Saving the Next Generation: Political Capacity and Infant Mortality Decline in India’s States

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National political development and its effect on economic and demographic changes are topics extensively addressed by power transition theory. Studies in political demography demonstrate that the political capacity of national governments plays a critical role in altering mortality and fertility patterns in developing nations. We test the effects of political capacity on infant mortality rates in fifteen Indian states in the period 1981 to 2000. We find that the political capacity of a state government lowers infant mortality in the low and middle income states. This effect gets weaker across higher income levels. We also find that the wealthier states tend to be healthier. Female education exerts a negative effect on infant mortality within urban populations but its effects diminish in rural populations. A key implication of our study is that the politically capable states in India are positioned to complete the demographic transition and are likely to emerge as the regional drivers of economic growth. Sustained gains in economic productivity will eventually determine India’s role in world politics in the twenty-first century.

KEYWORDS Power transition theory, political capacity, infant mortality, India

Power transition theory (PTT) articulates an inter-related set of theoretical propositions that explain the dynamics of conflict and cooperation among nations at the global level, and the interaction between politics, economic and demographic change at the national level (Organski, 1958, 1968; Organski, 1965; Organski and Kugler, 1980; Organski et al., 1984; Kugler

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National power or the ability of a nation “to impose on or persuade an opponent to comply with demands” is a key element used to explain interstate interactions in the global and regional power hierarchies (Tammen et al. 2000, p. 8). Changes in national power result in the movement of a nation relative to others within a hierarchy. Relative power distributions determine conditions of power parity or preponderance among nations, creating the structural conditions for war or peace in world politics.¹

National power and its variation across nations and over time are determined by its three components: national population size, economic productivity of the population, and the capacity of the national political system. As Tammen et al. (2000, p. 18) state, “population is the sine qua non of great power status.” Population size determines the potential power of a nation. A large yet unproductive population does not ensure a nation great power status. If this population were to transform into a productive one, the subsequent economic gains greatly alter prospects of great power status. Economic productivity is thus another critical component that allows nations to project their capability far beyond their borders.

Demographic stability contributes to the productivity of a population. The demographic transition leading to low birth and death rates, total fertility rates at replacement levels, and high life expectancy has a favorable impact on the developmental trajectory of nations. Demographic stability generates opportunities for human capital accumulation and transmission across generations (Soares, 2005). As the ability to innovate and derive gains from production and organization increases so do economic productivity and the standards of living (Ahituv, 2001; Barro and Becker, 1989; Becker, Murphy, and Tamura, 1990; Feng, Kugler, and Zak 2000; Galor and Weil, 2000).

In world politics today, large and stable populations such as the U.S. and EU are not only more productive but among the most powerful as well (Maddison, 2001; Tammen et al. 2000). In contrast, nations with expanding populations have little incentive to accumulate human capital and, consequently, remain entrenched in a poverty trap. Barro and Sala-i-Martin (2004) identify 18 sub-Saharan African countries experiencing negative growth in per capita real domestic product in the period 1960–2000. The low income poverty trap in much of sub-Saharan Africa has been, in part, attributed to low life expectancy and high population growth (Bloom and Sachs, 1998). The share of population living under conditions of extreme poverty is approximately 49 percent (United Nations, 2003). In the early 1950s, Asian and African nations exhibited similar levels of life expectancy: 41.2 against 37.8 years, a difference of 3.4 years. The current gap is about 16.3 years, with life expectancy of 62.8 and 46.5 years respectively. Population growth
in sub-Saharan Africa has averaged approximately 2.8 percent in the past three decades compared to 1.8 percent for other less developed countries (in Asia and Latin America). The decline in mortality coupled with persistent high fertility has resulted in an expansion of the youth cohort and a reduction in the ratio of the working-age to dependent population. High youth dependency ratio has led to a dilution of human capital as evidenced by a decline in primary school enrollment ratios—from 68 to 65 percent of the primary school age cohort for females and from 90 to 78 percent for males (World Bank, 1997). On the other hand, the Chinese experience suggests that a nation can escape the poverty trap by effectively managing its population. For instance, China has gained 27 years of life expectancy in 30 years, lowered infant mortality and total fertility by 36.1 and 50.2 percent respectively in a 15 year period, from 1970 to 1985 (United Nations, 1989) and reduced the share of population living in extreme poverty from 33 to 18 percent in the period 1990 to 1999 (United Nations, 2003).

The third component of national power is political capacity. Political capacity or the ability of the government elite to mobilize the population and extract resources needed to implement national goals plays a critical role in motivating a transition to demographic stability. The expansion of the state machinery that accompanies national economic development has the unintended effect of lowering mortality and fertility (Organski et al., 1984). Political capacity also enables a nation to resolve domestic conflicts and maintain internal stability (Benson and Kugler, 1998). By generating conditions conducive to economic growth, political capacity can alter the growth path of a developing nation (Feng, Kugler, and Zak, 2000). The interaction between political development, economic productivity, and demographic change within nations is of theoretical significance in PTT, as it is the motor for structural power changes in the global hierarchy.

This study empirically verifies a key demographic relationship at a sub-national level. We identify the impact of political capacity on infant mortality rates in fifteen Indian states over the period 1981–2000. Section I develops the relationship between politics and demographic change. Section II outlines the key theoretical expectations within the context of the Indian states. Section III addresses the variables and data used in this analysis. Section IV presents an analysis of the data, estimation, and a discussion of the results and section V concludes.

POLITICAL CAPACITY AND DEMOGRAPHIC CHANGE IN PTT

Studies in political demography specify the theoretical relationship among political capacity, economic development and demographic change within nations (Arbetman and Kugler, 1997, Organski et al., 1984, Feng, Kugler,
and Zak, 2000, 2002a, 2002b). The classical demographic transition theory (Thompson, 1929; Notestein, 1945) provides a starting point. This theory develops a set of generalizations relating the transition from a state of high to low birth and death rates, and from low to high life expectancy with levels of socioeconomic development in a nation. While the inverse effect of income on fertility has emerged as a strong empirical result (Barro, 1991; Becker, 1992; Feng, Kugler, and Zak, 2000), the classical demographic transition theory has been unable to explain the significant changes in fertility and mortality patterns in nations at low levels of development. Organski et al. (1984) address this deficiency by examining the impact of national political development (or political capacity) on vital rates.

