

# **Human capital estimates for Indian states**

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# Human Capital

- Human Capital - “the knowledge, skills, competences and other attributes embodied in individuals that are relevant to economic activity” OECD (1998, page 9).
- The most important assets of a country and key determinant of a nation’s economic performance.
- Treatment in national accounts - controversial
- E.g. Expenditure on primary education generates streams of future income, but this expense is regarded as consumption rather than investment.
- Frequently discussed but difficult to measure

# Human Capital

- Seminal contributions by Becker (1966), Mincer (1974), and Schultz (1961)
- Literature focused on estimating returns to education.
- Investment in education - only one of the many forms of investment in human capital.
- Education an important component of economic activity
- Investment in human beings, like tangible investments generates a stream of future benefits.
- Educational expenditure in India averages around 4.2% of the gross domestic product;
- Estimating the returns to investment in education is useful for comparing it with other forms of investment.

# Objective

- Estimate the value of human capital in different Indian states

# Measurement of Human Capital

- Value of human beings - Three Methods
- **Cost-based approach' (cost-of-production approach)**
- Income-based approach' (capitalized earnings procedure)
- Educational stock-based approach

# Cost-based approach

- — Origins to cost of production method of Engel (1883)
- - Involves estimating the total cost of producing a human being.
- Retrospective approach - focusing mainly on historical costs of production.
- Human capital - estimated using the depreciated value of the dollar amount spent on an individual.

# Income-based approach

- measures the total human capital by the total discounted values of his expected future stream of earnings in his lifetime.
- Forward-looking (prospective) because it focuses on expected returns to investment.
- Jorgenson and Fraumeni (1989, 1992) – the most comprehensive study
- They define the “*investment in human capital in any year as the sum of lifetime incomes for all individuals born in that year and all immigrants plus the imputed labor compensation for formal schooling for all individuals enrolled in the school*”.

# Educational stock-based approach

- Popularised by Barro and Lee ( measured by ‘years of schooling’).
- Education-augmented labour input,
- Adult literacy rates
- School enrollment ratios
- Average years of schooling of the working-age population.



# Observed earning as value of human capital

- Pioneering work by Mincer (1958,1974)
- Formal education; on-the-job training, specific training and other recognized investments in human capital have an influence on earnings.
- The total amount invested in human capital and rate of return on this investment can be estimated from using the information on observed earnings.

# Framework for accounting for Human capital Formation in India

❖ **Accounts developed for age cohorts 15-60**

❖ **Following educational groups considered:**

❖ 1) Illiterate : 2) Non formal education; 3) Below primary; 4) Primary; 5) Middle; 6) Secondary; 7) Higher secondary; 8) Technical/Diploma; 8) Graduate and above (in Agriculture, Engineering, Medicine, Other subjects).

# Valuation

- Average wage cannot be used
- Factors like skills, parental background, and quality of schooling etc. cannot be observed using wages
- Following approach adopted
- **Step 1:**
- we used the Mincerian earning function approach.
- The wage of an individual is assumed to depend on level of schooling, skills possessed, technical qualifications, on-job training (job experience is used as a proxy) and other socioeconomic characteristics that represent the innate abilities of the individual.
- **Step 2:** From this earning function we estimated the marginal rate of return for different levels of schooling and obtained the predicted wages for different age cohorts by educational levels.

# Estimation of the Mincerian model

- $\ln twrec = \alpha + \beta_1 sex_1 + \beta_2 sec_1 + \beta_3 soc\_grp_1 + \beta_4 hhpro_1 + \beta_5 hhpro_2 + \beta_6 hhpro_3 + \beta_7 hhdtype_4 + \beta_8 geduc_2 + \beta_9 geduc_3 + \beta_{10} geduc_4 + \beta_{11} geduc_5 + \beta_{12} geduc_6 + \beta_{13} geduc_7 + \beta_{14} geduc_8 + \beta_{15} skill + \beta_{16} exp + \beta_{17} exp_2 + \beta_{18} mpce + \varepsilon$
- Equation estimated using the Heckmann Maximum Likelihood Estimation
- First stage - a probit estimation is used to estimate the probability of being employed (the dependent variable takes a value 1 if employed 0 otherwise)
- In the second stage the actual wages are used in the regression equation.
- Using the regression equation, we predict the wages for different age cohorts by educational level.

