alpha_3 * \ln DEVEX_{it-1} + \alpha_4 * \ln INFLN_{it} + \alpha_5 * RWAGE_{it} + \beta_1 * (\ln IMR_i * T) + \beta_2 * (\ln CIRC_i * T) + \beta_3 * (\ln SPOILT_i * T) + \beta_4 * (TURN_i * T) + \epsilon_{it}$$

	Mean Consumption (MEAN)	Headcount (H)	Poverty Gap (PG)	Squared Poverty Gap (SPG)
Current plus lagged real agricultural income per hectare	.0730431 (4.315906)	-.0937844 (-3.567929)	-.1728401 (-4.302316)	-.2363467 (-4.394936)
Current plus lagged real non-agricultural income per capita	.1704255 (7.657633)	-.2642095 (-7.811463)	-.4180990 (-8.225782)	-.5434267 (-8.014791)
Lagged real development expenditure per capita	.1186540 (2.706151)	-.1025663 (-1.516176)	-.2130438 (-2.071294)	-.3003432 (-2.183738)
Inflation	-.2400301 (-4.145597)	.2409687 (2.645642)	.3700998 (2.630104)	.4352607 (2.305375)
Real wage	.0137437 (2.274699)	-.0330592 (-3.570633)	-.0497512 (-3.554127)	-.0631230 (-3.376339)
Infant mortality rate	-.0081083 (-5.260983)	.0114041 (4.986714)	.0173502 (5.136791)	.0212066 (4.722805)
Newspaper circulation	.0023163 (4.797611)	-.0038185 (-5.309201)	-.0053681 (-5.039828)	-.0063739 (-4.499003)
Percentage of spoilt papers	-.0143514 (-4.342543)	.0198239 (4.035381)	.0346801 (4.773693)	.0475973 (4.927059)
Election turnout	.0043986 (2.304782)	-.0059670 (-2.102810)	-.0099273 (-2.365446)	-.0127265 (-2.280458)
AR1	.3199050 (4.614250)	.2735748 (3.707941)	.2357370 (3.160524)	.2277342 (3.058612)

Figures in parentheses are t-ratios

By looking at the elasticities for the social capital variables, the impact of social capital on poverty reduction can be assessed. The signs on the coefficients suggest those states which have been relatively well endowed with social capital have been more successful at reducing poverty.

Looking at the two social capital regressions which were run, the first included variables on: i) newspaper circulation, ii) members of mahila samatis and iii) the endogamy rate, and the second included: i) spoilt papers and ii) election turnout. The first regression shows that higher newspaper circulation and membership of womens groups lead to higher mean consumption and lower poverty being observed. Similarly, lower endogamy rates are associated with higher mean consumption and lower levels of poverty.

The second regression shows that social capital in the form of higher levels of participation (in elections), measured by the proportion if spoilt paper and election turnout, is associated with higher levels of mean consumption and lower levels of poverty.

Whilst this study does provide evidence for a relationship between social capital and poverty reduction, it is limited in the extent of its analysis for the two main reasons: i) the lack of detailed data on social capital, ii) the modelling complexities involved in modelling broad conceptions of social capital and poverty. It therefore follows that for an effective understanding social capital, this approach needs to be augmented by more detailed state specific case studies.

CONCLUSION

There are many problems associated with conceptualising and measuring social capital. The idea of considering narrow versus broad conceptions of social capital is useful because it allows us to examine the limitations of various approaches to analysing the economic impact of social capital. Here I have drawn a parallel with poverty, where the kind of research questions which can be addressed depend crucially on the way in which the concept is conceived.

The studies reviewed in this paper show that there are two main types of study on the economic payoffs to social capital: i) micro level studies based on sample data, and ii) macro level studies based on national and sample data. It can be seen that within the developing country context, the former has been the exclusive vehicle for analysis; allowing detailed study of the effects for broadly conceived social capital. However these approaches suffer from a limitation, in that they provide no means for aggregating up and looking at social capital from the macro level. The studies which have focused on social capital at the macro level have tended to focus on industrialised countries, where there is available data. In the developing country context this kind of data is scarce making analysis more problematic. In this paper a model has been constructed that makes efficient use of limited data.

