

**HIGHER SECONDARY EDUCATION IN TAMIL NADU  
AND LEARNING OUTCOMES**

**SYNOPSIS OF THE THESIS**

Submitted to the

**UNIVERSITY OF MADRAS**

FOR THE AWARD OF THE DEGREE OF

**DOCTOR OF PHILOSOPHY (ECONOMICS)**

BY

**A.PUNITHA**

UNDER THE SUPERVISION OF

**Dr.R.ARUNACHALAM**

PROFESSOR AND HEAD (Retd)

DEPARTMENT OF ECONOMICS

UNIVERSITY OF MADRAS

CHENNAI- 600 005

**UNIVERSITY OF MADRAS**

**FEBRUARY 2014**

# HIGHER SECONDARY EDUCATION IN TAMIL NADU

## AND LEARNING OUTCOMES

### **Introduction**

Human capital formation contributes to the economic growth of both developed and developing countries. The essential and the most important component of human capital is education. Education plays an indispensable role in improving the status of a nation as well as its people (Qadri, et al 2011, Nirbachita Karmakar 2006, Ravinder Rena 2006, Loening 2005 and Psacharopoulos 1988). There is increasing evidence provided by studies conducted at the micro level as well as the macro level, which show that education is directly related to individual earnings (Psacharopoulos 1986), productivity (Romer 1986) and economic growth (Schultz 1961, Denison 1967, Barro 1999, Hanushek and Woessmann 2007). The success of countries like Japan, China and Korea in achieving high growth rates was attributed to the presence of a trained labour force among other factors.

### **Secondary Education**

Education through schooling helps in improving the quality of human resources by providing both cognitive and non-cognitive skills. At the individual level, primary education equips individuals with the most rudimentary reading, writing and computation skills termed foundation skills (Education for All Global Monitoring Report, EFA GMR, 2012). Lower secondary school extends and consolidates the basic skills learned in primary school; upper secondary school helps to acquire transferable skills (i.e. to communicate ideas and information effectively, to be creative and to be able to solve problems) and also adds technical and vocational skills (EFA, GMR2012). Formal secondary education is the most effective way of developing the skills needed for work and life. By providing higher order skills such as critical thinking, creativity, learning to learn etc., it enables a person to advance to better paid work and be in a better position to adapt in a rapidly progressing world. People with secondary education are more likely to get a formal sector job but even those who do not, are able to manage their businesses in a better manner. Equitable access to secondary education also helps to break inter-generational transmission of poverty.

At the societal level, a more educated community may have the capacity to bring in the much needed innovations, enhance the ability to introduce better and newer methods of production

and usher in advanced technology into the economy. When secondary education is available more children are encouraged to complete their primary schooling and completion of secondary education ensures that people do not slip back into illiteracy. Furthermore, secondary education helps in creating a pool of qualified people with knowledge and skills who contribute to economic development, to entrepreneurship, to develop S & T, to deliver basic services and to be enlightened leaders.

Secondary education exerts significant growth effects while contributing to a decline in poverty and income inequalities. Secondary education increases age of marriage among women and decreases fertility rates (Brown 2012). Awareness about AIDS /HIV is better with secondary level education (World Development Indicators 2012). Adults with higher levels of educational attainment are generally more likely than those with lower levels of attainment to engage in social activities and exhibit greater satisfaction with life (Education at a Glance OECD 2011).

Developed and Developing countries have expanded their schooling systems. There has been quantitative expansion in enrolment at all levels such as primary, secondary and tertiary levels. The number of pupils in secondary school world-wide grew from 196 million in 1970 to 531 million in 2009. The number of teachers was 20.3 million in 1990 and stood at 30.4 million in 2009. Pupil Teacher ratios (PTR) was 17:1 at the secondary level in 2009 (Global Education Digest, 2011). In South Asia primary Gross Enrolment Ratio (GER) improved from 76 percent to 108 percent from 1980 to 2008, secondary GERs from 27 to 52 percent, trailing behind that of East Asia Pacific and Latin American countries. Primary completion rates increased from 76 percent to 79 percent between 1991 and 2008 (World Bank 2010).

Primary education is no longer the exit point from school. As more children complete primary education, the demand for secondary education is likely to expand. More over the demand for upper secondary education has increased with the need for more sophisticated workers with the relevant competencies, knowledge and skills, which can be acquired only after the primary level of education. (Global Education Digest 2011). Therefore twelve years of schooling is deemed to be a necessity in a knowledge driven economy. Thus secondary education provides the basic nexus between primary and higher education.