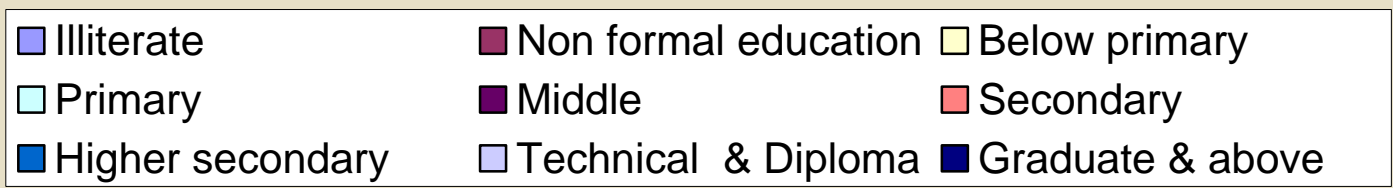
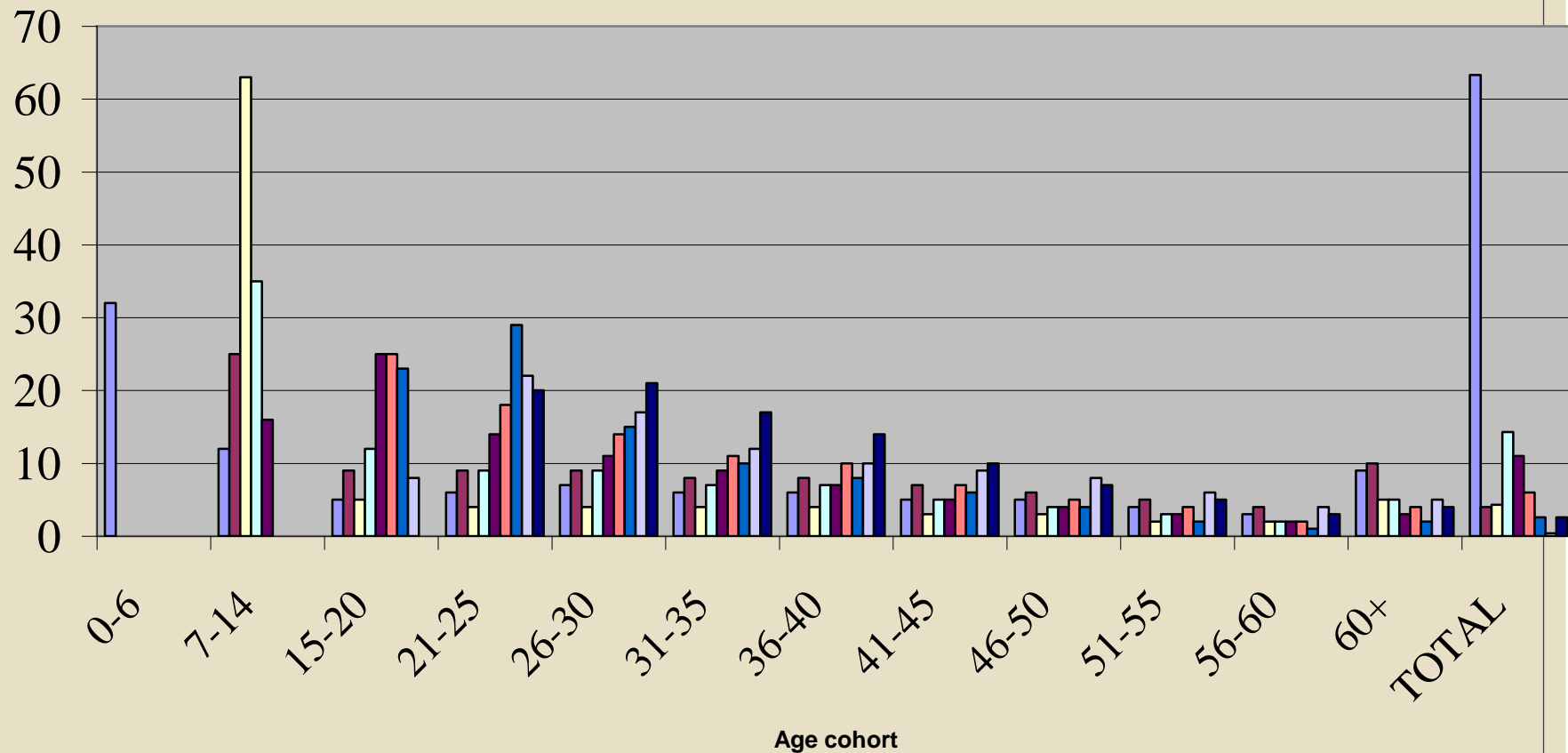
# Results of Mincerian specification

- Education - plays a very important role in determining wages.
- For all the age cohorts the returns to education are positive as one moves to a higher educational level.
- Investment in education gives positive returns.
- Similarly experience has a positive impact on earnings
- Experience has diminishing returns
- Skill has a positive impact upon earnings
- Returns to skill are higher at younger age cohort
- Returns to education are
  - positively influenced by on-the-job investment in the form of training (captured by experience)
  - but negatively affected by depreciation (the wearing of human capital because of ageing).
- The net effects mixed depending on the profession/education.
- Individuals in rural areas earn less than the one in urban area
- Profession and Gender significantly affects the wages.