It can be seen clearly from the analysis that those states which were initially well endowed with social capital, were also more successful at reducing poverty; thus Putnam's result for Italy can be replicated with developing country data.

APPENDIX

A1: Explanatory variables

Time dependent (Y)	Denotion
log of real agricultural SDP per hectare of net sown area*	YPH
log of net sown area per person in state	NSA
log of real non-agricultural state domestic product per person in state*	YNA
log of rate of inflation in rural sector**	INFLN
log of real wage rate	RWAGE
log of per capita real state development expenditure***	DEVEX

Initial Conditions I (X) - physical and human capital	
log of % of villages with electricity	ELCT
log of km. of rural roads per 100 sq. km. of area	ROAD
log of % of operated area irrigated	IRR
log of % of households landless	NOLAND
log of female literacy rate (per '000 popn.)	LITF
log of male literacy rate (per '000 popn.)	LITM
log of infant mortality rate (per '000 live births)	IMR
log of ratio of urban-to-rural mean consumption (%)	GFR
log of general fertility rate (per '000 females aged 15-44)	MCR

Initial conditions II (X) - social capital	
log of number of newspapers	PAP
log of circulation of papers (,000)	CIRC
log of average circulation of papers	AVCIRC
log of average of youth clubs functioning per block	YC
log of average membership of youth clubs functioning per block	MYC
log of average number of membership in youth clubs per 100 youths	MYC
	100
log of average number of Mahila Samitis (women's groups) functioning per block	MS
log of average membership of Mahila Samitis per block	MMS
log of average number of Balwadis/nurseries functioning per block	NURS
log of average membership of Balwadis/nurseries per block	MNURS
log of endogamy rate (% of births in rural areas occurring at child's mother's natal village)	ENDOG
log of marriage distance	MARDIST
log of net female rural-to-rural migration	MIGF
log of net male rural-to-rural migration	MIGM

* Real values of agricultural and non-agricultural SDP are calculated using adjusted CPIAL for each state as the deflator.

** The rate of inflation in the state is measured by the change per year in the natural log of (adjusted) CPIAL; $INFLN_t = (CPIAL_t - CPIAL_{t-1})/\tau_t$

*** Development expenditure consist of spending on both economic and social services - summarised in A2

A2: Composition of development expenditure

Economic services	Social services
Agriculture and allied activities	Education
Rural development	Medical and public health
Special area programs	Family welfare
Irrigation and flood control	Water supply and sanitation
Energy	Housing
Industry and minerals	Urban development
Transport and communications	Labour and labour welfare
Science	Social security and welfare
Technology	Nutrition
Environment	Relief (on account of natural calamities)