Political capacity speaks to the effectiveness of national political systems in the tasks they set out to perform. Do government elites have the tools to effectively implement a chosen national agenda in the face of competing demands? How successful are political systems in collecting, pooling, and allocating human and material resources toward national goals? Political capacity is the ability of a national government to mobilize available human resources (political reach) within its society and collect material resources (political extraction) to implement national goals. Political reach and extraction are the twin mechanisms that drive the expansion of the scale and scope of government activities within society, resulting in the “massive expansion and transformation of the political system” (Organski and Kugler, 1980, p. 7).

The processes characterizing political development within a nation occur alongside social and economic development. In the initial stages of development, the primary concerns of the ruling elite are maintaining security and extending central political control over larger sections of a population, rather than implementing production and welfare enhancing policies (Organski, 1965). The limited pool of available human and material resources results in low levels of extraction. State treasuries retain very little residual revenue following substantial expenditures to maintain political support and internal order. Consequently, nations in the early stages of development reflect low political capacity. Attempts to increase political capacity through additional extraction from populations at subsistence income levels generate political costs likely to threaten the very survival of a government. Mobilization of previously untapped sections of the population, however, expands the potential resource pool. The limit for political reach occurs when all available human resources are effectively mobilized within the nation.

National economic development not only increases the resource base from which a government can extract, but generates a variety of societal demands as well. The satisfaction of competing demands necessitates the provision of public goods that in turn requires additional revenue extraction. Successful implementation of policy generates new sources of
political support for a regime and lowers the political costs associated with revenue extraction. A nation can experience large gains in political capacity through effective extraction under conditions of development, while maintaining productive investments in human and physical capital. As residual tax revenue increases, governments have greater discretion in policy setting (Feng, Kugler, and Zak, 2000). In the advanced stages of development, the limits to extraction are reached. Additional revenue extraction does not generate an increase in political capacity but imposes ever increasing political costs.

The growth in the extractive capacity of a nation under conditions of development has the unintended consequences of reducing birth and death rates, in turn, increasing the economic productivity of individuals in society. An expansion of the state apparatus results in greater governmental involvement in infrastructure development, the provision of public health services, and implementation of laws that create opportunities for women in education and employment and limit the participation of children in the workforce. These actions not only increase the likelihood of infant and child survival but the opportunity costs of additional children as well. Political intervention by capable governments thus has the effect of altering mortality outcomes and fertility choices.

Rouyer (1987), in one of the first studies to estimate the effects of political capacity on fertility in fifteen Indian states, reports similar patterns. He suggests that at relatively low incomes, the state government emerges as an important provider of resources that enhance the quality of life of its population. The greater the political effort a government exerts, the more effective is policy implementation in the areas of health, education, and family planning. Politically capable governments can successfully implement policies leading to an improved quality of life, greater control for women over marriage decisions, and availability of and access to family planning alternatives. As these outcomes are realized fertility starts to decline. The results, using data from 1977, show that political capacity has a positive effect on the measure of physical quality of life (and a negative effect on infant mortality) that in turn has a negative effect on fertility. Rouyer concludes that under conditions of low economic development, it is political capacity rather than income that has a direct and far more significant role in reducing fertility.

While extant studies examining variation in infant and child mortality at the national, state, and district levels in India have focused on the socioeconomic and proximate determinants (Claeson et al., 1999; Claeson et al., 2000; Zachariah and Patel, 1982; Tilak, 1991; Jain and Visaria, 1998; Measham et al., 1999, among others), the role of politics remains largely unexplored. Commonly studied factors include maternal factors (age at childbirth, parity, and birth intervals), environment (intensity of household crowding, household water and food contamination), nutrient deficiency
(availability of nutrients to infant and mother during pregnancy and lactation), injury-related disabilities, personal health control (use of preventive methods such as immunization, malaria prophylactics, pre- and postnatal care), maternal education, and economic status.

The National Family Health Surveys (NFHS 1, 1992–1993; NFHS 2, 1998–1999; IIPS-ORC Macro 2000) shed light on a large number of factors affecting infant and child mortality in India. Infant mortality rates exhibit a U-shaped pattern with respect to the mother’s age at childbirth and birth order. Children of the youngest and oldest mothers experience higher mortality rates than children whose mothers are in their prime reproductive ages. Similarly, first and higher-order births have a lower likelihood of survival. The timing of successive births is also shown to have a significant effect on the survival of children. Mortality rates decrease as the length of the previous birth interval increases.

Prenatal, delivery, and postnatal maternal care also result in lowered infant mortality rates. Evidence suggests that children of mothers who receive all three types of care have a substantially lower risk of mortality. For instance, a leading cause of infant deaths is neonatal tetanus, an infection that occurs in infants delivered in unhygienic conditions and/or using unsterilized instruments. Jain and Visaria (1998) identify tetanus as the cause for 10–30 percent of infant deaths. While infant mortality is the result in 70–90 percent of neonatal tetanus infections, the disease is preventable. Two doses of tetanus toxoid vaccine given a month apart during early pregnancy are almost 100 percent effective in preventing tetanus in mother and child. Similarly, nutritional deficiencies in pregnant women such as iron deficiency anemia can result in infants with low birth weight and an increased susceptibility to infections. Prenatal care typically includes regular checkups of pregnant women by a healthcare professional, immunization, and iron and folic acid supplements, and is also shown to reduce complications at the time of birth (NFHS-2).

