One Polity, Many Countries: Economic Growth in India, 1873-2000

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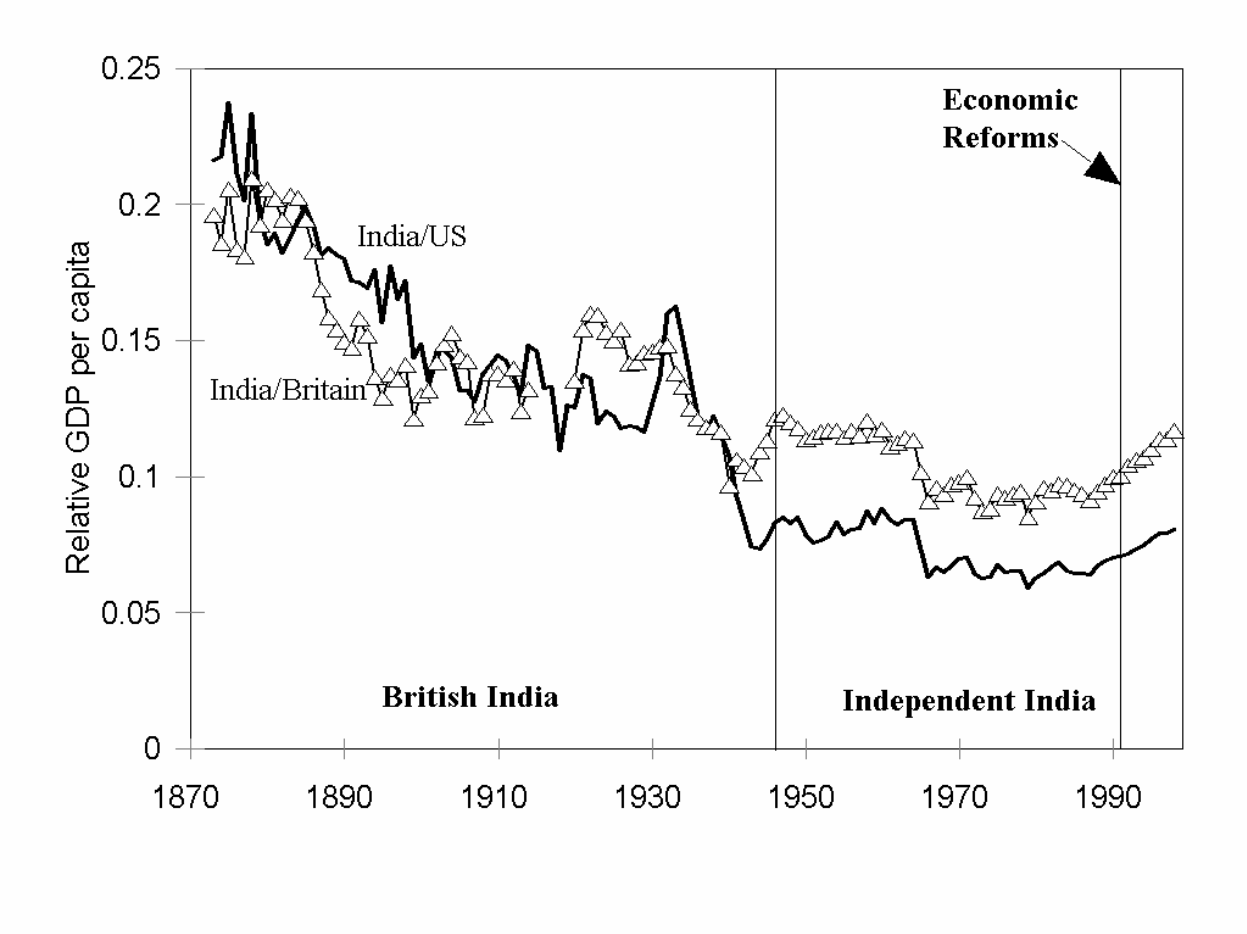
We argue, based on Indian experience, that the major determinants of economic growth are not political and economic institutions. Through the laissez faire Colonial regime, and the interventionist economy of Independent India income per capita declined relative to advanced economies until the 1980s. And though economic growth has been impressive since 1986, the upturn pre-dates even the modest economic reforms of 1991. Further there is increasing regional variation in income per capita across states in India despite the dominance of national economic policies. Some states' growth rates have declined since the reforms. Yet labor has moved little within India from the regions of persistent low incomes to those of high incomes. The experience of Europe and the USA suggests that encouraging migration of workers to high productivity areas within India is the only policy we know will improve overall income per capita.

Introduction

India is perhaps the most interesting of all economies for those interested in economic growth. For it is one of the poorer countries of the world, and has even seen an erosion of its income per capita relative to the economically advanced economies such as the USA since we have the first reasonable data in 1873. But this has occurred in an institutional environment that has been very favorable for most of this period. Indeed from an economist's perspective the institutional environment in the Colonialist years from 1873-1947 – secure property rights, free trade, fixed exchange rates, and open capital markets - was close to ideal. So India captures the twentieth century paradox of a world of ever more rapid and easy movement of information and goods combined with large and often increasing disparities in living conditions.

Figure 1 shows calculated GDP per capita in India from 1873 to 1998 measured relative to the USA and Britain. India did show a substantial increase in absolute GDP per capita over these years. Real incomes per capita in 1998 were 3.6 times those estimated for 1873. But relative to both Britain and the USA Indian income per person fell from 1873 to the mid-1980s,

Figure 1: Indian GDP per Capita relative to Britain and the USA, 1873 to 1998



Sources: India. Pre-1947, Heston (1983). 1950-1980, Penn World Tables (PWT 5.6). 1981-1998, Statesforum. USA. 1873-1929, Balke and Gordon (1992). Economic Report of the President (2001). United Kingdom/Britain. 1873-1965, Feinstein (1972), 1965-1998, United Kingdom, National Statistical Office.

before rising from 1987 to the present. The rapid growth of Indian income per capita in the last 14 years has led some economists to optimistically predict that modest institutional reforms have provided a speedy remedy to India's problems, and that India is finally about to join the advanced economies (see DeLong, this volume).[1] But Indian income levels relative to the US in 1998 at 8% were still below even those of the early nineteen sixties. And growth has been very uneven within the Indian economy, so that in some states income per capita has continued to decline relative to the US. Income per capita in Bihar, with a population of over 100 million, is currently about 4% of that in the US, and still falling relative to US incomes. And since we have little understanding of what caused the erosion of India's economic position from 1873 to 1987, it is premature to say we know that a moderate degree of political intervention in the Indian economy was responsible for a decline of income to 7% of potential.

Many other countries that have witnessed a declining relative income level have done so in circumstances where political and social institutions have suffered breakdowns. Thus many of the countries of Africa which are now among the world's poorest have suffered from ethnic strife, and the collapse of political institutions, since their independence. But the Indian economy experienced its decline in a long period of relative political and social stability, first under British colonial rule until 1947, and even after independence. Indeed the erosion of India's relative economic position has continued across three different political regimes. The accelerated economic growth since 1987 has been associated by many with the recent liberalization of the economy. But the era of reform properly dates only from 1991. Yet Indian

[1] Since growth started under the Rajiv Gandhi administration, elected in late 1984, De Long concludes that though the reforms were "hesistant" the "consequence of this first wave of reform was an economic boom."

income per capita rose 10% relative to the US in 1987-1991, compared to a 14% gain in 1991-1998.[2]

Independence did create a substantial change in economic management. After 1947 there was a gradual move from a laissez faire policy, with low taxation rates and taxation based heavily on lump sum taxes on land rent, to an interventionist policy that relied more on taxes that could at some deadweight cost be evaded.[3] But India has remained a lightly taxed economy. Table 1 shows the average state revenue as a percentage of income by province in British India in 1938-9, and in Independent India in 1949-50 (before the formation of the modern Indian states) and 1998. Before independence a large share of tax revenue was generated by the land tax, which was in effect a lump sum tax on land. Since then land taxes have steadily declined as a share of revenues. Now land taxes constitute no more than 1% of national tax revenue. Land taxes have largely been replaced by sales taxes. Thus the form and incidence of taxation varies little across the modern Indian states.