### **Secondary Education in India**

Growth oriented sectors like information technology, financial services, telecom, tourism retail are highly dependent on employees who have at least completed secondary education.

Particularly in India, secondary education gives rise to the most needed positive externalities such as increasing age at marriage, improved birth practices, child rearing and declining fertility rates (NFHS III 2007).

The importance of secondary education lies in the fulfilment of the large manpower needs of the semi-organised and the organised sectors of the economy. It is the supply chain for higher education. Further Secondary education assumes an important role of providing primary school teachers who are drawn from the secondary level of education. If secondary education is of good quality, along with teacher training, an excellent set of teachers would lay the foundation for good quality education. As pointed out by the Twelfth Plan document low participation rates and poor quality at the secondary stage are a bottleneck in improving both the participation in higher education and schooling at the elementary stage. The country needs to move towards universalisation of secondary schooling of adequate quality because the social and economic benefits of such secondary education lies in the likely improvements in health, gender equality, social cohesion, political participation, responsible citizenship, reduction in crime rates and decent living conditions (EFA GMR 2013/14).

Expansion in enrolment at the secondary level has been commendable but it has not kept pace with that of both developed and other developing countries. Disparities can also be seen within the country. India belongs to the group of countries with medium enrolment at the lower secondary level and poor progression to the upper secondary level (EFA Global Monitoring Report 2012). States such as Kerala and Tamil Nadu, for example would be at the top of South Asian comparisons if they were to be treated as separate countries. There is a great deal to learn from the experiences within India (Dreze et al, 2013). The number of students enrolled in secondary education increased by 372 lakhs during the period 1980-81 to 2009-10 all over India and the corresponding increase in Tamil Nadu was 21 lakhs. Gross Enrolment Ratio in secondary education (classes IX-XII) stood at 52 percent for India as against 66 percent for Tamil Nadu in 2011.

Despite higher levels of enrolment at all levels and a massive increase in physical infrastructure, the value added by formal education is still weak. Poor quality of education resulting in weak learning outcomes at each stage of education is the central challenge facing the Indian education sector today. Increasing inputs (number of schools, classrooms, teachers and so on) will by themselves not be enough to ensure quality education for all children.

Improving learning outcomes is crucial for inclusive growth which is also echoed in the Twelfth Plan. (Twelfth Plan document vol 3).

### **Measuring Educational Outcomes**

Outcomes in education can be captured by the extensive margin or the intensive margin

(Psacharopoulos, 1988). **Extensive margin** refers to the number of years of schooling of labour force, gross enrolment rates and completion rates at different levels of education. The most widely used measure of Gross Enrolment Ratios (GER) at the secondary and upper secondary levels points to the rapidly expanding enrolments all over the world. In the year 2011 GER for lower secondary education in India was 69 percent which is lagging behind other developing countries like Korea (97 percent), Mexico (84 percent), China (87 percent) and Indonesia (81 percent) (World Development Indicators, 2012). The country's mean years of schooling at 5.12 years is well below the other emerging market economies such as China (8.17 years) and Brazil (7.54 years) and significantly below the average for all developing countries (7.09 years) (Twelfth Five Year Plan, Volume 3).

**Intensive margin** may mean the quality of education acquired. Furthermore, educational quality may mean different things to different people. First, there is a traditional input definition, by which high expenditure per pupil or lower repetition rates are indicators of good quality.

Second, there is an output definition of educational quality based on students' learning outcomes. Learning outcomes may be measured by the scores in Standard Assessments Tests. Such international or national assessments are not conducted on a continuous basis at the secondary level in India. Two studies that are available are Performance on International Student Assessment (PISA) in 2009 and the other conducted by Das and Zanjong (2010) in Rajasthan and Orissa on mathematical capability of grade IX students using Trends in international maths and science study (TIMSS). Results from various achievement tests point out to low levels of learning. From the PISA+(2009) on 15 year old students for testing their reading skills, mathematical and scientific ability, two states of India, Tamil Nadu and Himachal Pradesh fared miserably and were placed in the penultimate position. Shanghai (China) and Korea were among the top two performers. Turkey, Mexico and Brazil were ahead of India's ranking.

Students are assessed on curriculum based evaluations in India. India has thirty four State Boards and three National Boards at the upper secondary level (World Bank 2009). Passing the Board examination leads to certification of students. Therefore passing the examination is considered as an outcome. This study considers passing the examination as an outcome. Learning outcomes can be improved by the integration of both the entities, namely, the extensive and the intensive margins.