Household and living conditions such as access to a toilet and potable water, the use of clean cooking fuels, and larger household spaces lower the risk of disease and improve health outcomes. In addition, infants delivered at a medical institution are likely to experience lower mortality than children delivered at home. The same holds for births assisted by a medical professional relative to a traditional (untrained) birth attendant. These factors are also closely related to either household income or literacy (NFHS-2).

Cross-state comparative studies within India (Beenstock and Sturdy, 1990; Claeson et al. 2000; Tilak, 1991) identify differences in income levels and maternal education as some key socioeconomic factors that influence infant and child survival and report results consistent with cross national empirical research. Cross-country studies find a negative relationship between income levels and infant mortality (Pritchett and Summers, 1996; Filmer and Pritchett, 1999). Female education is another factor shown to
lower infant mortality rates (Caldwell, 1979; Desai and Alva, 1998). Educated mothers are expected to make informed decisions relating to child care such as cleanliness, sanitation, immunization, and in locating appropriate health services for infants, hence increasing the chances of child survival. Evidence indicates that illiterate mothers experience greater incidence of infant mortality compared to mothers with at least a high school education.

THEORETICAL EXPECTATIONS

We examine the effect of politics on infant mortality in Indian states using the theoretical framework provided by PTT. Successive national population and health policies since 1952 have emphasized a commitment to improving demographic and health outcomes in India. The National Population Policy (NPP 2000) focuses on the health and education of women and children in order to achieve population stabilization by 2045, and envisions a reduction in the infant mortality rate to less than 30 and the total fertility rate to replacement levels by 2010. These outcomes are to be achieved through universal immunization, delivery assistance by trained medical personnel for all births, promoting delayed marriages for women, the availability of a wider choice and universal access to family planning information and services, the prevention of major infectious diseases (such as HIV), and free and mandatory education until age 14.

The provision of basic health services to pregnant women, infants, and children commenced during the First and Second Five-Year Plans (1951–1956 and 1956–1961), and continued under the Minimum Needs program during the Fifth Five-Year Plan (1974–1979). Over the years, additional schemes such as the Child Survival and Safe Motherhood (1992) and the Maternal and Child Health programs have been developed. Currently, all maternal and child health programs have been integrated into the Reproductive and Child Health program (1996). These programs aim at providing services such as growth monitoring, free immunization for mothers and infants, oral rehydration therapy and treatments for diarrhea and acute respiratory infections, pre- and postnatal care for pregnant women. While broad goals for health and population outcomes are outlined at the federal level in India, implementation of specific policies are the responsibilities of states. The state government, thus, emerges as a key provider of many of these health services.

We expect the political capacity of a state government to play a role in protecting infants and generate advances in health conditions. States that extract resources effectively are better equipped to protect the most vulnerable section of a population. Specifically, we expect political capacity conditional on levels of development to exert a downward effect on infant
mortality. That is, political capacity is expected to play a stronger role in those states at lower levels of development relative to the wealthier states. As income levels increase we expect the effect of political capacity to wear off. Among the relatively poor states, we expect to see states with higher political capacity registering lower infant mortality rates compared to the less capable ones. A similar pattern is expected to emerge in rural and urban infant mortality as well.

DATA AND VARIABLES

Our analysis involves first estimating political capacity for fifteen Indian states for the time period 1981–2000. Using this measure we identify the effect of politics on infant mortality, conditional on levels of development and controlling for the effects of secondary female enrollment. Here we provide an overview of the variables and data used in this study.

Political Capacity (PC)

Political capacity is measured as the taxable capacity of a state. The tax ratio is dependent on the productive resources that provide the economic handles for government extraction, and on the effort exerted by a government in collecting those resources (Bahl, 1971; Chelliah, Baas, and Kelly, 1975). Political capacity of a state government is estimated as the ratio of actual state tax revenues to predicted state tax revenues. A state that is extracting revenues at higher than expected levels—given its level of development—is considered capable relative to one that is extracting at lower than expected levels at a similar level of development. The deviation from the expected performance is a consequence of political capacity. As Arbetman and Kugler (1997, p. 20) observe, this measure of political capacity does not directly measure its political components but the “shadow of politics.”

As in most federal structures, the division of tax powers between the federal and state levels is outlined in the Seventh Schedule to the Indian Constitution. Taxes on foreign trade, nonagricultural income (personal and corporate), and excise taxes on production (except liquor) are assigned to the federal level. Taxes on property, agricultural income (including land revenue), the sale and purchase of goods (except interstate trade), mineral rights (subject to limitations imposed by the federal government), inland transportation (except railways), and entertainment fall under a state’s jurisdiction. The division of tax powers follows the principle of “separation;” that is, the power to levy a tax belongs exclusively to the assigned level. Since the important taxes are assigned to the federal level, the Constitution provides for the redistribution of a portion of certain central taxes (income
and excise duties) to the state. (Bagchi, 1998; Bajpai and Sachs, 1999; McCarten, 2003).

A state’s own tax revenue comprises approximately 65 percent of tax revenues and about 46 percent of total revenue in the state. Sales tax is the most important revenue source of the states, comprising approximately 60 percent of a state’s own tax revenue. Other sources of tax revenue for the state include agricultural income tax, state excise duties on liquor, stamp duty and registration fees, and motor vehicle tax. State excise duties on liquor account for about 14 percent of a state’s own tax revenue. However, some states such as Andhra Pradesh, Gujarat, Haryana, and Tamil Nadu have imposed a prohibition on the sale of liquor at various times resulting in revenue losses. Revenue generation from stamp duties and motor vehicles taxes also suffers as a result of undervaluation of property and lack of computerization respectively (Lahiri, 2000). Agricultural income tax makes an insignificant contribution to a state’s tax revenue as it is not consistently imposed by all the states. Despite the similarity of tax structures, tax effort varies considerably across the states from a high of 10 percent of state domestic product in Tamil Nadu to a low of 4 and 5 percent in Uttar Pradesh and Assam respectively.