India would seem also to have one great advantage relative to other under developed economies, and that is that it is a political amalgam of countries - almost as diverse in religion, languages and culture as is Europe - that was forged as the result of the accident of British colonial rule in the nineteenth century. In 1991, 44 years after independence, there were still eleven languages spoken as the principle tongue by more than 20 million people in India. To achieve economic growth a country does not have to experience productivity gains in all sectors or all regions. As long as some industries and some localities can achieve productivity growth

[2] The reforms had three important elements. The rupee became completely convertible in the current account, and restrictions on capital account were lessened. India joined the WTO and participated in the Uruguay Round of trade negotiations. The government has thus reduced though not eliminated trade restrictions. Finally restrictions on foreign direct investment have been considerably weakened.

[3] This change was in part accidental. The land tax was fixed in nominal terms and the inflation of the war years severely eroded its real value.

Table 1: Taxation Before and After Independence, by Province or State

Province	Revenue/ Income 1938-9 (%)	Revenue/ Income 1949-50 (%)	Land Revenue /All Taxes 1938-9 (%)	States	State Taxes/ Income 1998 (%)	Land Revenue /State Taxes 1998 (%)
Madras	4.3	3.5	44	Andhra Pradesh	7.6	2
Bombay	5.2	4.6	38	Bihar	4.7	1
Central Provinces	3.0	3.0	65	Gujarat	8.0	1
United Provinces	4.0	3.8	64	Haryana	8.0	0
Bihar	3.4	3.2	34	Karnataka	8.1	0
Assam	4.1	3.0	61	Kerala	7.9	1
Orissa	3.2	3.5	45	Madhya Pradesh	5.7	1
East Punjab	5.9	3.5	56	Maharashtra	5.8	1
West Bengal	4.4	8.2	31	Orissa	5.2	3
				Punjab	6.0	0
				Rajasthan	6.9	1
				Tamil Nadu	8.2	0
				Uttar Pradesh	4.7	1
				West Bengal	5.1	9
All India	4.0	4.2	46	India (all taxes)	8.3	1

Source: Natarajan (1949). Statesforum.

its gains can be transmitted to the economy as a whole through the migration of capital and labor within the economy to the successful locality, and through international trade the economy can specialize production in this sector. In the Industrial Revolution in Britain in 1760-1860 there was very little productivity growth in the southern half of the country where two thirds of the population lived in 1760. Most of the productivity growth in the north occurred in textiles. But through the twin forces of labor migration and international trade the success of Britain in this one sector was translated into widespread economic growth. By having so much internal diversity it would seem that India was peculiarly fortunate relative to more homogenous underdeveloped countries such as its neighbor Bangladesh.

The Sources of Divergence

Why did Indian income per capita decline relative to the advanced economies such as the USA? The overwhelmingly cause was a decline in the relative efficiency of utilization of technology in India relative to Britain and the USA. Conventional estimates report that about one third of the difference in incomes per capita between countries comes from capital (conventionally measured), and the rest from efficiency (TFP) differences.[4] But this assumes that differences in capital per worker across countries, which are very highly correlated with differences in income per capita and measured TFP, are exogenous. In a world where capital can flow between economies capital/worker should be regarded as an endogenous variable, and would itself be *responding to* differences in the level of productivity across countries. Thus in the case of India by the late nineteenth century rates of return on capital were pretty close to those of England, as table 2 shows. The imperial connection removed all political risk for British investors.

Table 2: Rates of Return, Britain and India c. 1910

Asset	Rate of Return in Britain (%)	Rate of Return in India (%)
Agricultural land, 1900-14	2.83	4-6
Industrial Capital, 1900-14	8	7
Railway Equity, 1870-1913	4.3	5.0
Railway Debt, 1870-1913	3.7	3.7
Bank Rate	4.3	5.4

Note: Returns were lower on Indian than British railway bonds because the Indian Government guaranteed the bonds of the railways as a way of promoting infrastructure investment.

Sources: Edelstein (1982). Goldsmith (1983). Clark (1987, 1998). Wolcott and Clark (1999), p. 402.

[4] See, for example, Easterly and Levine (2000).

Thus suppose the production function was Cobb-Douglas so that

$$Y = A\,K^{\alpha}\,L^{\beta}T^{\gamma} \qquad (1)$$

where T denotes land. Choosing units so that A, K, Y and T are 1 in India, if the rental of capital were the same across countries, capital per worker in country i, relative to India, would be

$$(K/L)_i \;=\; A_i^{1/(1-\alpha)}\,(T/L)_i^{\,\gamma/(1-\alpha)} \;=\; (Y/L)_i \qquad (2)$$

The amount of capital employed would thus depend on the level of efficiency of the economy. The more efficient an economy the more capital it would attract, which would have a second round effect in increasing income per person. Capital per person in this Cobb Douglas case would be just proportionate to output per person. If capital were exogenously chosen in each economy then the efficiency (TFP) of other economies relative to India would be

$$TFP_i = A_i = (Y/L)_i(K/L)_i^{\,-\alpha}\,(T/L)_i^{\,-\gamma} \qquad (3)$$

But with capital endogenous and rates of return equalized across countries then

$$(Y_i/L_i) = (A_i)^{1/(1-\alpha)}\,(T/L)_i^{\,-\gamma/(1-\alpha)} \qquad (4)$$

Also the level of efficiency of any economy can be calculated as

$$A_i = (Y/L)_i^{\,1-\alpha}\,(T/L)_i^{\,-\gamma} \qquad (5)$$

Table 3: Calculated Relative TFP, USA and Britain (India = 1)

Years	USA TFP	Britain/UK TFP
1873-79	2.8	3.0
1906-14	3.8	3.8
1947	5.3	4.1
1987*	6.2	4.9
1991*	5.9	4.6
1998*	5.4	4.2

Note: *For these years the assumption that the rate of return to capital was the same in India as the other countries is suspect because of government regulations in India on foreign investment.

Thus in this case we can calculate relative TFP for the USA and Britain relative to India from just the relative outputs per capita and the relative amount of land per person. Since the share of land in national income, γ, has become very small in recent years (4) suggests that the sole significant cause of differences in income per capita between India and the USA and other advanced economies is differences in TFP. Table 3 shows the implied TFP of the USA and Britain relative to India assuming the share of capital in national income was 0.33, and that the share of land was 0.

After independence in 1947 the Government of India imposed a variety of restrictions on the free mobility of capital so that the assumption of an equalized rate of return on capital is suspect. But the proportionality posited above between output per person and capital per person holds. US output per person was 14.3 times output per person in India in 1992, while capital per person 17.8 times greater. UK output per person was 10.5 times Indian output, and capital per person 10.9 times greater (Penn World Tables, version 5.6).

These differences in TFP could have two causes – slow diffusion of Western technology, or the inability to effectively employ Western technology. We would argue that since the late nineteenth century the evidence is that technology was able to diffuse rapidly to poor countries, and that the low TFP of India comes in large part from an inability to effectively employ this new technology.

If we look at the industry with which we have expertise, cotton textiles, for example, we see that up to at least the 1940s there is no sign of any Indian lag in the types of machinery employed compared to the advanced economies. In the early nineteenth century a specialized machine building sector developed within the Lancashire cotton industry. These machinery firms, some of which such as Platts were exporting at least 50% of their production as early as

1845-1870, had an important role in exporting textile technology. These capital goods firms were able to provide a complete "package" of services to prospective foreign entrants to the textile industry, which included technical information, machinery, construction expertise, and managers and skilled operatives. By 1913 the six largest machine producers employed over 30,000 workers (Bruland (1989), pp. 5, 6, 34). These firms reduced the risks to foreign entrepreneurs by such practices as giving them machines on a trail basis, and undertaking to supply skilled workers to train the local labor force. Similar capital goods exporters developed in the rail sectors, and later in the U.S. in the boot and shoe industry. The sales records of the English machine builders have survived along with detailed descriptions of the machines ordered by each customer. These show that Indian firms were buying Platt machinery of a description that was very similar to that used in the advanced economies.

Instead the problem that limited the growth of the Indian industry was the low profits made by cotton mills in India, because of their inability to employ the technology effectively. These low profits prevented the rapid industrialization of the country under the British despite India's great labor cost advantages. Table 4, for example, shows the gross profit rates of Bombay mills by quinquennia from 1905-9 to 1935-9, as well as the size of the Bombay industry and the output per worker in Bombay as an index with 1905-9 set at 100. As can be seen profits were never great, but the industry grew substantially in the era of modest profits up to 1924. Thereafter, however, profits collapsed (as a result of Japanese competition) and the Bombay industry soon began to contract. The last column shows what was happening to output per worker in Japan, where using the same machinery as in India, in both cases purchased from England, output per worker increased greatly.