## **Review of Literature**

The review deals with the following aspects namely education attainments, secondary education in India and studies investigating determinants of learning attainment and outcomes.

Available estimates of the impact of cognitive skills on outcomes suggest strong economic returns within developing countries (Hanushek, 2007). Hanushek and Woessmann (2007) show with the help of international data the presence of large deficits in education in developing countries. The deficit in cognitive skills is higher than that of enrolment and attainments. Therefore major structural changes in schooling institutions are required to close the economic gap with the developed countries. Orazem and King (2007) show that compared to developed countries, developing countries have large gaps in schooling attainment between men and women and between urban and rural residents. As countries develop and education levels rise, these gaps reduce but within country gaps remain. They also highlight the importance of behavioural models or experimental evidence to explain outcomes. Owen (2010) estimates the impact of secondary school on human capital, occupational choice and fertility for young adults in Kenya.

Motiram and Osberg (2011) examined school attendance and total human capital investment time i.e. time in school, travel time and instruction time. The poor human capital investment by rural Indian families was largely due to the influence of supply side factors, i.e., school quality and availability rather than the impact of household characteristics say parental education or income. Studies point to low attainments and the presence of large inequalities in education in developing countries.

Sahu (2007) gives an account of the aims and objectives of secondary education as proposed by the various Commissions. Mukhopadhyay (2007) highlights the landmarks in educational development with special reference to secondary education through the various Five Year

Plans. The study of Geetha Rani (2007) reflects an expansionary phase in the number of institutions and students enrolled especially in secondary education. The Government of India's strategy for the development of secondary and higher education in India was prepared by the World Bank (Secondary Education in India: Universalizing Opportunities 2009).

Sujatha and Geetha Rani (2011) find that the expansion of institutions leads to an increase in student enrolments at the secondary level of education. Progress in outcomes, as measured in terms of number of students appearing for the Board examination and graduating from school has also increased in India. However, there are considerable interstate variations.

Talukder (2011) has analysed the impact of the female secondary education enhancement policy on female secondary education. Narula (2012) investigates the reasons for massive increase in private secondary schools in Madhya Pradesh and attributes it to the influence of the physical and academic infrastructure of schools.

Organisation for Economic Cooperation and Development (OECD) Programme for International Student Assessment (PISA 2009+) (2012) study shows the extent to which students near the end of their compulsory education have acquired knowledge and skills. It assesses outcomes primarily in the areas of reading, mathematical and scientific literacy of 15 year olds. Students in Tamil Nadu attained a mean score of 337 on the reading literacy scale, which was lower than all other participants with the exception of Himachal Pradesh, India and Kyrgyzstan. Their mean score of 351 on mathematical literacy scale was higher than Kyrgyzstan but lower than all other participants. With respect to scientific literacy, the mean score was 348, which was below the level of all the OECD countries. The relationship between socio-economic status and reading performance in Tamil Nadu was very weak. The study also examined several school level factors along with student and school demographics. School level factors account for a considerable proportion of variation in reading performance between schools.

Annual Status of Education Report (ASER 2013) measuring reading skills of Standard VIII students showed that in Tamil Nadu, only 68 percent of the students could read Standard II text books and with respect to maths only 39 percent could do problems on division. Performance of students of Class V over a period of five years from 2009 to 2013 show slight fall in reading skills and some minor improvement in maths capability. The difference between government and private schools was not significant. The studies discuss qualitative differentials between different types of school.

Duraisamy et al (1997) explore the negative impact of enrolment expansion on school conditions and learning using cross district time series analysis of Tamil Nadu. Increase in educational quantity may be at the expense of quality because of budget constraints. Government policies that make schools accessible can increase enrolments. However, if public resources do not increase with student numbers, condition of schools and academic achievements will suffer. Large increases in pupil-teacher ratio are detrimental to learning. The study also considers the determinants of expanding enrolments. The variables considered are family characteristics, village characteristics and government policies. Proximity to school does influence enrolment decisions.

Lee and Barro (1997) analyse the role of family factors and school inputs on three indicators of school performance namely international test scores, repetition rates and dropout rates. Richer educated parents, smaller classes and higher teacher salaries enhance outcomes. Case and Deaton (1999) consider educational inputs determining educational outcomes. They find strong and significant effects of pupil teacher ratios on enrolment, achievement and test scores for numeracy.