Given our aim to identify the ability of a state government to extract resources from its relatively limited resource base in implementing national goals, we focus on a state’s own tax revenue. State tax revenues are published by the Reserve Bank of India (State Finances: A Study of State Budgets 1981–2000 and RBI Bulletin, various years). The procedure and results are presented in Appendix 1.

Infant Mortality Rate (IMR)

Infant mortality is the probability that an infant will not survive the first year following birth. It is computed as IMR = \([Deaths under 1 year of age/ Total live births in a calendar year]\)\times1000 (Rowland, 2003). The data for total, rural, and urban infant mortality rates for the 15 Indian states from 1981 to 2000 are taken from the Sample Registration System (SRS) survey results published by the Census of India (Compendium of Vital Statistics and SRS Bulletin, Census of India, 1971–2000).\(^6\)

State Domestic Product (SDP)

Data for nominal state domestic product, real state domestic product, and per capita domestic state product (SDP) are taken from the Ministry of Statistics and Programme Implementation (Government of India) and the Reserve Bank of India. The variables are published as Net State Domestic Product (current rupees) and Net State Domestic Product (constant 1993–1994 rupees).
In addition to the above variables we control for female education with measures of female enrollment ratios. We compute this measure as \( FENR = \frac{\text{Number of females in the ages 11–14 enrolled in school}}{\text{Total number of females in the ages 11–14}} \). The data is taken from reports (*Selected Education Statistics & Education in India, 1981–2000*) published by the Ministry of Human Resources Development (Government of India).

**ESTIMATION AND RESULTS**

Table 1 presents summary measures for infant mortality, political capacity, and per capita state domestic product for the fifteen states by state income quartiles (Panel A) and by state (Panel B).

**TABLE 1** Descriptive statistics for IMR, PC, and SDP

**Panel A:** Average IMR, PC and SDP by SDP Quartiles

<table>
<thead>
<tr>
<th>Quartile</th>
<th>IMR</th>
<th>PC</th>
<th>SDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 25% Less than Rs. 5217.5</td>
<td>103.6 (24.2)</td>
<td>0.92 (0.24)</td>
<td>4435.8 (617.6)</td>
</tr>
<tr>
<td>Second Less than Rs. 6348.5</td>
<td>80.3 (24.0)</td>
<td>1.0 (0.27)</td>
<td>5627.2 (324.7)</td>
</tr>
<tr>
<td>Third Less than Rs. 8752</td>
<td>71.8 (23.9)</td>
<td>1.1 (0.19)</td>
<td>7476.2 (661.7)</td>
</tr>
<tr>
<td>Richest 25% Less than Rs. 15082</td>
<td>59.0 (14.4)</td>
<td>0.97 (0.15)</td>
<td>11164.6 (1737.0)</td>
</tr>
</tbody>
</table>

Standard deviation in parentheses.

**Panel B:** Summary measures for IMR, PC and SDP by State

<table>
<thead>
<tr>
<th>State</th>
<th>IMR (Total)</th>
<th>IMR (Rural)</th>
<th>IMR (Urban)</th>
<th>State Domestic Product</th>
<th>Political Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>73.3 (7.6)</td>
<td>79.4 (7.5)</td>
<td>50 (8.9)</td>
<td>6685.6 (1503.2)</td>
<td>1.17 (0.23)</td>
</tr>
<tr>
<td>Asm</td>
<td>87.9 (13.3)</td>
<td>89.9 (12.8)</td>
<td>58.3 (18.0)</td>
<td>5468.85 (324.5)</td>
<td>0.63 (0.09)</td>
</tr>
<tr>
<td>Bhr</td>
<td>84.2 (17.8)</td>
<td>86.4 (18.8)</td>
<td>58.0 (9.7)</td>
<td>3670.8 (481.6)</td>
<td>0.96 (0.24)</td>
</tr>
<tr>
<td>Guj</td>
<td>81.0 (20.5)</td>
<td>90.2 (23.9)</td>
<td>58.0 (13.8)</td>
<td>9374.5 (248.5)</td>
<td>1.05 (0.13)</td>
</tr>
<tr>
<td>Har</td>
<td>78.6 (12.0)</td>
<td>82.9 (14.0)</td>
<td>59.3 (5.5)</td>
<td>10277.6 (1965.4)</td>
<td>0.95 (0.08)</td>
</tr>
<tr>
<td>Kar</td>
<td>67.2 (8.0)</td>
<td>76.6 (8.0)</td>
<td>39.4 (9.4)</td>
<td>7117.2 (1848.4)</td>
<td>1.31 (0.11)</td>
</tr>
<tr>
<td>Ker</td>
<td>21.4 (7.9)</td>
<td>22.1 (8.7)</td>
<td>18.5 (5.8)</td>
<td>7055.2 (1611.9)</td>
<td>1.24 (0.11)</td>
</tr>
<tr>
<td>MP</td>
<td>111.1 (14.8)</td>
<td>118.5 (16.4)</td>
<td>69.5 (10.6)</td>
<td>6039.4 (935.0)</td>
<td>0.98 (0.17)</td>
</tr>
<tr>
<td>Mah</td>
<td>60.2 (10.5)</td>
<td>69.8 (10.7)</td>
<td>41.7 (8.9)</td>
<td>10210.5 (2722.9)</td>
<td>0.98 (0.13)</td>
</tr>
<tr>
<td>Ors</td>
<td>115.4 (14.0)</td>
<td>119.7 (14.8)</td>
<td>70.7 (6.5)</td>
<td>4627.2 (470.6)</td>
<td>0.86 (0.15)</td>
</tr>
<tr>
<td>Pnj</td>
<td>61.0 (9.6)</td>
<td>65.9 (10.7)</td>
<td>45.7 (9.7)</td>
<td>11569.7 (1906.4)</td>
<td>0.92 (0.11)</td>
</tr>
<tr>
<td>Raj</td>
<td>93.4 (12.6)</td>
<td>99.1 (14.3)</td>
<td>62.6 (7.7)</td>
<td>6191 (1512.0)</td>
<td>0.88 (0.08)</td>
</tr>
<tr>
<td>TN</td>
<td>66.1 (13.5)</td>
<td>75.6 (16.3)</td>
<td>45.9 (7.1)</td>
<td>80268 (2274.8)</td>
<td>1.26 (0.13)</td>
</tr>
<tr>
<td>UP</td>
<td>111.7 (27.1)</td>
<td>117.9 (30.0)</td>
<td>77.0 (12.9)</td>
<td>4994.3 (513.9)</td>
<td>0.89 (0.10)</td>
</tr>
<tr>
<td>WB</td>
<td>67.4 (12.1)</td>
<td>72.4 (13.7)</td>
<td>45.0 (6.1)</td>
<td>6380.7 (1373)</td>
<td>0.82 (0.11)</td>
</tr>
</tbody>
</table>