Table 4: The Bombay Industry, 1907-1938

Year	Gross profit rate on fixed capital	Size of the Bombay Industry (m. spindle-equivalents)	Output per worker in Bombay (Index)	Output per worker in Japan (Index)
1905-9	0.09	3.09	100	100
1910-4	0.05	3.43	103	115
1915-9	0.07	3.68	99	135
1920-4	0.08	4.05	94	132
1925-9	-0.00	4.49	91	180
1930-4	0.00	4.40	104	249
1935-9	0.02	3.91	106	281

Notes: Profits and output per worker were calculable only for the mills listed in the Investor's India Yearbook.

Source: Wolcott and Clark (1999).

The inefficiency of operation of Indian mills relative to the advanced economies mainly showed up in terms of very low outputs per worker, rather than in low outputs per machine hour. Thus output per worker hour using the same technology in spinning cotton yarn in the USA is many times what it is in India since India entered the factory cotton textile industry. In 1978, for example, output per worker-hour in cotton spinning was 7.4 times greater in the US than in India on mills using substantially the same equipment. If there is substantial possibility of capital-labor substitution then the odd pattern of the same output per spindle-hour but low outputs per labor-hour in India could still be the result of a generalized managerial inefficiency combined with a move to substitute labor for capital in Indian mills. But even in elements of the operation where the substitution possibilities were very limited or non-existent India shows up in textiles as having low output per worker. Thus in spinning machines are stopped at regular intervals to remove the output packages in an operation called "doffing." Since the machines fill at a regular rate doffing can be scheduled for the machines in rotation and there is no issue of machine interference from changing the work assignment. Table 5 shows the number of packages doffed from spinning machines by workers in India, the USA and England in a variety of years from 1907 on (data does not exist for the USA in more recent years because this operation was largely mechanized). As late as 1990 workers in southern India were completing an average of 230 doffs per hours, and worker productivity at this task in the Gujarat and Maharashtra centers of the industry was similar. This was less than one quarter of the last recorded average US performance of 1,000 doffs per hour achieved thirty years earlier in 1959. Yet work study tests India suggest that, based on performance rates of Indian workers on the tasks doffers in India complete, a fully employed doffer would complete 863 doffs per hour. Thus compared to both

Table 5: Spindles Doffed per Worker per Hour

Year	USA	England	India
1921	728	-	118[a]
1944	606	354	124[b]
1946	770		
1949/50	933	570[c]	-
1959	1,000	-	-
1969	-	600[d]	-
1978	-	-	160[e]
1990	-	-	230

Notes: [a]Bombay City and Island. Calculated from Shirras (1923) on the assumptions that there is one side per ring spinner (170 spindles), that output per spindle-hour averages 0.038 lbs., and that the weight of the doff package is 0.084 lbs (the same as Britain in 1949).

[b]India except the Bombay Presidency.

[c]Lowest cost mills.

[d]Assumed performance in modernization study.

[e]South Indian mills. Doff package assumed to be 0.12 lbs.

Sources: Shirras (1923), Cotton Spinning Productivity Team (1951), Ratnam and Rajamanickam (1980), Doraiswamy (1983), SITRA (1990), Textile Council (1969).

US performance in practice, and what Indian workers can complete under work study conditions, the typical doffer in 1990 actually worked for only about 25% of the their time in the factory.[5]

Thus the problem of the Indian economy is heavily associated with production inefficiency. This production inefficiency is observed even when the same methods and machinery is employed in production in India as in the advanced economies. And this production inefficiency is associated in particular with an underutilization of the efforts of workers in the production process.

Regional Income per Capita in India, 1890-1998

While India as a whole has grown poorer relative to the advanced economies since 1873, there has always been considerable disparity between richer and poorer regions within India, and this disparity has been growing in recent years. Consideration of regional growth in India is complicated by the changing boundaries of regions over time. The major administrative break was caused by the formation of the Republic of India in 1950. The new republic established 14 states and 5 union territories in 1956.[6] But new states were created by the subdivision of older ones in 1960 and 1966, and some union territories have been converted into states so that there are now 25 states, the last created in 1991. Table 6 shows for the 25 current states their population in 1991, their principal languages, their rates of urbanization and literacy, and their income per person in 1991 in rupees of 1990. States were largely based on language groupings.

[5] Interestingly the SITRA pamphlet referred to above suggests that the worker assignments would be cost minimizing at only 440 spindle doffs per hour. But it does so on the assumption that (1) any increase in assignment would have to be accompanied by an increase in wages per worker, (2) given the "monotonous and repetitive nature" of doffing it would be too much to expect more of workers, and (3) attempts at higher assignments would result in machine interference.

[6] States Reorganization Act of 1956.

Table 6: The Principal Indian States and Territories in 1991

State or Territory	Population 1991 (m.)	Principal Language	Urbanization (%)	Literacy (%)	Income /Person (Rs) (1991)
Andhra Pradesh	43.5	Telagu	26	45	4,728
Assam	22.4	Assamese	11	53	4,014
Bihar	86.4	Hindi	13	38	2,655
Delhi*	9.42	Hindi	90	76	10,177
Gujarat	41.3	Gujarati	34	60	5,687
Haryana	16.5	Hindi	22	55	7,502
Himachal Pradesh	5.2	Hindi	9	63	4,790
Jammu & Kashmir	7.7	Urdu	24	27	3,872
Karnataka	45.0	Kannada	31	56	4,696
Kerala	29.1	Malayalam	26	91	4,207
Madhya Pradesh	66.2	Hindi	23	43	4,149
Maharashtra	78.9	Marathi	39	63	7,316
Orissa	31.7	Oriya	13	48	3,077
Punjab	20.3	Punjabi	30	57	8,373
Rajasthan	44.0	Rajasthani	23	39	4,113
Tamil Nadu	55.9	Tamil	34	64	5,047
Uttar Pradesh	139.1	Hindi	20	42	3,516
West Bengal	68.1	Bengali	27	58	4,753
All India	846.3				4,934

Note: *Union Territory. "Others" includes Arunchal Pradesh, Goa, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and the Union Territory of Pondicherry.

Source: Cashin and Sahay (1996).

Table 7: Coefficient of Variation of Income Per Person, India and Europe

Year	India (19 localities) Wages	Imperial India (10 provinces)	India (19 states)	India (14 states)	Non-Communist Europe (18 Countries)
1890	0.30[1]	-	-	-	0.23
1914	0.26[1]	-	-	-	0.21
1938	-	0.29[3]	-	-	0.27
1949	-	0.28[3]	-	-	0.25
1961	-	-	0.22	0.20	0.38
1971	0.35[2]	-	-	-	-
1981	-	-	-	0.28	-
1991	-	-	0.31	0.31	0.21
1998	-	-	-	0.36	0.17

Notes: [1]Carpenters. [2]Rural wages only. [3]Excluding provinces which later fell in Pakistan. The earlier Indian data does not control for price level variations, but Bill Collins found that the national coefficient of variation in real wages across Indian Districts was .337 in 1873-79, and .355 in 1900-1906 (Collins, (1999), Table 2). Our uncorrected estimates are thus similar in magnitude.

Luxembourg was omitted from the list of European nations as an outlier.