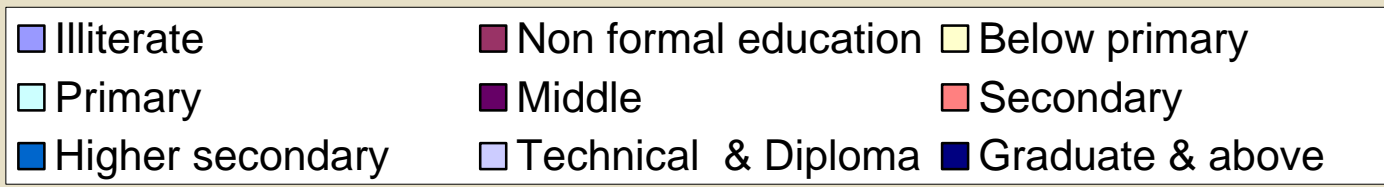
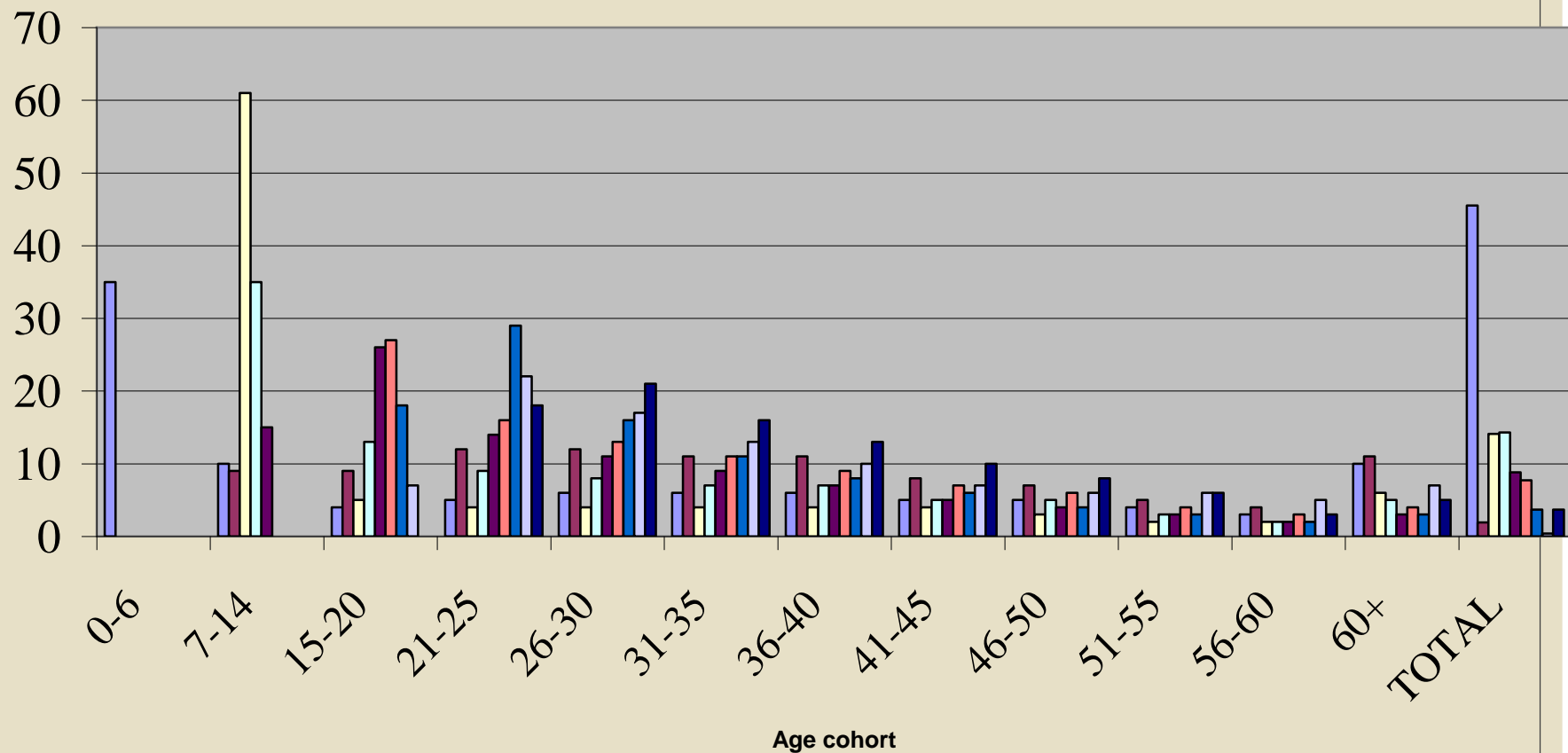
# Value of total stock of human capital

- **Step 3:**
- Using predicted wages the present value of lifetime labor income for different educational levels has been computed
- The present value of the lifetime labour income of an individual is the discounted value of future income weighted by probability of survival and discount rate (Jorgenson and Fraumeni (1989, 1992) and Wei (2001)).
- For this considered two stages:
  - Work and study stage (age groups 15-25)
  - Work only stage (25-60)
- We multiplied the present value of annualized life income (for different educational qualifications for different age cohorts) with the physical accounts