Glewwe and Kremmer (2005) provide a review of the factors affecting the quantity and quality of education obtained by children in developing countries. The focus has been on the education programs and factors within the education system and not outside, such as economic crisis or early childhood nutrition status, etc. With respect to the quality of education, low scores in international assessment tests like, TIMSS, PISA, PIRLS, etc. have been related to low secondary enrolment in those countries.

Bhorat and Oosthuizen (2006) analysed the determinants of Grade Twelve pass rates in South Africa .They estimate an education production function utilising post-Apartheid data with school and community level information for the year 2000-2001. Pupil Teacher Ratio, physical resources did not influence pass rates, but knowledge resources, teacher and parent characteristics were crucial.

Alvarez et al (2007) show that accountability through increased use of state level assessments improves learning outcomes in Mexico. Continued use of assessments provides a constant feedback to beneficiaries and is used by authorities for designing interventions. Student testing, school ranking, school report cards are shown to have a strong positive impact on learning.



Hanushek (2010) associates teacher effectiveness with the economic impact of higher achievement. Raj Chetty et al (2011) address two issues: whether value added provides unbiased estimates of teacher impacts on student achievements and whether high value added teachers improve student long term outcomes. The students assigned to high value added teachers are likely to attend high ranked colleges and earn higher salaries, live in high socio economic status neighbourhoods and save more for retirement. Teachers have large impacts on all grades from IV-XIII. The study concludes that good teachers create substantial economic value and the test score impacts are helpful in identifying such teachers.

Glewwe et al (2011) reviewed 79 studies from 1990 to 2010 to infer the effect of school resources on educational outcomes in developing countries. They find that a fully functioning school with quality roof, floor, wall, desk, tables and school library was conducive to learning. Teachers with greater knowledge of subjects they teach and providing tutoring affects learning. Teacher absence has a negative effect on learning.

Hanushek and Woessmann (2011) provide a cross country study by making use of the results of international test on educational achievement, to analyse the determinants and impact of cognitive skills. Quantitative input (resources) measures show little impact while several measures of institutional structures and the quality of the teaching force can account for significant differences in the levels of student achievement.

The review shows studies in India delve more on participation and less on outcomes. There is a need for more research with respect to the factors influencing outcomes in India to corroborate international evidence.

### **Statement of the Problem and Need for the Study**

India is likely to surpass China and become the most populous country in the World. It is likely to have the largest number of illiterate people (India Human Development Report 2011). Demographic trends suggest the likely rise in dependency rates in India in the near future which is detrimental to human development. These trends can be influenced favourably by following suitable education initiatives (HDR 2013). Low and middle income countries are advocating more schooling for the present and future generations. It is also noteworthy that middle income countries like Brazil and Mexico with a significant rise in participation and suitable interventions at the secondary level education, were also able to improve their mean scores in PISA and reduce inequality in learning outcomes.

The changing demographic profile also indicates a shrinking active labour force and therefore improving the productivity is vital to maintain the growth of the country. And Productivity improvements are associated with education. Enrolment is the first step towards learning and education. Even though enrolments have increased at all levels in India and Tamil Nadu, it should translate into completion and graduation to impact productivity. Improving outcomes and performance in education thus remains a universal challenge to date in India and hence in Tamil Nadu.

Tamil Nadu is a rapidly progressing state with an impressive development trajectory. Progress in the growth of the Tamil Nadu economy can also be attributed to the gains in educational outcomes (Punitha, 2013). The Tamil Nadu Vision 2023 document, under its Education and Skills mission, aims at establishing a robust human resources pipeline by providing universal access, equity, quality at primary, upper primary, secondary and higher secondary level. The surge in service sectors like hospitality, telecommunication, information technology and manufacturing sectors like automobiles require manpower with the skills acquired at secondary level education.

At this juncture a pertinent question arises, whether after having achieved noteworthy enrolment growth rates, has Tamil Nadu been able to achieve a corresponding or higher level of completion and graduation rate. A look at certain indicators, show that Tamil Nadu has shown better performance in not only enrolment but also in slightly better mean years of schooling (6.214 in 2007-08) , good physical infrastructure, adequate provision of additional inputs like textbooks, uniforms etc. Despite these achievements, Tamil Nadu falls short of attaining the most important learning outcome namely the acquiring of cognitive skills. This is clearly evident from the PISA 2009+ study results, wherein Tamil Nadu was placed at the lowest position of 72<sup>nd</sup> rank among 74 economies.