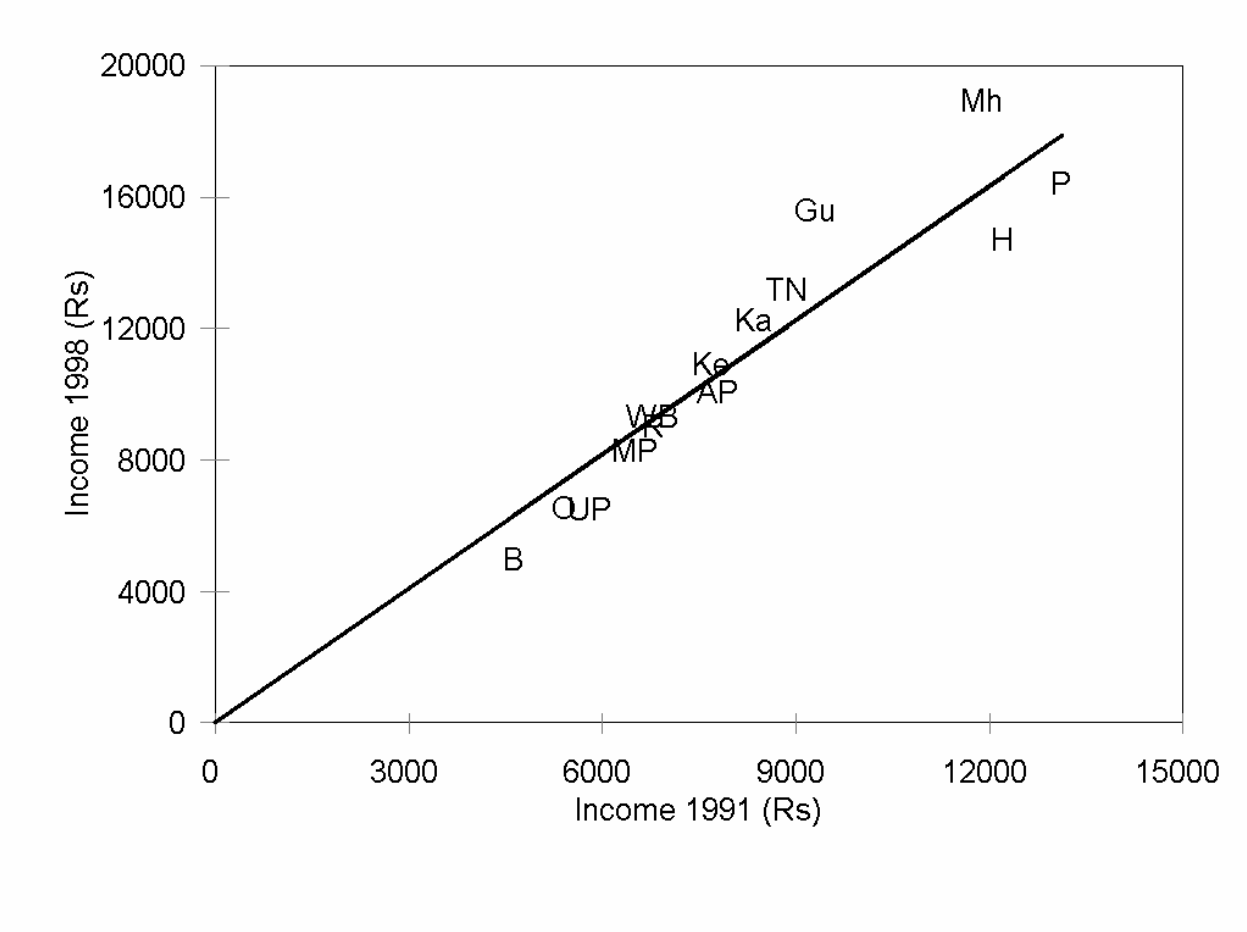
Sources: Europe. 1890-1950, Prados de la Escosura (2000). 1950-1998, OECD. India GDP. 1938, 1949, Nataraja (1949). 1961, Cashin and Sahay (1996). 1981, 1991, 1998, Statesforum. India, Wages. 1890, 1914, Datta (1914). 1971, Lal (1988).

There is considerable variation in state real incomes per capita in 1991, even excluding the union territory of Delhi which has the highest income of all. Incomes in the Punjab in 1991 were 3.2 times those in Bihar. Interestingly the levels of income per capita have actually been diverging in India since at least 1961, despite the relative uniformity of institutional structure across states, as shown for example in the small variations in taxes as a share of income revealed in table 1.[7] Table 7, for example, shows the coefficient of variation of various measures of income per capita across Indian regions from 1890 on. In the earlier colonial period, with no variation in institutional structure across regions, and improving transport and communications, income variations were significant and relatively stable. Since Independence the evidence is for steadily increasing income disparities, both before the economic liberalization of 1991 and since then. The fortunes of various states have also varied widely. In 1961, for example, West Bengal was the second richest of the 14 major states, with an income per capita very close to the richest Maharashtra. By 1998 West Bengal ranked 9th in income per capita, and its income was less than one half that of Maharashtra.

Figure 2 shows the state real income levels in 1998-9 compared to those of 1991-2 in rupees of 1993-4. Also shown is the predicted level of income per capita in 1998 based on 1991 when we assume all states' incomes increased by the same proportion. The figure reveals clearly that in the 1990s the richest states have been improving their income levels faster than the poorer

[7] Aiyar (2001) and Cashin and Sahay (1996) claim to have found convergence in a cross section of Indian states. But they mean by convergence that they can find a regression specification under which the growth rate of income is associated negatively and statistically significantly with the initial level of income, not that actual incomes per capita are becoming less varied. Thus Cashin and Sahay (1996) only find evidence for convergence if they include the initial share of manufacturing in state GDP and the initial share of agriculture in their regressions, and if they divide the periods into decades. Aiyar (2001) finds convergence over the period 1971 to 1995 if he divides the period into 5-year increments, and includes for each period initial literacy and investment. Abler and Das (1998)

Figure 2: Income in 1998-9 as a function of 1991-2 (1993-4 Rupees)



Note: Throughout in the figures we use the following symbols for states: AP, Andhra Pradesh, B, Bihar, G, Gujarat, H, Haryana, Ka, Karnataka, Ke, Kerala, MP, Madhya Pradesh, Mh, Maharashtra, O, Orissa, P, Punjab, R, Rajasthan, TN, Tamil Nadu, UP, Uttar Pradesh, WB, West Bengal. Rajasthan's income per capita is projected from 1997-8.

Source: Statesforum.

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included a measure of investment in their convergence regressions, which covered the entire period, 1961-90, and found no convergence, though they did find a statistically significant effect of investment.

states. Gujarat had a growth rate of income per capita of 7.4%, while Bihar's was 1.0%. This despite the facts that the existence of measurement errors in the estimated state GDP per person in each year will tend to produce an appearance of convergence. In 1991, for example, Bihar, the poorest of the 14 major states, had a GDP per capita of just 39% of the second richest state Maharashtra. But by 1998 Bihar's GDP per capita of only 26% of Maharashtra's, since income per capita in Bihar increased by only 7% in these seven years. Indeed relative to the USA the large northern Indian states of Bihar and Uttar Pradesh, with a combined population in 1998 of 277 million, both saw declining incomes per capita in the 1990s. Three out of the 14 major states, including these two, had slower growth rates of income per capita in the 1990s than in the 1980s.

India's experience since the 1960s constrasts sharply with that of western Europe and the United States. Table 7 shows, for example, for 18 non-communist countries in Europe the coefficient of variation of incomes back to 1890.[8] While in 1961 these European states showed much more variation in incomes per capita than did India, by 1998 the position had reversed, with European states showing dramatic convergence in income levels. The convergence of incomes per capita across the states of the United States is an oft cited example of a supposedly general convergence tendency (Barro and Sala-I-Martin, (1991, 1992)). But the experience of the Indian states, and indeed also of provinces in China, suggests that the convergence witnessed in Europe and within the United States reveals no general growth law, but a contingent and accidental feature.[9]

[8] Luxembourg was omitted. By 1999 it had the highest income per capita in the world.

Explaining Income Divergence in India since 1961

Just as the sources of India's decline in relative income compared to the advanced economies from 1873 onwards seems unconnected to government policy so the divergence of income per capita within India again seems largely unconnected with government policy. As table 1 shows the burden of taxation across Indian states has varied little since independence, with the wealthier states if anything collecting a larger share of income in taxes. There are more subtle elements of the regulatory climate in each state that the gross tax burden will not reveal, but for most important industries, such as textiles, the significant government policy was made at the Federal level, as with the excise tax on yarn and cloth, and the rights of workers in the mill sector.[10]

An investigation of the divergence of incomes in the reform era since 1991 shows no very promising signs of the effects of state policy. Table 6 shows the effects of some of the measurable dimensions of state policy such as state taxes as a share of state GDP, public education expenditure per 100 workers, public capital expenditures per 100 workers, and the percentage of children enrolled in primary and secondary education. In each case the variable is included as variable Z in a regression of the form

$$\text{Growth Rate of } GDP/N_{1991\text{-}98} = a + b(GDP/N)_{1991} + cZ + e \qquad (6)$$

to control for the possible dependence of these Z variables on income per capita. Without any other variables included the coefficient on $(GDP/N)_{1991}$ is strongly positive (though significant at

[9] China similarly has seen growing income disparities in the years 1978-1998. Income per capita in Guangdong in 1998 was nearly three times that of Quinghai, even though Guangdong's per capita income slightly lagged that of Quinghai in 1978. Démurger (2001).