**% distribution of population by education in 1993 (all India)**

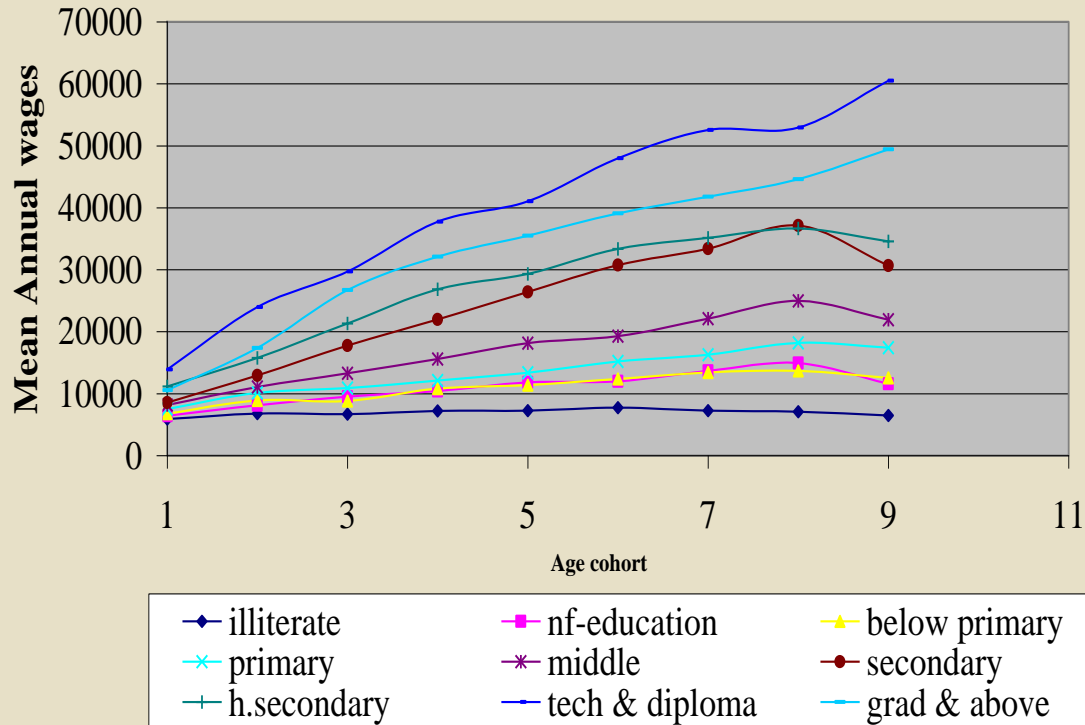


**% distribution of population by education in 2001 (all India)**

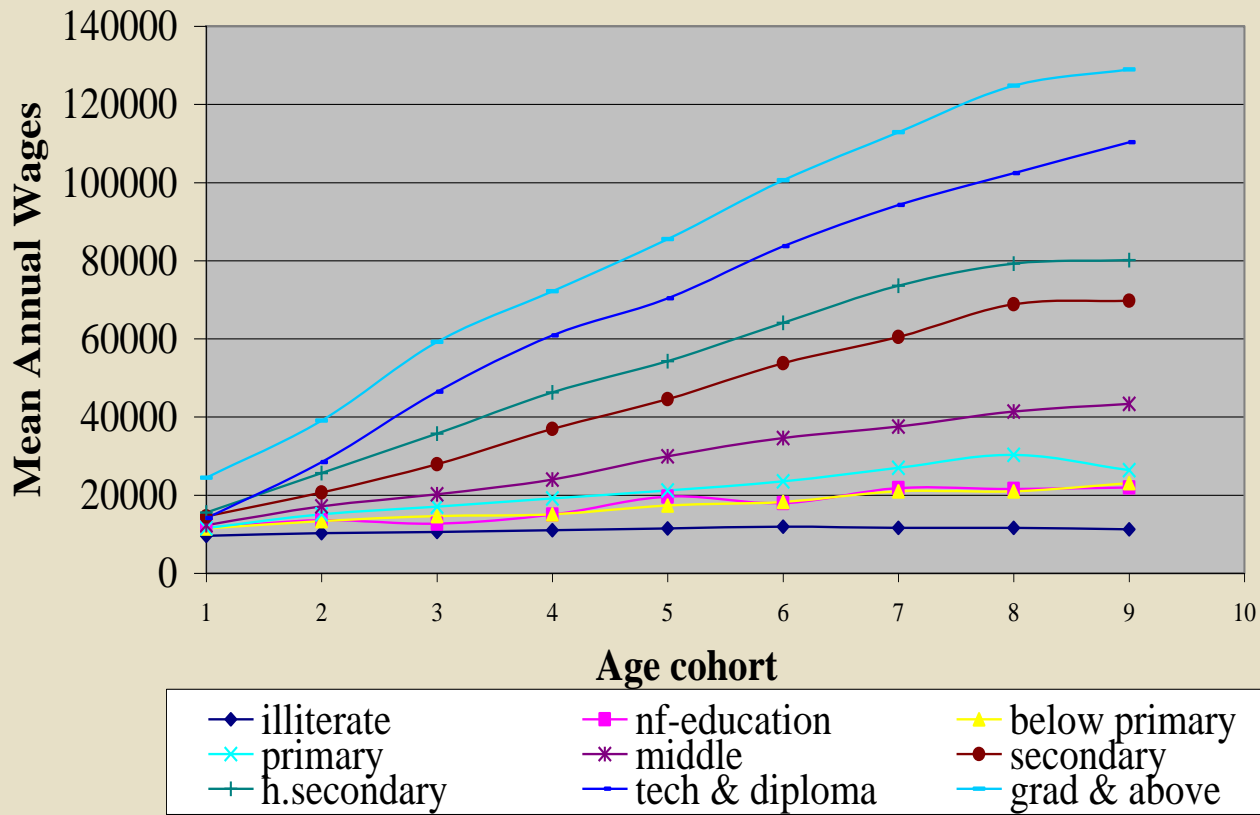




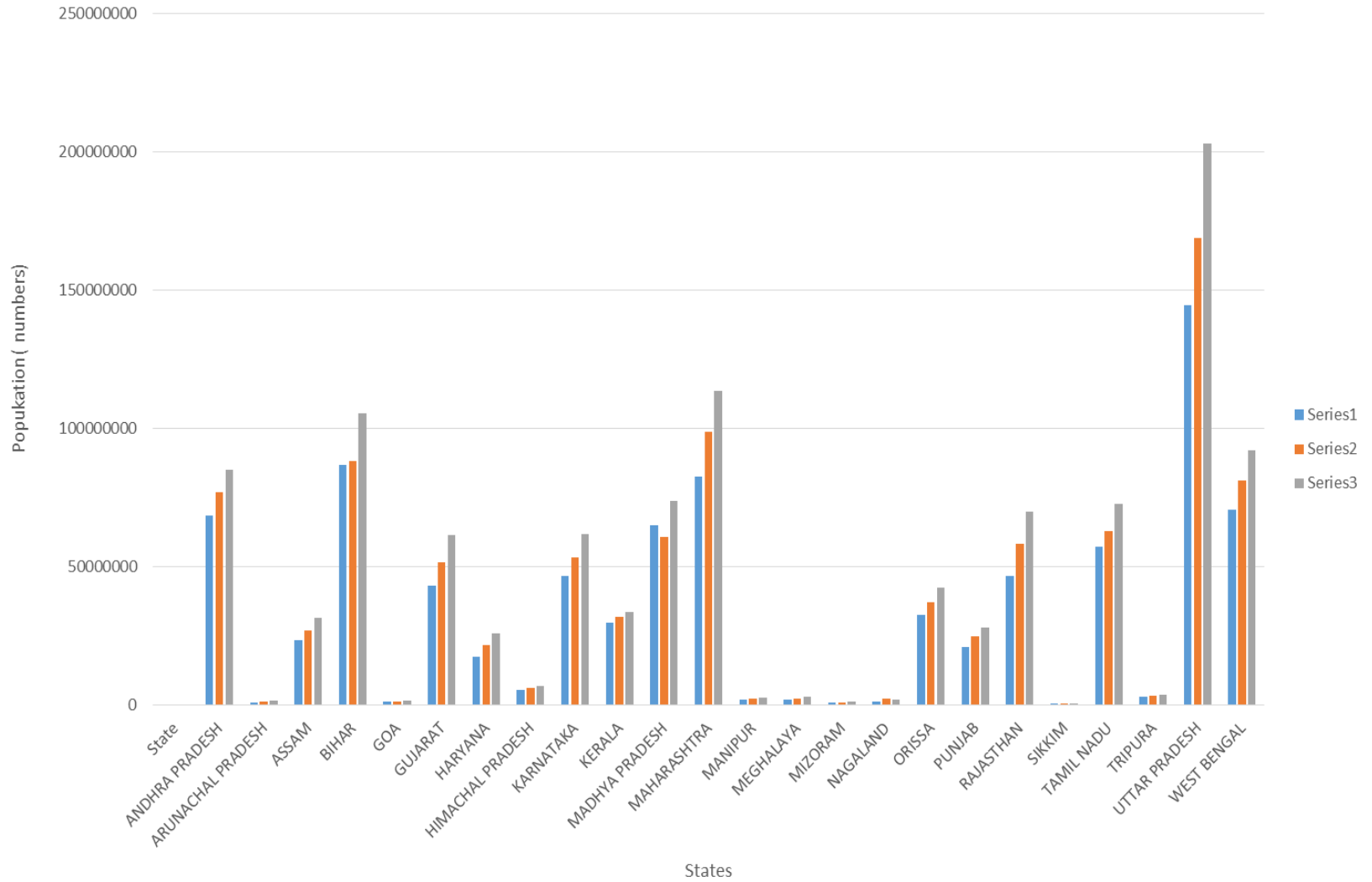