A3: Initial conditions II (X) - social capital

	pap	circ	avcirc	yc	myc	myc 100	ms	mms	bn	mbn	endog	fem	migf	migm	mar	spoilt	turn	cand
Andhra Pradesh	567	848	1447	22	336	5	17	264	2.6	29	16.11	14.8	-17194	-45139	13.9	0.718	4.169	1.229
Assam	110	186	1691	16	343	5.2	13	359	2.4	65	2.2	6.1	94472	205481	10.6	0.800	3.966	1.228
Bihar	225	578	2569	23	355	5.3	4	96	2	43	9.02	11.2	-164238	-346479	10.1	0.687	3.850	1.480
Gujarat	527	1544	2930	23	547	7.5	10	199	4.9	151	6.18	9.3	23936	24960	13.2	0.923	4.060	1.128
Karnataka	398	1235	3103	15	378	5.7	4	118	3.7	1.4	15.17	13.3	64537	106037	15.1	1.004	4.082	1.219
Kerala	569	2536	4457	18	720	7.9	11	1206	5.6	170	17.68	12.3	21994	-3525	8.7	0.405	4.257	1.021
Madyha Pradesh	467	605	1295	26	372	5.5	8	135	5.3	76	9.71	11.8	97018	137373	16	0.579	3.637	1.212
Maharashtra	1706	6145	3602	34	660	10.8	18	400	6.2	166	18.05	12.7	9129	33939	15.6	1.077	4.100	1.339
Orissa	119	208	1748	34	788	13.4	8	234	9.8	237	4.66	12.5	-18450	-42824	9.6	0.080	3.161	0.896
Punjab	427	595	1393	13	178	2.4	11	200	4.1	89	12.97	12.2	-37949	-99265	19.4	0.803	4.180	1.581
Rajasthan	572	634	1108	20	298	3.8	8	139	2.3	46	6.23	9.6	-32815	-25598	20.8	0.755	3.958	1.618
Tamil Nadu	870	4942	5680	6	129	1.9	9	202	4	95	14.23	14.1	-127664	-128442	10	0.786	4.231	1.310
Uttar Pradesh	1473	2273	1543	8	129	1.8	6	47	9.2	89	4.09	9.9	-34224	-164964	14	0.756	3.931	1.639
West Bengal	1204	2729	2267	20	578	7.9	5	148	1.7	81	5.88	13.5	83450	286301	8.2	0.543	4.0217	1.134
Jammu and Kashmir				4	49	0.8	0.5	6	0.4	60	2.66	11.3	-1588	-5020	5	0.3955	4.010	0.916

A4: Correlation matrix of initial conditions - social capital

	pap	circ	avcirc	yc	myc	myc 100	ms	mms	bn	mbn	endog	fem	mardist	spoilt	turn	cand
pap	1															
circ	0.892	1														
avcirc	0.254	0.662	1													
yc	-0.269	-0.311	-0.222	1												
myc	-0.218	-0.093	0.162	0.912	1											
myc100	-0.259	-0.133	0.144	0.925	0.989	1										
ms	0.080	0.058	-0.015	0.614	0.616	0.588	1									
mms	-0.139	0.081	0.402	0.632	0.772	0.724	0.878	1								
bn	0.109	0.133	0.108	0.471	0.523	0.511	0.700	0.605	1							
mbn	0.089	0.085	0.037	0.140	0.144	0.132	0.258	0.230	0.261	1						
endog	0.415	0.538	0.459	0.292	0.325	0.290	0.459	0.522	0.358	-0.186	1					
fem	0.421	0.472	0.308	0.029	0.057	0.066	-0.038	0.028	0.076	-0.138	0.702	1				
mardist	0.192	-0.091	-0.515	0.426	0.241	0.217	0.628	0.359	0.526	-0.196	0.408	-0.044	1			
spoilt	0.400	0.392	0.176	0.020	-0.030	-0.035	0.336	0.134	0.095	-0.390	0.337	-0.145	0.584	1		
turn	0.522	0.599	0.413	-0.388	-0.256	-0.330	0.1051	0.1371	-0.263	-0.216	0.416	0.1075	0.068	0.595	1	
cand	0.328	0.092	-0.344	-0.045	-0.221	-0.260	0.285	0	0.191	-0.135	0.164	-0.161	0.695	0.575	0.269	1

A5: Reduction of (headcount) poverty in the states of India

The figure below show the geographic distribution of poverty reduction in India. The shaded states correspond to those states with above average poverty reduction.



A6 Social capital in the states of India

The figure below show the geographic distribution of social in India. The shaded states correspond to those states with above high levels of social capital¹¹.



¹¹ The level of social capital was estimated by recoding the data on social capital: i) pap, ii) circ, iii) yc, iv) ms, v) bn, vi) endog, vii) mardist, viii) spoilt, ix) turn, and x) cand. The data was recoded by calculating quartiles and assigning a value between 0 and 3 for each quartile. An average score for each state was then calculated - giving each state a social capital index between 0 and 3. The diagram above show those states with a score over 1.5

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