Table 8: State Growth and State Policy Measures, 1991-1998

Version	Adjusted R-squared	Variable	Estimated Coefficient	Standard Error	p-value
1.	0.189	Log GDP/N, 1991	2.961	1.474	0.068
2.	0.380	Log GDP/N 1991	0.042	1.867	0.983
		Taxes as a Share of state GDP, 1991 (%)	0.654	0.302	0.053
3.	0.233	Log GDP/N 1991	1.059	2.054	0.616
		Public Education Expenditure per 100 workers, 1991	0.015	0.012	0.222
4.	0.147	Log GDP/N 1991	2.604	1.641	0.135
		Public Capital Expenditures per 100 workers, 1991	0.006	0.010	0.540
6.	0.436	Log GDP/N, 1991	1.379	1.384	0.340
		% Enrolled Primary School, 1981	0.113	0.045	0.029
7.	0.146	Log GDP/N 1991	2.446	1.722	0.184
		% Enrolled Secondary School, 1981	0.049	0.078	0.544
8.	0.431	Log GDP/N 1991	6.716	1.958	0.006
		Phones per 100 workers, 1985	-1.906	0.771	0.031
10.	0.123	Log GDP/N 1991	2.923	1.539	0.084
		Km. Roads per 100 workers, 1985	0.403	1.345	0.770

Sources: See Appendix Table 1.

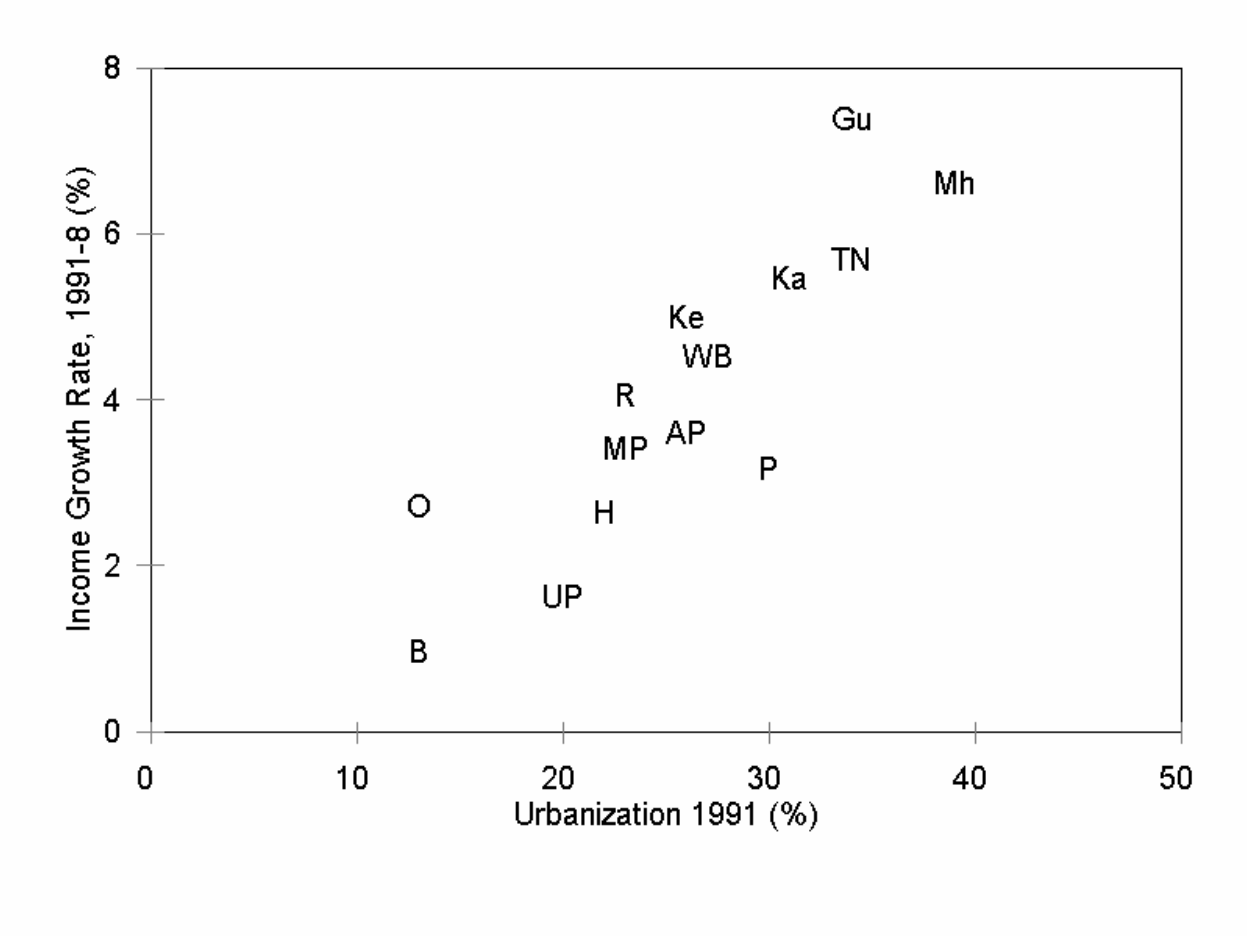
[10] Thus Misra, in his 1993 book on government policy and the textile sector, has no discussion of any effects of different state policies with regard to textiles (Misra (1993)).

only the 10% level). As can be seen if state taxes as a share of income are included then they are a much better predictor of growth than the current level of income. The association is that higher state tax levels in 1991 are associated with faster growth. But if we look at what the states might do with this revenue to foster income growth the picture is less clear. Both education expenditures per 100 workers in 1991 and capital expenditures per 100 workers show little sign of connection with economic growth. The percentage of children enrolled in primary school in 1981 does show a very strong connection with economic growth. But this is a variable only partially under the control of state governments. And before we get two excited about the possibilities in fostering economic growth through increased expenditures on education, notice that the percentage of children enrolled in secondary education in 1981 is not at all a predictor of growth in the 1990s.

We have two other measures of the states potential success in developing infrastructure, the number of phones per 100 workers in 1985 and the number of km of roads per 100 workers in 1985. Neither of these suggests much role for state actions. Phones per worker are statistically significantly associated with economic growth once we control for initial income. But the association is negative. And the amount of road infrastructure shows no connection. Thus if state policy was responsible for the divergence of incomes after 1991 it had to be through some very subtle measures.

Because the two high income states in 1991 which did not perform so well were Punjab and Haryana, which were still fairly agricultural and rural, it is possible to predict the growth rates in the 1990s fairly successfully using measures such as the urbanization rate in 1991 or the manufacturing share of output in 1991. Figure 3, for example, shows the income growth rates as a function of the urbanization rates in 1991. But this offers us little insight into the nature of the

Figure 3: Income Growth Rates 1991-8 and Urbanization Rates 1991



Source: Statesforum. Cashin and Sahay (1996).

growth process. The internal variation in economic performance within India seems mainly to suggest that the role of institutional variations, the kind of things that economists can suggest advice on, must be limited.

The Employment Relationship

We see above that the obvious correlates that economists have focused on in recent years to explain differences in income growth rates across economies are of little help in explaining the movement of income per capita across states in post independence India. What we are desperately lacking is any kind of hypotheses that would explain the facts of India's peculiar economic path in the last 150 years. These facts are as follows.

1. A widening of the economic gap between India and the advanced economies from at least 1873-1980 on, and probably from as early as 1800.[11]

2. A de-industrialization of India in response to the industrialization of the advanced economies, even in the period of free trade. Thus by 1912 India was largely a raw material exporter. Why, at least in the era of free trade up till 1914 did India not only get poorer relative to the advanced economies, but also develop a comparative advantage in agriculture?

3. Wide differences in performance by different regions within the same institutional structures both under the British and after independence.

4. Low levels of performance by workers within India, but high levels of performance when these workers relocate to other economies such as Britain and the USA. Further no

[11] See Williamson quote.

indication that workers in India in such industries as textiles have any less aptitude than those in the USA in terms of the times taken to perform standard tasks.