**All States** 78.7 (27.3) | 84.4 (28.5) | 53.3 (17.3) | 7175.9 (2733.8) | 0.99 (0.22)

Standard deviation in parentheses.
Panel A indicates that average infant mortality rate has decreased from 103.5 to 59 across increasing per capita income quartiles. Poor states are characterized by high infant mortality rates and states at successively higher levels of wealth register lower values. The poorest and richest quartiles exhibit lower relative variation in infant mortality (approximately 23 and 24 percent respectively). States falling in the second and third quartiles exhibit the greatest relative variation (approximately 29 and 33 percent). The poorest income quartile consisting typically of observations from the states of Bihar, Orissa, and UP (with a mean income level below approximately Rs. 5218) report high infant mortality rates ranging from averages of 84 to 115 deaths per 1,000 live births. The richest quartile, mainly composed of Gujarat, Haryana, Maharashtra, and Punjab (with a mean income level greater than approximately Rs. 8752), exhibit relatively lower ranges from 60 to 81. The middle income states that include Assam, MP, Rajasthan and WB (in the second quartile), and AP, Karnataka, Kerala, and TN (in the third quartile) exhibit considerable variation ranging from 21 (Kerala) to 111 (MP).

Figure 1 reinforces the patterns described above. Infant mortality decreases across increasing income levels. However, some states at lower income levels have performed on a par with or better than the relatively richer states.

FIGURE 1 Infant Mortality Rates Across Income Levels.
Consider the variation in political effort expended by states across levels of per capita output. A state with a political capacity index greater than 1 is considered to be extracting more than what can be expected given its level of development. States with political capacity less than 1 are performing at levels below expectation. Panels A and B reveal several features of political capacity of the Indian states. The poorest states (Orissa and Uttar Pradesh) tend to be the least capable states, with political capacity well below 1. The richest states (Gujarat, Haryana, Maharashtra, and Punjab) exhibit the least relative variation and extract around expected levels (between 0.92 and 1.05). States comprising the second and third income quartiles indicate considerable variation. Across the middle quartiles, we find that states such as AP, Karnataka, Kerala, and TN (with political capacity of 1.1 and above) are among the relatively capable states while others such as Assam, MP, Rajasthan, and WB (political capacity between 0.63 and 0.98) are less so.

Figure 2 indicates that the pattern of political capacity across levels of development is consistent with Organski et al. (1984). Political capacity is expected to be low at lower levels of development. As income levels increase, political capacity is expected to increase as well (as political costs decrease). At high levels of development, political capacity is expected to stabilize since the costs of extraction are high. Within India, states at lower income levels reflect low capacity while the middle-income states have a
wider range of political capacity. The rich states exhibit relatively stable patterns of extraction.

We present OLS estimates with panel-corrected standard errors (Beck, 2001; Beck and Katz, 1995, 1996; Kittel, 1999). This estimation method is used to correct issues (panel heteroskedasticity and contemporaneous correlation) that typically arise in modeling time series cross section data and has been utilized in political science research (Chhibber and Nooruddin, 2004, Ross, 2006; Stasavage, 2005, among others). All the models presented here include state fixed effects (to capture unit heterogeneity) and period lagged effects from the dependent variable in order to correct for serial correlation.

\[
IMR_{i,t} = \beta_0 + \beta_1 \text{SDP}_{i,t} + \beta_2 PC_{i,t} + \beta_3 (PC \times SDP) + \beta_4 FENR_{i,t} + \beta_5 IMR_{i,t-1} + \beta_6 IMR_{i,t-2} + F_i + \varepsilon_{it}
\] (1)

IMR<sub>i,t</sub>: Infant Mortality Rate (i = state, t = time)
SDP<sub>i,t</sub>: Per Capita State Domestic Product (constant 1993–94 Rupees)
PC<sub>i,t</sub>: Political Capacity
PC*SDP: Interaction term
FENR<sub>i,t-1</sub>: Female Enrollment Ratio (ages 11–14)
IMR<sub>i,t-1</sub>, IMR<sub>i,t-2</sub>: Lagged IMR
F<sub>i</sub>: State i Fixed Effects

Results of the estimation are presented in Table 2. The conditional impact of political capacity on infant mortality rates (total, rural, and urban) across development levels is captured using a multiplicative interaction term (PC*SDP) as reported in Models 1 through 4. In models including an interaction term, the “unconditional” effects of the independent variables cannot be interpreted and tested for significance as they typically are in linear regression without interaction terms (Brambor, Clark, and Golder, 2005; Braumoeller, 2004; Jaccard, Turrisi, and Wan, 1990). Table 3 reports the marginal impact of political capacity and Figures 3, 4, and 5 present the statistical significance.