Thus, in spite of a seemingly notable track record, what may be the reasons that have led to a comparatively low level of performance in education in Tamil Nadu? It is imperative that one understands the dynamics involved in shaping the learning outcomes that determine the quality of educational standards as well as the factors influencing the performance of students in Tamil Nadu at the secondary level. Such analysis is helpful in improving the efficacy of the system. However, factors influencing performance are complex entangled in economic social psychological and cultural factors thus necessitating the present study.

Keeping this in view, the present study aims at providing an analysis of the pattern of enrolment, completion and graduation from school. A statistical investigation is undertaken to identify the major contributory factors in respect of learning outcomes of such students. In this regard the following objectives were drawn up

### **Objectives**

The main objectives of the study are

1. To trace the evolution of policy relating to secondary education in Tamil Nadu
2. To study the pattern of enrolment, completion and graduation at the secondary and higher secondary stage of school education.
3. To analyse the growth in institutions, teachers and expenditure at the secondary level.
4. To examine the relative importance of major factors influencing graduation in standard XII Board examination in Tamil Nadu
5. To analyse the effect of the factors influencing performance of students of standard XII in Chennai district.

On the basis of the above objectives the following hypotheses have been formed.

### **Hypotheses**

1. There is a significant impact of various factors on the graduation of students' (i.e. measured in terms of the number of students passing the examination) of standard XII in Tamil Nadu.
2. There is a significant impact of various factors namely student characteristics, family related factors, school or institutional characteristics, and teacher related factors on the performance of Students (i.e. measured in terms of overall marks secured in examinations) of standard XII in Chennai district.

To test the above hypotheses the following research methodology was adopted

### **Research Methodology**

The objectives specified for the study warrant the use of both secondary as well as primary data sources. Secondary data shows the enrolment, number of schools, teachers, student teacher ratios, expenditure on secondary education and pass percentages from standard X and XII board examinations. As the secondary data is limiting in capturing other important variables that influence the graduation of students, a primary survey was conducted to show

the influence of the other variables such as individual factors and the support extended by family on the performance of students.

### **Secondary Data**

Data has been collected from Department of School Education, Government of Tamil Nadu. Enrolment of students, number of schools, teachers, Pupil teacher ratios for high school and higher secondary classes has been obtained from the department and various issues of Selected Information on School Education in India, Ministry of Human Resource Development (MHRD), and Department of Education. The number of working days has also been secured from various issues of Selected Information on School Education in India.

The Directorate of Public Examination conducts and publishes results for Standard X and Plus 2. Data from the Directorate is used for analyzing the completion and graduation of students for the whole of Tamil Nadu.

Data from published sources like the Tamil Nadu Economic Appraisal, Statistical Abstract of Tamil Nadu, Budget Documents, Policy Notes, have also been utilized. Detailed expenditure data on plan and non-plan expenditure on secondary education for the various years from Analysis of Budgeted Expenditure, Government of India, was also collected. Online sources like MHRD, SEMIS, pallikalvi, tn school education.nic were also used for the study.

Secondary data pertains to the period of three decades from 1980-2012. The year 1980 marks the introduction of the 10 + 2 system of school education in Tamil Nadu as recommended by the Kothari Commission, from the earlier system of 11 +1 +3 years of education.

Per capita Gross State Domestic Product at constant prices has been calculated by the Economic and Political Weekly Research Foundation based on Government of India data. The percentage of adults who have completed secondary schooling is obtained from National Sample Survey (NSS) rounds. Average teacher salary has been calculated on the basis of basic pay scales of a Post Graduate trained teacher in aided and government schools. Expenditure on education has been arrived at by dividing total expenditure on secondary education by the number of students enrolled in classes IX to XII.