The hypothesis we suggest, and it is a speculative one, is the following. The disadvantage India has relative to the advanced economies is in the **employment relationship**. This, to sound almost Marxist, is where a worker sells their labor power for a set time to an employer. The Industrial Revolution in the West saw not only the development of new technology, but a greater reliance on the employment relationship as a way of producing output. In the pre-industrial period most industrial workers were instead sub-contractors. They sold output to employers in an arms length relationship. The arrival of the steam powered factories in the 1770s also brought with it a new employment concept, "factory discipline". Under this new mode of employment the employer demanded regularity, punctuality, and sobriety from their employees as opposed to preferring to pay by results. The Industrial Revolution also brought a greater division of labor within production processes. Each employee specialized more on some element of the process, and there was also a complex hierarchy of employees supervising employees.[12]

The employment relationship, as those who have participated in it all know, is a peculiar one. In particular the fulfillment of the bargain to labor in exchange for wages is difficult to monitor. Workers vary in natural abilities, there are uncertain links between inputs and outputs, and it is often too costly or technically impossible to measure individual outputs. Economists traditionally think of the employment relationship as being sustained by monitoring and incentives between rational self-interested workers and employers. But the reality is that an at least equally important element is the complex human interplay between workers and bosses and workers and workers involving gift exchanges, pride and notions of fairness. As Akerlof (1982)

and others have stressed, workers give gifts to employers of more effort than they need to avoid termination, and employers in return give gifts of higher wages than are needed to retain workers. Economists are always tempted to try to reduce these arrangements to self-enforcing equilibria between completely rational self-interested agents. Such a reduction would imply that there can be no difference in the way the employment relationship works between different countries, unless of course multiple equilibria are possible. Differences in relative prices and technology may influence the amount of monitoring employers engage in and the amount of "cheating" workers engage in, but otherwise the employment relationship will be structured similarly across economies and will generate the same results.

But such a reductionism seems doomed to failure in capturing the nature of the exchange. Thus, for example, anyone who has purchased services in modern America knows that workers often give gifts to customers that hurt the interests of their firms. In this case there is no conceivable benefit to workers. The relationship that will be sustained between employers and workers depends not just on a rational calculus between self interested agents on the amount of effort to offer, and the amount of monitoring to engage in, but on the general attitude to gift giving. Here in America we live in the gift giving society. In most interactions we forbear to take full advantage of opportunism – we gift the other party with more than we need do, and we do it without any benefit to ourselves. In part we do this because we have in turn ourselves been the recipients of many gifts. That is the non-rational calculator element. One case is letting a person into your lane on a congested highway. There is a cost, you are slowed down slightly, and no conceivable benefit. But others have done the same for you. Another case is writing anonymous letters of recommendation for students. This gift giving exchange is sustained in part by being the recipient of many gifts in turn. It is an equilibrium, but not in the sense

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[12] See Clark (1994).

understood by economists. We receive from one and we give to another. Mutual gift giving thus constitutes a social equilibrium. It is self-reinforcing. Its breakdown is also self reinforcing. Various intermediate equilibria are also possible.

Suppose, however, that the employment relationship works well only in an environment of mutual gift giving. The unobservabilities in any employment relationship are such that only when the employed forbear from taking advantage of the unobservability of outcomes will the relationship work well. Suppose also that in India the cultural equilibrium is for employment not to constitute the mutual exchange of gifts. Workers expect all other workers to take advantage of opportunities to shirk, and they adjust their own behavior accordingly. In this case technologies that rely for their implementation on the employment relationship will be handicapped. Employees will provide little for their wage. They will be protected by the knowledge that any potential replacements will provide little also. If all around you give nothing to the employer then why should you give? Thus we can have several possible employment regimes. One where most workers voluntarily do more than they have to, and another where all workers act opportunistically. Since the mutual gift giving is sustained by observing that others do the same and by receiving gifts yourself subtle changes in behavior can lead to a move to a very different equilibrium. Workers moving from one environment to another will change their behavior.

Our idea then would be that Indian employers extract little of the labor power they pay for from employees because of employee's unwillingness to give voluntarily what is costly to monitor. The opportunism displayed within the complex hierarchy of employees in modern production enterprises defeats them.

What would be empirical implications of this hypothesis that we could test? The first would be that if poor performance by labor in India attaches just to the employment relationship,

then we should observe an adaptation by the economy to avoid this relationship in favor of self-employment and family employment where possible. India has seen an extraordinary maintenance in the textile weaving sector, for example, of handlooms. By the 1830s in England handloom weaving of cottons was largely superceded by power looms in factories, even though the wages of handloom workers were only about half those of factory workers.[13] Yet 170 years later the handloom sector in India is still very large, particularly in cottons. Indeed the output of the handloom sector has grown steadily since 1900 when statistics were first gathered. In 1997, as table 9 shows, output of woven cloth from handlooms in India was about 10 times as great as in 1900. In 1997-8 25% of cloth production in India was still from handlooms.

Cloth in India is in fact produced in three ways. The mill sector, consisting of large powerloom plants as in the USA, the handloom sector costing of looms in houses and workshops, and the "powerloom" sector, consisting of workshops of 1-50 powerlooms outside the formal regulation of the mill sector. The survival of the handloom industry in India is often attributed to government protection. Since independence the government has levied excise taxes on mill output while keeping the handloom sector tax-free. Thus even in 1997-8 most fabrics paid an excise duty of 10-20%, but handloom cloth was still exempted. However, the informal

[13] See Bythell (1969).

Table 9: Cloth Production in India by Sector, 1997-8 (meters^2)

Year	Mill Production	Decentralized Powerloom Production	Decentralized Handloom Production
1900-3	483	0	793
1936-9	3,630	0	1,420
1951	3,740	-	-
1973	4,299	-	-
1980-1	4,533	4,802	3,109
1997-8	1,948	20,951	7,603

Sources: Office of the Textile Commissioner (1997, 1998). Mazumdar (1984), pp. 7, 36.

"powerloom" sector has largely avoided paying these excise taxes.[14] So the tax advantages mainly serve to explain why smaller powerloom operations could out compete large mills. They do not explain why handlooms can still compete against untaxed powerloom operations. Powerlooms produce 2.5 times the amount of output per hour as handlooms, and one weaver should be able to operate between 4 and 8 powerlooms at a time, based on labor requirements in Britain and the USA in circa 1900. Day wages per worker in the handloom and powerloom sectors are about the same, so this implies that powerloom weaving costs per meter of cloth should be 5-10% of handloom labor costs. Since capital costs for powerlooms per meter are estimated to be only about 20% higher than for handlooms interest rates would have to be extraordinarily high before handlooms had any cost advantage. But in practice powerlooms in India require much more labor even than machine powered looms in England in the nineteenth century. Powerloom weavers typically supervise only 1.5 looms each (Mazumdar (1984), p. 93). This drastically reduces the labor cost advantages of the power loom. The high levels of staffing of power looms might be explained by the very low wages of the operatives, but Indian wages now are as high or higher than those in England in the 1830s when a more primitive powerloom easily swept aside the competition of handlooms. The key issue here is that because of the capital requirements powerlooms are operated with hired labor, while handlooms are placed in the homes of the workers, and the work is paid for on a piece rate basis.

Similarly if there is anything to the idea that the Indian economy works poorly because of a difficulty in operating the employment relationship then agriculture in India should tend to be structured differently, with more use of land renting and less of wage labor than in European agriculture at a comparable state of mechanization. The second implication would be that employment relations would be structured differently. If the relationship works because of

[14] See Misra (1993), pp. 89-119.

mutual gift giving then there is an incentive to engage in repeated interactions with the same worker. Employers will prefer to hire the same workers even where there is no learning specific to the job since then it is easier to establish relationships based on mutual gifts. Employers will avoid casual labor markets where encounters between the same worker and employer would be infrequent. Thus we see in agricultural labor markets in pre-industrial England a tendency for workers to be hired year round by the same employers, and to work for the same employer year after year. Wages were finely calibrated to the individual worker. In modern rural labor markets in India, by contrast, workers are typically hired by employers on a casual, daily basis, with little sign of preference for the same workers by employers. Wage rates paid tend to be standardized, with little adjustment to individual productivities. Seemingly there is little to be gained by connection with individual workers.[15]