Table 3 indicates that political capacity conditional on income levels has a negative effect on total, rural, and urban infant mortality. Additionally, these marginal effects diminish across higher levels of development. As seen in Figure 3, political capacity has a significant effect at an income level below approximately Rs. 8022 (representing 70 percent of the observations) and no effect at higher levels. For the states falling in the poorest income quartile, a ten percent increase in political capacity brings about a 1.5 to 1.3 percent decrease in total infant mortality rates. At average income levels, this effect reduces to about 1 percent. We also find that a politically capable state is able to avert more infant deaths than the less capable counterparts at
### TABLE 2  OLS with Panels Corrected Standard Errors

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>IMR (Total)</td>
<td>IMR (Total)</td>
<td>IMR (Rural)</td>
<td>IMR (Urban)</td>
</tr>
<tr>
<td>With Education</td>
<td>PC: -0.17** (0.085)</td>
<td>PC: -0.18** (0.080)</td>
<td>PC: -0.15 (0.087)</td>
<td>PC: -0.32** (0.128)</td>
</tr>
<tr>
<td></td>
<td>SDP: -0.26** (0.117)</td>
<td>SDP: -0.28*** (0.099)</td>
<td>SDP: -0.21*** (0.108)</td>
<td>SDP: -0.59*** (0.148)</td>
</tr>
<tr>
<td></td>
<td>PC*SDP: 0.000001 (0.00001)</td>
<td>PC*SDP: 0.000001 (0.00001)</td>
<td>PC*SDP: 0.000003 (0.00001)</td>
<td>PC*SDP: 0.000004 (0.00001)</td>
</tr>
<tr>
<td>t-1</td>
<td>FENR: 0.54*** (0.108)</td>
<td>FENR: 0.54*** (0.105)</td>
<td>FENR: 0.64*** (0.105)</td>
<td>FENR: 0.49*** (0.101)</td>
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<tr>
<td>t-2</td>
<td>IMR (RUR): 0.19* (0.104)</td>
<td>IMR (URB): 0.20 (0.101)</td>
<td>IMR (URB): 0.10 (0.101)</td>
<td>IMR (URB): 0.02 (0.097)</td>
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<td></td>
<td>Constant: 3.53*** (1.15)</td>
<td>Constant: 3.63*** (1.10)</td>
<td>Constant: 3.22*** (1.16)</td>
<td>Constant: 7.28*** (1.59)</td>
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<td>255</td>
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<td>Groups</td>
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<tr>
<td>R(^2)</td>
<td>0.97</td>
<td>0.97</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>Wald (\chi^2)</td>
<td>10636.29</td>
<td>12213.19</td>
<td>14675.89</td>
<td>84857.62</td>
</tr>
</tbody>
</table>

***1%, **5%, and *10% error levels. PCSE in parentheses. Fixed effects not shown.
comparable levels of development. Specifically, states with a higher level of political capacity have an infant mortality rate about 1.1 times lower. However, within the subset of cases for which the effect of political capacity is significant, we find that a one percent increase (in political capacity) at a lower level of development averts approximately 1 death per thousand live births while the same change (in political capacity) at relatively higher income levels averts only 0.3 deaths per thousand live births indicating the declining effect of politics.

The marginal effects and significance of political capacity on rural infant mortality are similar to effects observed with total infant mortality. A
A ten percent increase in political capacity conditional on income lowers rural infant mortality by approximately 1.4 percent. As seen in Figure 4, these effects are significant up to an income level of approximately Rs.8600. Figure 5
shows that political capacity has a significant negative impact on urban infant mortality only at very low levels of income, approximately Rs.3000. Below this income level a ten percent increase in political capacity results in a 1.8 percent reduction in infant mortality.

The marginal effect of income on infant mortality across levels of political capacity is almost unchanging, at approximately −0.28. While our expectation of the income effect is not conditional on political capacity, we find that the level of economic development is crucial to mortality change across all levels of political capacity. We also find that while the coefficient on female enrollment ratio is negative (as expected), its effect just misses statistical significance for total and rural infant mortality. Female education exerts a small but significant effect on urban infant mortality. In addition to static effects, past values of interaction between income and political capacity have effects on infant mortality that extend into future time periods.

We turn to a discussion of these results. Wealth, rather than political capacity, has played a significant role in reducing infant mortality in Gujarat, Haryana, Maharashtra, and Punjab. This is consistent with expectations that wealth and not political effects dominate in the richer states. Within the set of middle and low income states, we see relatively large political effects, with these effects getting weaker across income levels. Politically capable states register lower infant mortality rates relative to less capable ones at comparable income levels. The capable states of AP, Karnataka, Kerala, and TN have been the most successful in lowering infant mortality in the face of relative resource constraints. The relatively less capable states such as Assam, MP, and Rajasthan report higher infant mortality, while the poorest states comprising of Orissa and UP are among the least capable and exhibit the highest infant mortality rates in the country.

Policy recommendations emphasize the maternal-child health-nutrition cycle as an effective mechanism to reduce infant mortality in India. Figure 6 (Panels C and D) presents two indicators of maternal care and child health outcomes during the three year period preceding NFHS 2 (1998–1999) across average levels of political capacity. Panel C shows the percentage of women who received all of the following recommended types of prenatal care: three or more prenatal checkups (the first one within the first trimester of pregnancy), two or more tetanus toxoid injections, and iron and folic acid dosages for three or more months. Panel D shows the percent of children age 12–23 months receiving vaccinations against six serious but preventable diseases – tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles.

Figure 6 indicates that the politically capable states are extremely effective in providing prenatal care and child health services. The percentage of women receiving the recommended prenatal care is highest for Kerala (65 percent) followed by TN (50), Karnataka (42), and AP (36). Similarly, TN (89 percent) records the highest percentage of children receiving vaccinations.
against all six diseases, followed by Kerala (80), Karnataka (60), and AP (59). These states outperform their wealthier counterparts by substantial margins. The less capable states, on the other hand, perform poorly on both these indicators. In UP, Bihar, Assam, Rajasthan, and MP, between 4.4 to 10.9 percent of women receive all three components of prenatal care, and less than 25 percent of children receive all vaccinations. Some have the potential to reduce infant mortality by increasing their extractive capacity. Yet, it is states such as Orissa and UP that can derive the greatest gains by increasing political capacity but find it most difficult to do so, given their low levels of development.