**Mean annual income of persons for different educational level by age cohort  
for the year 1993**



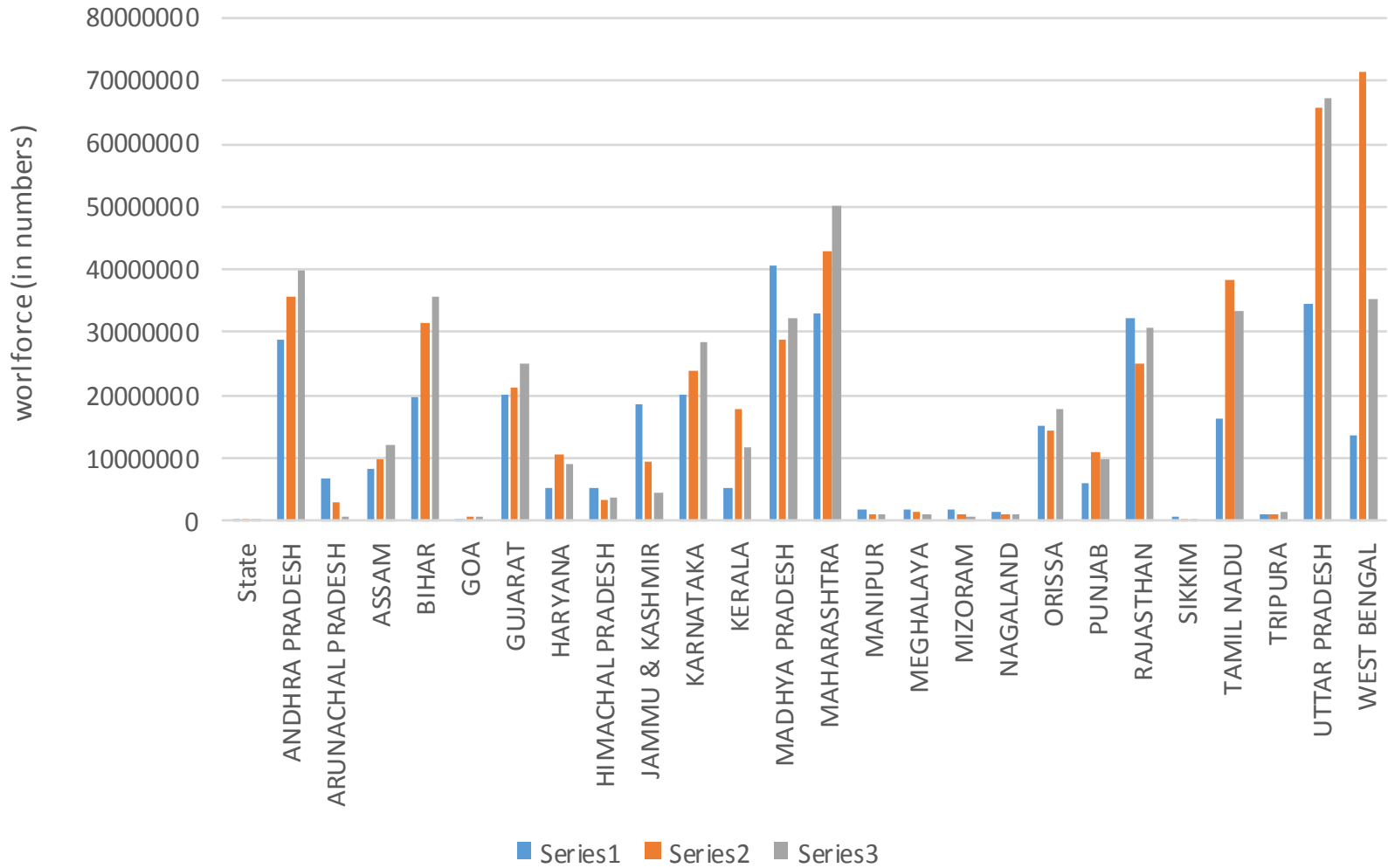
**Mean Annual income of persons for different educational level by age cohort for the year 1998**