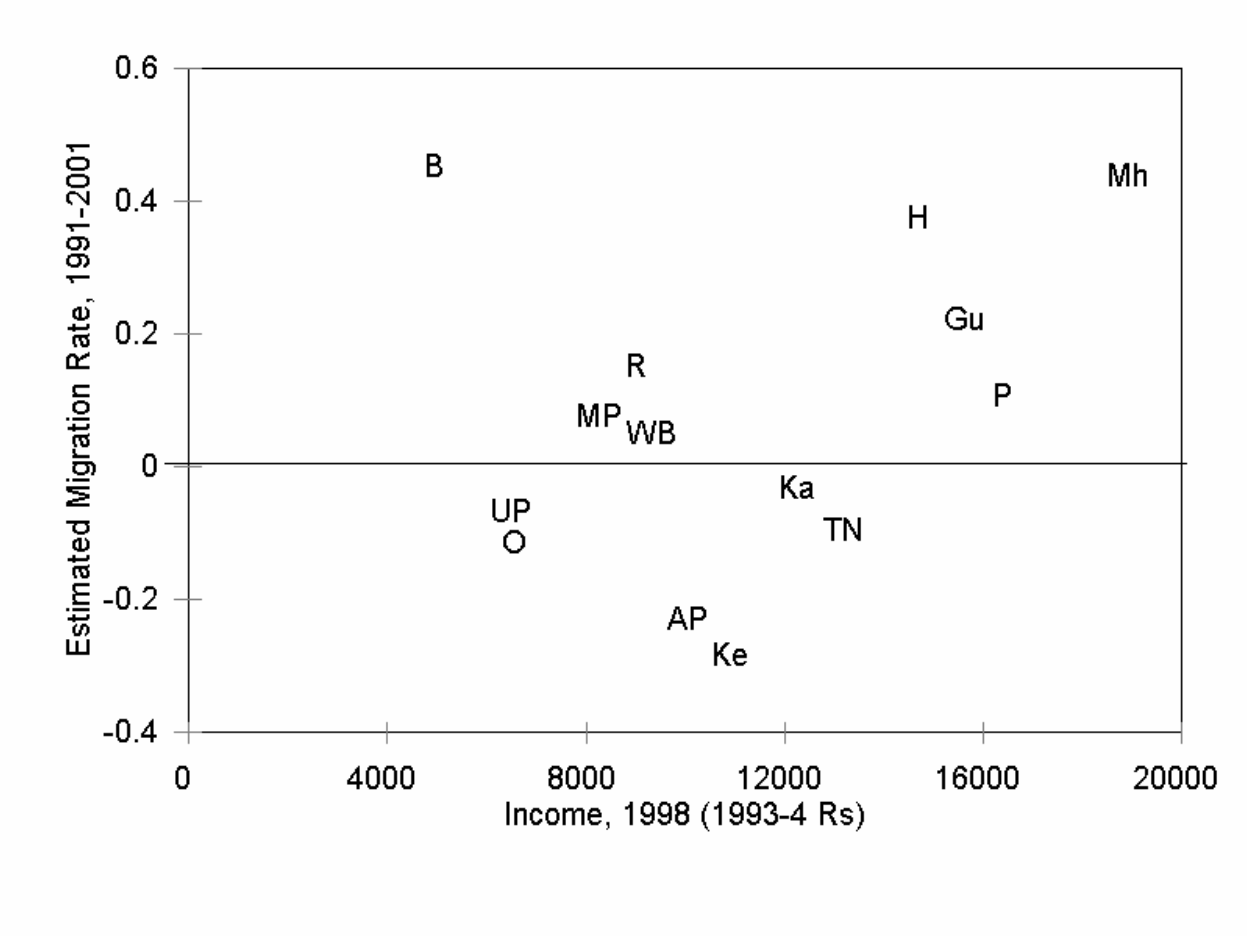
As noted above this is a somewhat inchoate hypothesis. It is not at all clear to us if it is consistent with the details of Indian experience. But it would allow for differences in worker productivity within the different States that constitute India as created by different social equilibria with regard to gift giving behavior by workers. And it would also imply that if an individual worker is transferred from one social setting to another their behavior could change accordingly. Further it would also explain the widening gap between India and the USA and other Western Economies from 1873 to the 1980s as the result of the increasing importance of the employment relationship in modern production systems.

[15] See Datt (1996).

Policy Implications

We reach two conclusions above. First that government policy has had little impact on output per capita in India since 1873 because of the importance of differences in the efficiency of use of technology in explaining income disparities in general. And second that there has been a growing regional disparity in incomes per capita within India since at least 1961. In these circumstances what can the government do to foster growth, and in particular to foster growth in states like Bihar and Uttar Pradesh which have seen little impact even from the more rapid growth that began in the 1980s? Within both the USA and Europe movement of people from low income regions to high income regions has been an important force in increasing overall economic growth rates. But within India there has been little movement of people towards the higher income states despite the very large disparities in income that have emerged in the 1990s. Figure 4 shows the estimated net migration rate per year for the 14 major Indian states from 1991 to 2001 as a percentage of 1991 population as a function of state domestic income per capita in 1998. The net migration rate was estimated from the difference between actual populations in 2001 and those projected from populations in 1991 and state birth and death rates. With the notable exception of Bihar the states with high incomes in 1998 were clearly net recipients of migrants, while those with low incomes were net losers of people. But migration rates were very modest compared to the changes in population occurring through natural increase. Maharashtra, for example, now the richest Indian state had a net gain of only 0.44% of the population in each year. But overall population growth in Maharashtra was about 2% per year, so that migration was a small factor in population change. Similarly outmigration from desperately poor Uttar Pradesh was estimated at only –0.07% per year, compared to a natural rate of population increase of 2.8% per year.

Figure 4: Estimated Net Migration per Year 1991-2001 versus State Income per Capita, 1998

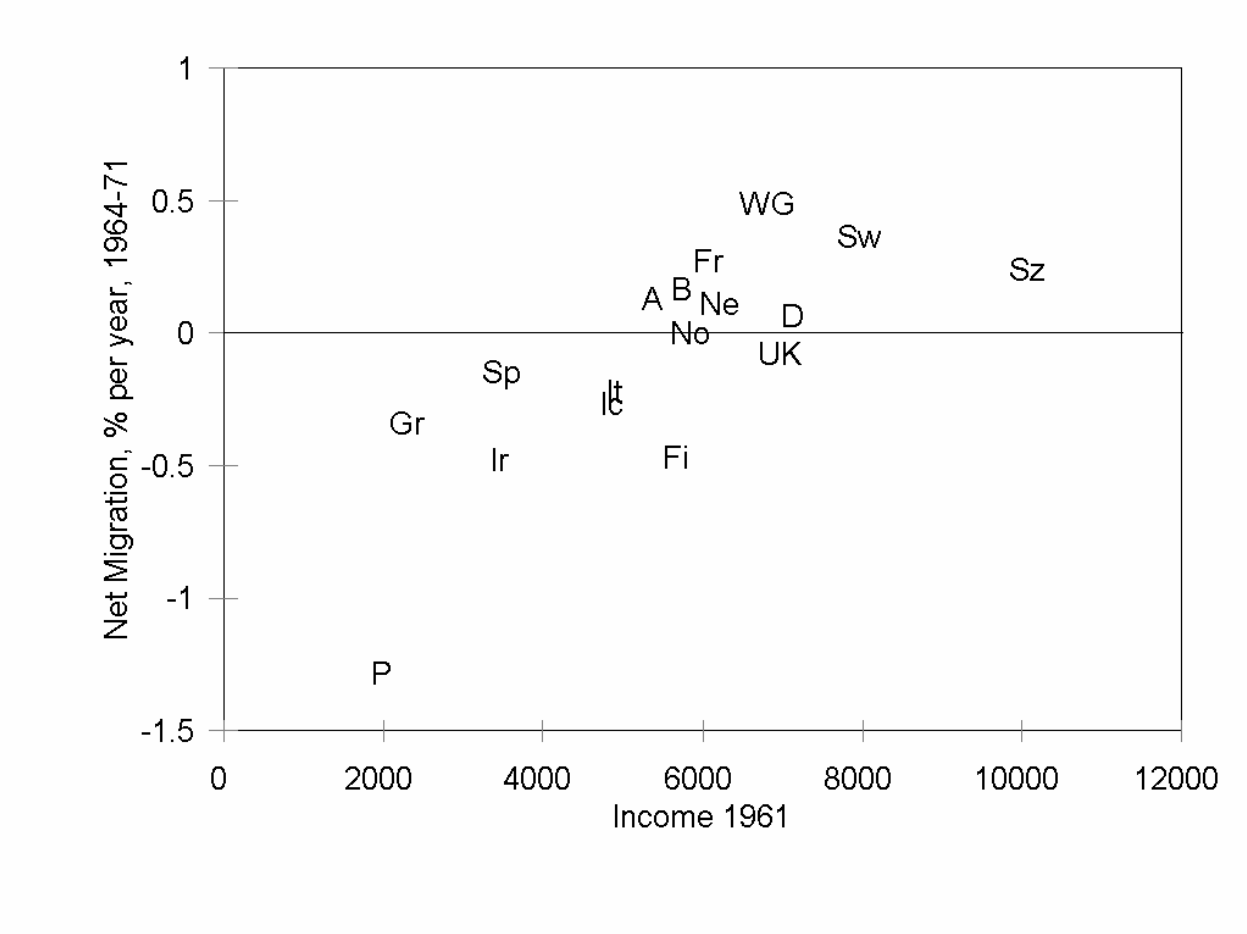


Sources: Census of India.