CONCLUSION

A reduction in infant mortality is an early step toward a stable population. Survival of a greater proportion of infants provides a motivation for the transition from natural to controlled fertility and reduces the supply of children within households (Easterlin, 2005). Stability of a population lays the foundation for greater gains in economic productivity. In a recent study examining the impact of regime type on infant mortality, Ross (2006, p. 872) observes that “there are often remarkable variations in poverty within countries which cannot be caused by regime type: in India child mortality rates range from 18.8 in Kerala to 137.6 in Uttar Pradesh. Are there any dimensions of governance that explain these variations?” Our study provides an answer to this puzzle. We show that the political capacity of a state government conditional on levels of development depresses infant mortality rates. Politically capable governments lower
infant mortality rates through effective implementation of maternal and child health programs and policies aimed at infrastructure development. However, the effect of political capacity diminishes as levels of income within a state increase, and disappears after a certain level of development is reached. At lower levels of income, states with higher political capacity have achieved greater reductions in infant mortality relative to their less capable counterparts. Weak governments face the greatest difficulty in lowering infant mortality yet have the greatest need to achieve that end. Consistent with PTT, we find that the effect of political capacity on mortality change observed at the national level is evidenced at subnational levels as well.

In India, where large sections of the population are rural, the role of politics takes on even greater significance. By altering mortality patterns, political capacity can increase the economic potential of rural regions. Populations in these regions do not have to rely on economic growth as the impetus for demographic stability. An increase in the economic productivity of its rural population is essential for India to emerge as a dynamic global power in the twenty first century. The results pertaining to rural and urban infant mortality suggest that political intervention has a greater significance in rural centers relative to urban areas. As political capacity expands, market failures associated with the provision of sanitation, health care services, hospitals, transportation, and infrastructure are overcome in rural regions. For instance, in rural areas, a mix of community health centers, primary health and sub-health centers have evolved to provide an effective public health delivery system (including infant and child survival services). In contrast, urban centers tend to be rich, have better health facilities, and markets typically provide such services to the population. These remain primarily clinic based with a greater concentration of nongovernment health care delivery systems. However, policies aimed at increasing female literacy in urban areas may be fruitful in reducing urban infant mortality. This study allows us to identify the potential regional drivers of economic change in India. Politically capable states are better positioned to successfully complete their demographic transition. These states are also more likely to reduce uncertainty in economic policy, attract foreign investments, offer a relatively healthier workforce, maintain internal peace, and derive rapid gains from production.

PTT anticipates that demographic and economic changes over the next 50 years will impact India’s relative position in the south Asian regional and global hierarchies. Within the south Asian hierarchy, which includes Bangladesh, Bhutan, and Pakistan (Lemke, 2002), India’s share of population resources is a little more than seventy-five percent. This large population gap is not bridged by 2050, given a decline in birth rates for all members. Among the great powers in the global hierarchy (including US, EU, Japan, Russia, and China), India currently controls approximately 30 percent of
population resources. Forecasts indicate that the momentum generated by a large cohort in reproductive ages will lead to an expansion of India’s population to approximately 1.7 billion by mid-century (U.S. Bureau of Census). Once India overtakes China in population size in the period 2025–2030, another global demographic overtaking is unlikely (Kugler, Tammen, and Swaminathan, 2001).

Forecasts of economic performance place India on a rapid growth trajectory over the next 30–50 years. Wilson and Purushothaman (2003) claim that growth rates of GDP in India could average between 5–6 percent over the next 30 years and remain close to 5 percent as late as 2050. Their study predicts India’s emergence as the third largest economy, following China and the U.S. by 2050. While uncertainty clouds long-term projections, Bajpai (2002) suggests that it is possible for India to experience sustained high growth in the region of 8–10 percent, given a political commitment to the economic reform process initiated in 1991. Successive national governments have gradually expanded the process of deregulation and liberalization despite opposition from coalition partners, regional political parties, and other organized groups.

The economic and demographic trends outlined above have important consequences for conflict and cooperation. Our previous discussion suggests that India’s preponderant position within its regional hierarchy will strengthen over time. While several disputes exist between India and other members of the south Asian hierarchy, none dominates more than the territorial concerns over the valley of Kashmir. At the heart of this dispute lies the claim of sovereign rights over the territorial status of Kashmir by both India and Pakistan. Despite continuous confrontation, PTT anticipates that the Kashmir crisis is not likely to escalate to a major conflict. Pakistan’s challenges to the existing regional status quo are likely to decrease as its power relationship declines over time.

With a large population and potential production possibilities, India possesses the foundations for becoming a great power in the twenty-first century. In order to realize this potential, India will not only need to achieve demographic stability, but create opportunities for production and employment as well. As Tammen et al. (2000, p. 20) note, “should India with a population of 1 billion increase its per capita productivity and then efficiently extract resources from its population, it would be on a trajectory to eventually challenge international leadership in the latter half of the twenty-first century.” Will India scale the global hierarchy as a dissatisfied power or will its rise be peaceful? The answer depends on how the dominant powers—the United States and then China—manage India’s potential ascent. A successful integration into the coalition of satisfied powers will diminish India’s challenges to the international status quo while failure to engage India may well set the stage for conflict later in this century.
CONTRIBUTORS

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NOTES

1. The other key element of PTT is the extent to which a nation is satisfied or dissatisfied with the international and/or regional status quo. (Dis) Satisfaction interacts with the relative power status of a nation producing higher or lower likelihoods of war. For an extensive review, theoretical extensions, empirical evidence, and implications see the works cited here as well as Lemke and Reed (1996), Kugler and Lemke (2000), and Kugler (2006) among others.

2. The chapters in Arbetman and Kugler (1997) show political capacity as having significant effects in attracting foreign investments, stabilizing monetary flows, reducing seigniorage and lowering inflation, and promoting economic growth.