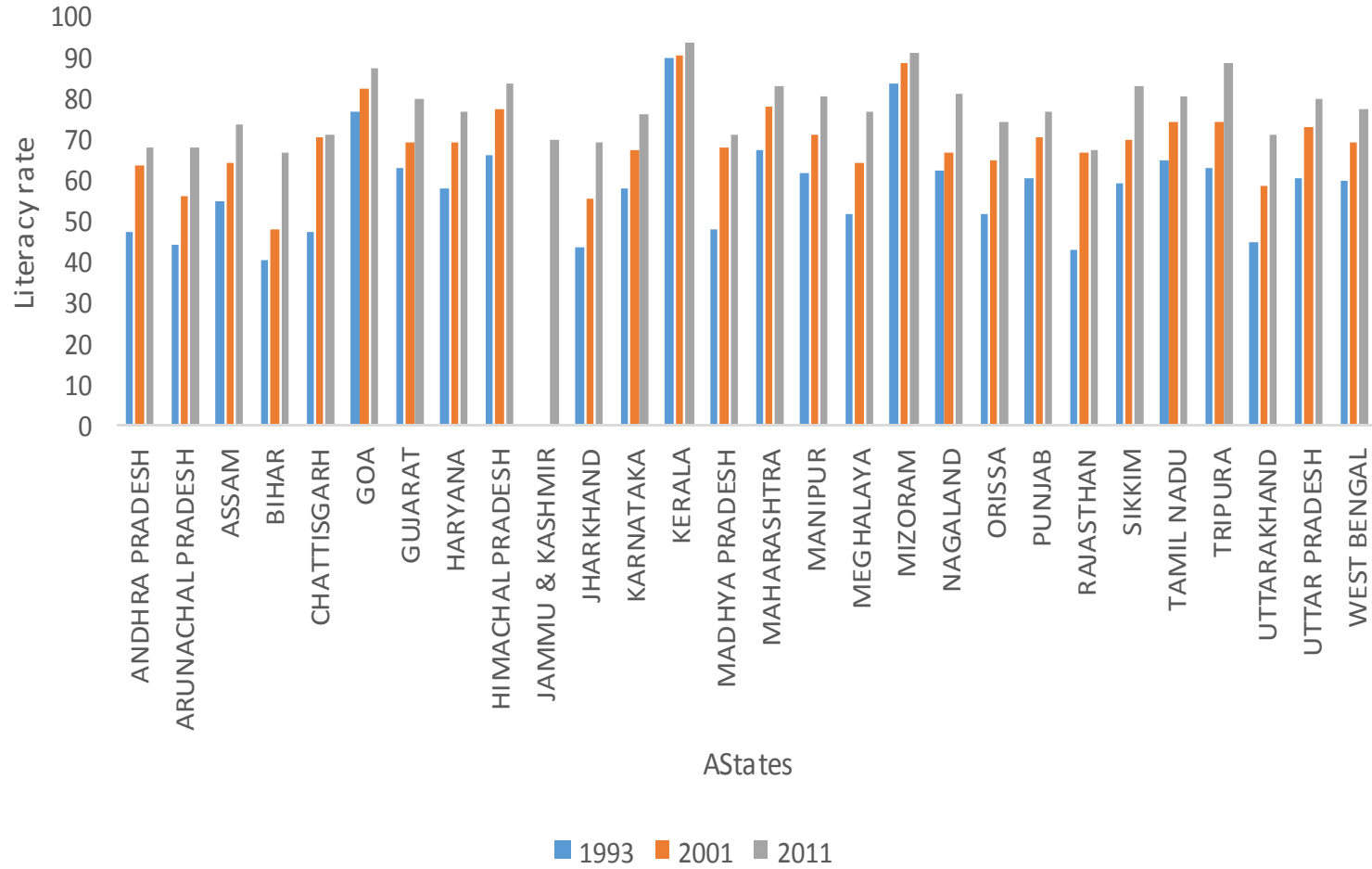
Popukation change during 1993-2011



# Total workforce 1993-2011

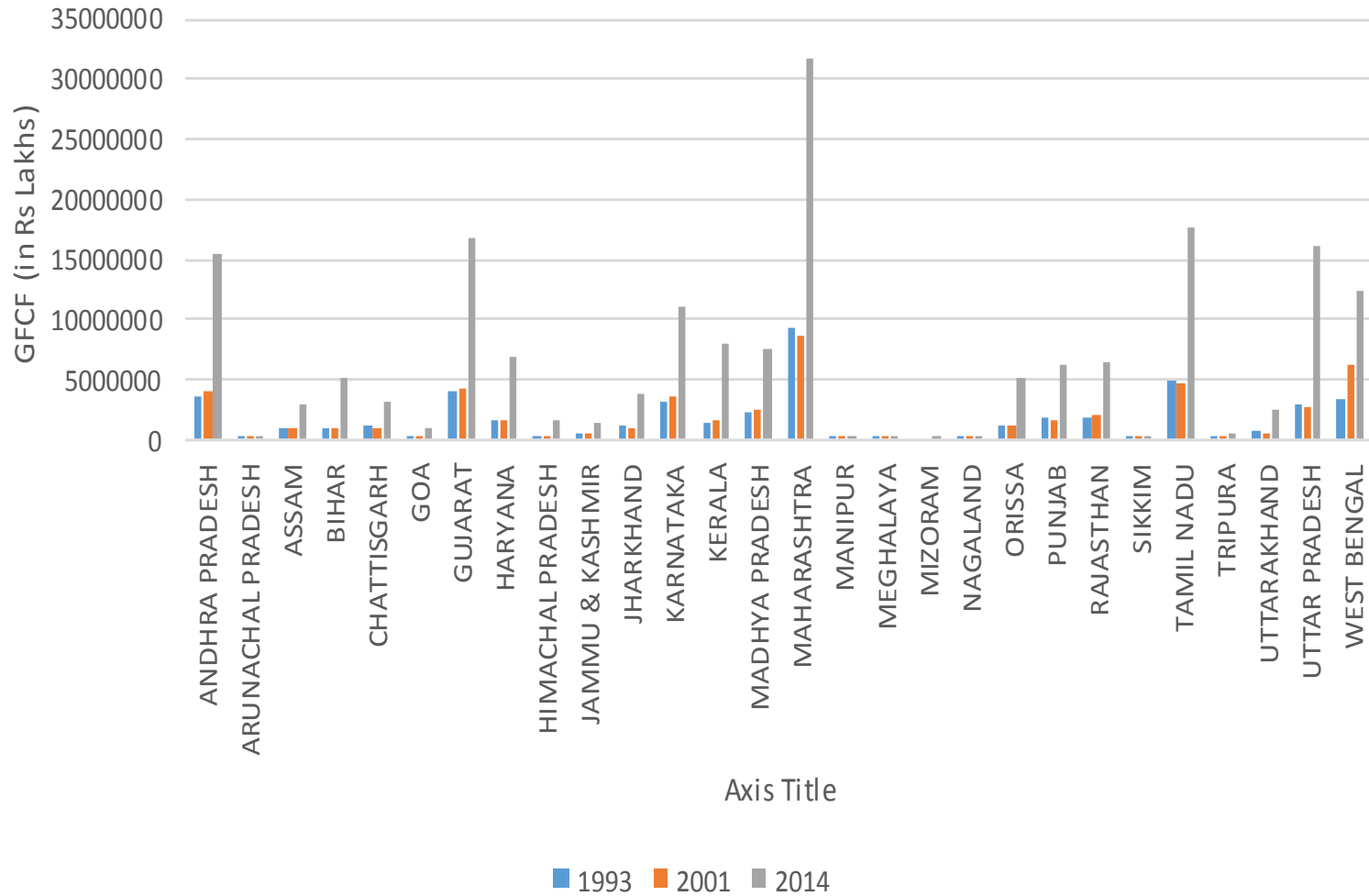


## Growth in literacy rates across states 1992-2011

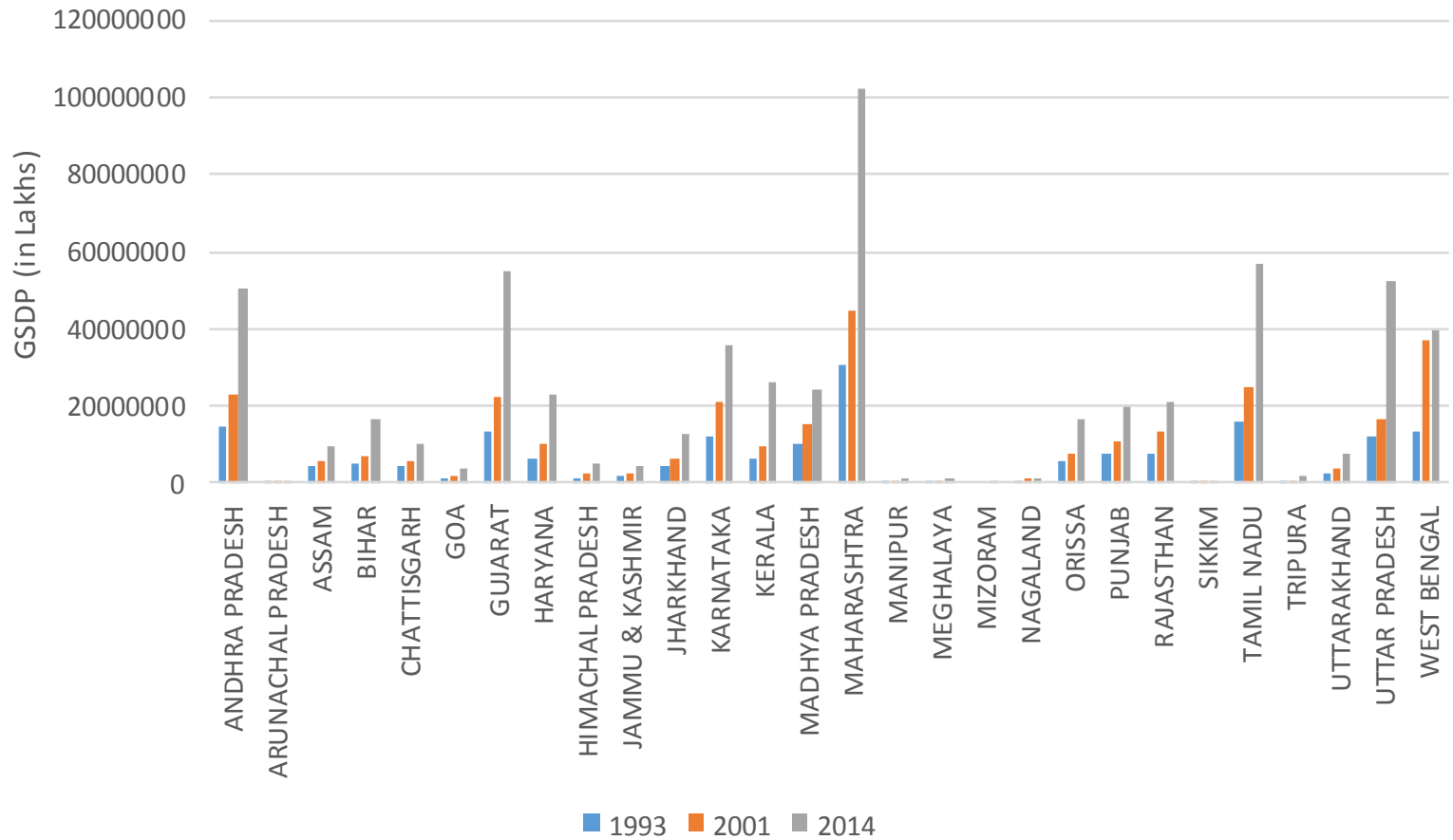


# Gross fixed capital formation in Indian state 1993-2011

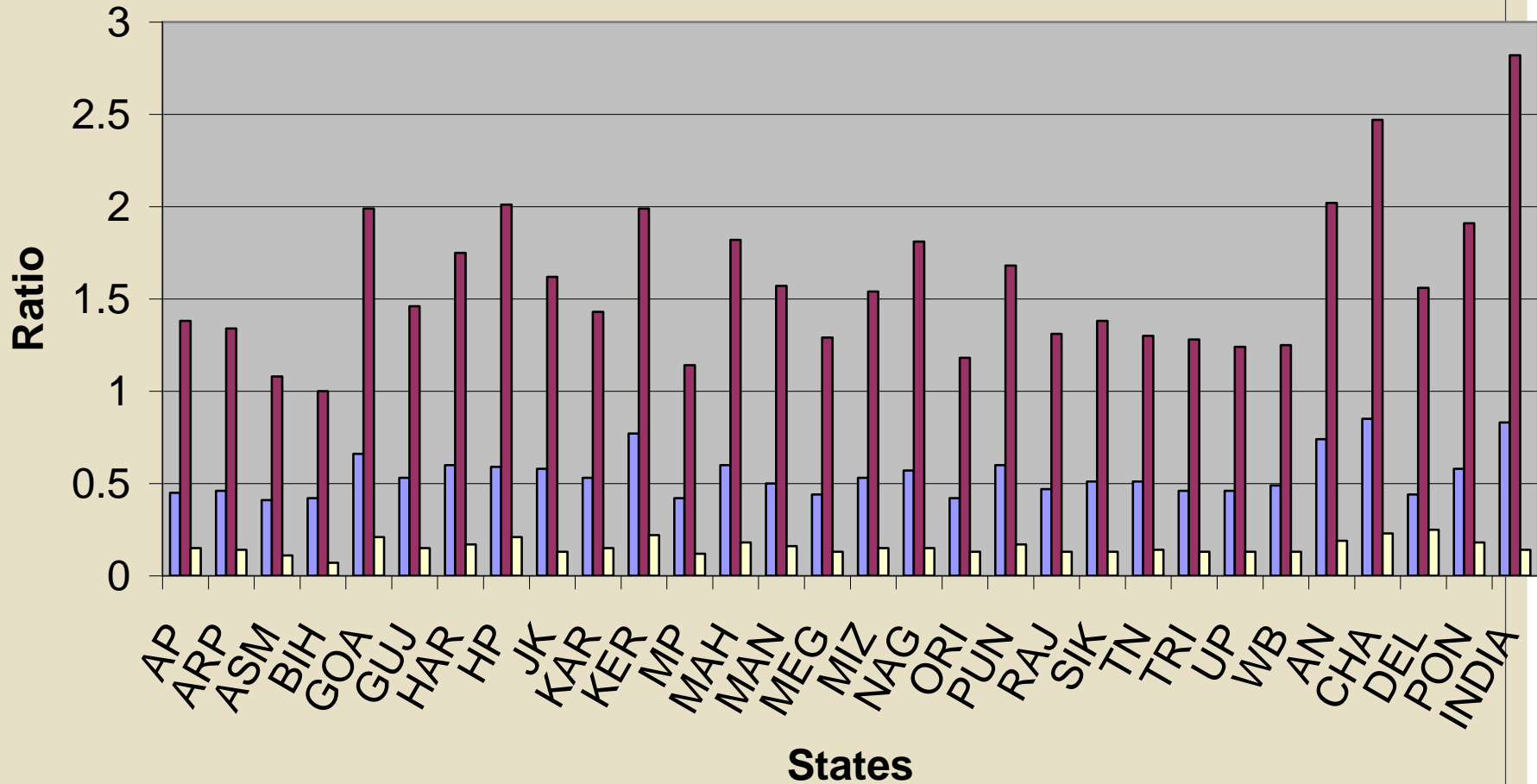
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## GSDP between 1993 and 2011



## Per capita human capital and human capital accumulation



■ Per capita Human capital 1993     
 ■ Per capita human capital 2001  
■ Per capita human capital accumulation



## Human capitla formation vs GFCF 2011



# Conclusions

- Our results captured the value generated through expansion in education
- On a per capita basis, the value of human capital in India has increased between 2001 and 2011
- Some states have higher human capital formation than produced capital accumulation
- We need to check if this growth in human capital is improving the productivity of the nation
- It is important to see how much growth is contributed by different forms of capital
- For sustainability all four forms of capital are important
- We need to analyze the trade-offs and allow for adequate investments to ensure non-declining capital

Thank You for your attention