These migration rates between Indian states, where there is no legal impediment to migration, are very modest compared even to migration rates across European nations in the 1960s when there were significant legal impediments in many cases, and also language barriers. Figure 5 shows net annual migration rates for non-communist Europe in 1964-71 compared to income per capita in 1961. These net migration rates include, however, also migration to the Americas and Australasia. By 1970 after twenty years of constrained post war migration into Germany and France about 7% of the workforce was foreign born in each country (Faini et al. (1999)). Hatton and Williamson estimate that between 1870 and 1913 Europe lost 13% of its population through emigration to the New World, despite the transoceanic nature of this migration (Hatton and Williamson (1998)).

Within the USA, where the legal and language barriers do not exist net migration rates between states are even higher. Figure 6 shows net annual internal migration rates for U.S. states for the years 1900-1999 compared to average annual pay for those employed in 1997 in dollars. By comparison the limits of state net migration rates in India in the 1990s are also shown. US domestic net migration rates are many times greater than those in India, though the comparison may be influenced by the smaller average size of US states. Interestingly US migration has little on its face to do with differences in wage income per capita across states. The earnings reported here, however, make no allowance for differences in living costs across states. Also international migration into US states is quantitatively important, and many of the high income states losing internal migrants, such as California, New Jersey and New York, are substantial net recipients of international migrants. Finally there is a significant component of life-cycle migration of the elderly in the US to high amenity states for retirement purposes. Barro and Sala-I-Martin (1991) estimated the relationship between relative state income and in-migration in the

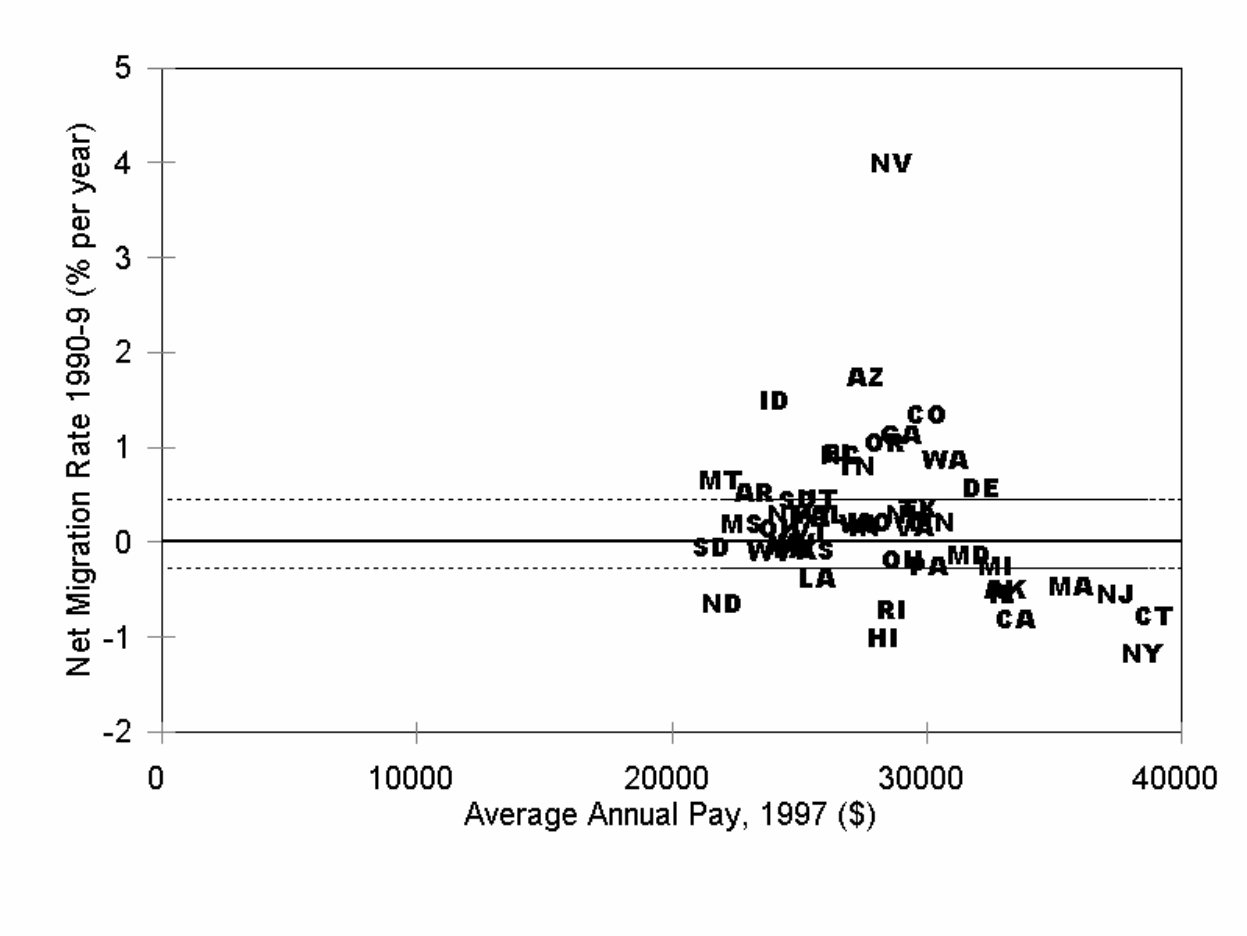
Figure 5: European Net Migration per Year 1964-1971 versus National Income per Capita 1961



Note: A, Austria, B, Belgium, D, Denmark, Fi, Finland, Fr, France, WG, West Germany, Gr, Greece, Ic, Iceland, Ir, Ireland, It, Italy, Ne, Netherlands, No, Norway, P, Portugal, Sp, Spain, Sw, Sweden, Sz, Switzerland, UK, United Kingdom

Source: United Nations (1991).

Figure 6: Net Internal Migration Rates, 1990s, US States



Source: U.S., Census Bureau.

1980s controlling for some of these factors. They find that a 10% increase in a state's per capita income leads to a 0.26 percentage point increase in net migration per year. That responsiveness of migration to economic opportunity transferred to India would imply that a state like Maharashtra with an income per capita in 1998 85% greater than the rest of India would experience net migration equivalent to 2.2% of its population per year, five times the actual rate for the 1990s. Bihar equivalently, with 42% of the average income of the rest of India would be loosing about 1.5% of its population per year at US internal migration rates.[16] Had even 1% of the population of the lowest income states in India, Bihar, Uttar Pradesh and Orissa, moved to the highest income states in each year in the 1990s the growth rate of income per capita in India would have been increased by 0.3% per year.[17] This is not huge, but it is a more substantial boost to income growth rates than any other feasible action Indian policy makers might take.

[16] These rates are calculated for cases where the income disparities between states are much less than in India. The responsiveness in the US to a change from a 50% income premium to a 60% premium might well be much greater than going from a 10% premium to a 20% premium.

[17] Assuming that the migration did not affect per capita incomes in the sending and receiving states. But this in the light of historical evidence seems a reasonable assumption.

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Appendix Table 1. Data Sources used in Regression Analysis

Variable	Source
State GDP per capita, 1991-2 and 1998-9	www.statesforum.org
Annual Rate of population Growth, 1961-1991 and 1990-1997	Indian Central Statistical Office, Basic Statistics (1980). www.censusindia.net
Adult Literacy, 1991	www.censusindia.net
% of 5 to 14 year olds enrolled in primary school	A Social and Economic Atlas of India (1987)
% of 10 to 19 year olds enrolled in secondary school	A Social and Economic Atlas of India (1987)
Taxes as a share of state GDP, 1990-98	www.statesforum.org
Public Capital Expenditures per 100 workers, 1990-98[a]	www.statesforum.org. A Social and Economic Atlas of India (1987)
Education Expenditures per 100 workers, 1990-98[a]	www.statesforum.org. A Social and Economic Atlas of India (1987)
Phones, Km. Roads and Telephones per 100 workers, 1985	A Social and Economic Atlas of India (1987)
Urbanization, 1961 and 1991	Indian Central Statistical Office, Basic Statistics (1980). www.censusindia.net

[a]Workers are defined as those 15 to 59 participating in the labor force.