3. The demographic transition theory grew out of a description of demographic change in the late eighteenth-century Europe. With theoretical refinements over time, distinguishing demographic transition as a theory from the historical generalizations based on the European experience has become difficult. According to this theory, the emergence of stable populations is associated with higher levels of modernization. Low socioeconomic development engenders high birth and death rates that roughly balancing, result in slow population growth. Industrialization and urbanization provide impetus to a general improvement in socioeconomic conditions resulting in relatively rapid declines in mortality. Birth rates remain at high levels as fertility decisions are not directly affected in the short-run. Population explosions are likely as the gap between fertility and mortality widens. At relatively high levels of socioeconomic development factors such as medical technologies, greater availability of family planning alternatives, and the high marginal costs of additional children directly affect fertility decisions leading to lowered birth rates and smaller families at replacement levels. Empirical research indicates a greater variation in mortality and fertility decline within European nations than demographic transition theory would suggest (Easterlin, 2005; Gillis, Tilly, and Levine, 1992).

4. All of these studies conclude that India has witnessed a substantial decline in infant mortality rates in the past two decades. Total infant mortality has decreased from 110 to 68 deaths per 1,000 live births, urban infant mortality from 62 to 43, and rural mortality from 119 to 74 in the period 1981–2000. The decline in infant mortality in India has been relatively faster than the average decline in other developing nations (with the exception of China) during the same period (Cleason et al., 1999). Urban infant mortality has been lower than rural rates and changes in the former have been slower than the latter. Studies also show that the reduction in total infant mortality has not been uniform. Rapid declines have preceded periods of stagnation, a pattern distinct in the 1980s. In the 1990s, the decline in infant mortality has been slower and the periods of stagnation longer. While the general pattern of decline in the aggregate rates reflect changes at the state level, variation across the states is considerable.

5. The states include: Andhra Pradesh (AP), Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh (MP), Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu (TN), Uttar Pradesh (UP), and West Bengal (WB).

6. The SRS is a large demographic survey that provides annual estimates of the birth rate, the death rate, and other fertility and mortality indicators at the federal, state, and district levels. The field investigation consists of continuously enumerating births and deaths with follow-up surveys every six months. The data obtained from these two surveys are matched and the unmatched and partially matched events are reverified to arrive at an unduplicated and complete count of births and deaths. The
SRS originated in 1964–1965 with a pilot study and became fully operational in 1969–1970. The sample covers 1.1 million households and 6.33 million populations in India including all the States and Union territories in India. The coverage of births and deaths registration was reported to be approximately 98 percent (SRS Bulletin, October 2002). Comparisons of SRS estimates with alternate infant mortality estimates, the NFHS implemented across India in 1992–1993 and 1998–1999, indicate consistency (IIPS-ORC Macro, 2000).

7. We use natural log transformations of IMR and SDP in all models.

8. The coefficients on PC and SDP do not capture the average effects of political capacity and income on IMR. The coefficient on PC (−0.18 from model 2) captures the effect on IMR of a one percent increase in PC when SDP=0. Similarly, the coefficient on SDP represents the percent change in IMR for a one percent increase in SDP when PC=0. We get no information from these coefficients when SDP≠0 (in the former) and when PC≠0 (in the latter). Since the range of data in our sample does not include values of zero for either PC or SDP, the unconditional effects of these variables and their statistical significance are not considered as meaningful (Brambor, Clark, and Golder 2005).

9. The marginal effect of PC conditional on SDP is given by

\[
\frac{\partial \text{IMR}}{\partial \text{PC}} = \beta_{\text{PC}} + (\beta_{\text{PC}\times \text{SDP}}) \times \text{SDP}
\]

and the standard error of PC conditional on SDP is

\[
S_{\beta_{\text{PC}\times \text{SDP}}} = \sqrt{\text{var}(\beta_{\text{PC}}) + \text{var}(\beta_{\text{PC}\times \text{SDP}}) \times \text{SDP}^2 + 2 \times \text{cov}(\beta_{\text{PC}}, \beta_{\text{PC}\times \text{SDP}}) \times \text{SDP}}
\]

10. We find that enrollment levels for males and females across age groups are typically correlated with income per capita. Using lagged values of enrollment somewhat alleviates this problem.

11. Note that the sum of the coefficients of the lagged values of IMR is less than 1 for all models presented here (Kelee and Kelly, 2006).

12. The vaccination against the six diseases has been an important component of the child health policy in India. Guidelines specify that infants should receive full immunization by the end of the first year of life. The Expanded Program on Immunization was initiated by the Government of India in 1978 with the goal of reducing mortality from these diseases by making free vaccination services available to all eligible children. The Universal Immunization Program (1985–1986) introduced in every district of the country aims at covering 100 percent of all infants.

REFERENCES


APPENDIX I

ESTIMATES OF STATE POLITICAL CAPACITY

The following procedure is used to estimate state political capacity:

1. Generate ordinary least squares estimates using the following functional specification:

\[
STR_{i,t} = \gamma_0 + \gamma_1 SDP_{i,t} + \gamma_2 T + e_{it}
\]  

where:
- \( STR \) = State Tax Revenue
- \( SDP \) = Nominal State Domestic Product

2. The predicted values for \( STR \) are obtained from (2).

3. A measure of political capacity is calculated as the following ratio:

\[
\text{Political Capacity (PC)}_{it} = \frac{STR_{it}}{\hat{STR}_{it}}
\]

where \( STR_{it} \) is the observed value and \( \hat{STR}_{it} \) represents the fitted value.

For estimates of national political capacity, see Organski et al. (1984); Arbetman and Kugler (1997); and Feng, Kugler, and Zak (2000).

<table>
<thead>
<tr>
<th>APPENDIX 1 OLS with Robust Standard Errors</th>
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<tbody>
<tr>
<td>( STR )</td>
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<tr>
<td>SDP 3.60*** (0.20)</td>
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<tr>
<td>Time -0.06*** (0.014)</td>
</tr>
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<td>Constant -24.02** (1.79)</td>
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<td>( R^2 ) 0.37</td>
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<td>Root MSE 1.55</td>
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