## **Primary Data**

Primary data has been collected from Chennai district. Chennai, being the capital of Tamil Nadu, possesses a number of characteristics that is likely to provide interesting insights. The XIth plan document of Tamil Nadu has ranked Chennai district in first position with a Human Development Index (HDI) value of .842 (2006). Its per capita income is the highest among all districts in Tamil Nadu. District Gross Domestic Product (GDP) is nearly six times the State average in 2011. The adult literacy rates and life expectancy at birth are among the best in the state. Census 2011 shows an adult literacy rate of 90.3 percent and a female literacy rate of 87.2 percent. There is a cluster of industries around Chennai producing engineering goods, software and BPO, automobiles and components and leather. Chennai has a judicious mix of households with varying economic, educational, occupational, religious, social and cultural background. It is endowed with a good mix of government, private-aided and privately managed schools. Students' enrolments into schools are not largely restricted by social or economic criteria. It also has good availability of teachers in schools because the vacancies in Chennai to be filled in by the Government are the least as compared to the total teacher posts. Private schools are able to find trained teachers with the required qualifications

Chennai's performance in terms of pass percentage in Board examination at the Plus 2 (XII) level is also above 90 percent. The infrastructural facilities especially public transport, roads and connectivity, electricity, water and sanitation, schools, other support services like libraries, tuition facilities are good. The presence of colleges and higher education institutions are likely to motivate students. Awareness with respect to the benefits of education is high among parents and students. Aspiration level is likely to be better in such an enabling environment. Social and economic barriers or disadvantages need not be deterrent factors in performance. A careful analysis of all these aspects leads to the choice of Chennai as base for primary data collection.

A sample of 20 schools was chosen out of 420 schools in Chennai district, out of which 11 were unaided schools, 3 government schools, 6 aided schools. The schools with a fair representation from the zones were chosen in consultation with the personnel from The Office of The Chief education officer, Chennai. The sampling pattern was proportionate sampling. Utmost care was exercised in the choice of schools so as to include reputed as well as not so well known schools, elitist schools and schools with students from poor economic

and social backgrounds. The total number of standard XII students in Chennai district was 43616 of which 20724 were boys and 22897 were girls. The study aimed at a 2 percent sample totaling 872 students and data was collected from 960 students. However after elimination of incomplete questionnaires the sample was 851. The number of female students being 375 while that of male 476.

## **Variables**

**Dependent Variable** - The dependent variable, Performance of students is expressed in terms of total marks obtained in Pre Board Examination. Total marks reflect their overall performance. Examination performance reflects the achievements in learning based on the curriculum. Total marks could also be the basis for easy comparison of science students and students of humanities or vocational streams. The Pre Board Examinations are conducted on lines similar to that of the board examinations. The evaluation is usually more stringent as schools do not like to be liberal and inflate the marks. These marks are usually 10 percent lesser than the Board marks. However, the Board examination marks are considered significant and important because it forms the basis for eligibility for entrance into colleges. In fact, as far as Tamil Nadu is concerned, the marks obtained by students in their school final ( Plus 2 or XII<sup>th</sup> standard) decide the relative rankings of students for admissions into professional courses like engineering and medicine as well as other arts and science courses in colleges. For all practical purposes, therefore, the school examination is a competitive examination that decides their aspiration for higher studies. Marks obtained in examinations are the only available indicator of performance at the moment as students do not participate in standardized tests conducted by international agencies. Examinations have been an instrument for evaluation and assessment of the curriculum. It has received the recognition and approval from government, teachers and parents. Therefore, it can be considered an acceptable indicator of performance of students. The schools and teachers follow well laid procedures for the conduct of examinations and consequent evaluation.

**Independent Variables** - Four categories of variables have been selected for the primary study. They are Student related or individual factors A, Family related factors F, School and institutional characteristics I and Teacher related factors T.

Student related or Individual factors A- Gender, Streams /Subject, Attendance at School, Tuition and Mother tongue.

Family factors F- Social Category (Backward Class, Most Backward Class, Scheduled Caste/Scheduled Tribe and Others), father's education, mother's education, brother's education, family income, mode of transport to school ( cycle, public transport and private transport), number of children at home (single child and two or more children).

School related factors I- type of management (government, private aided, private partly aided and unaided), total number of children in XII, pupil teacher ratio, incentives, peer support scores

Teacher related factors T - percentage of teachers with professional training, percentage of teachers with more than ten years' experience, average teaching hours, teaching support scores.

### **Model for analysis of Secondary Data**

The researcher has adopted a slightly modified version of the Lee and Barro (1997) model for analyzing factors influencing the number of students graduating out of school using secondary data in Tamil Nadu.

$$PAS_{ijt} = \alpha_{jt} + \beta_1 F_t + \beta_2 R_t + \epsilon_{jt}$$

$PAS_{ijt}$  denotes number of students  $i$  passed in standard XII board examinations  $j$  in the particular year  $t$  (Test scores in mathematics, reading in the Lee and Barro model)

$F_t$  denotes family factors – Per capita GSDP and adults' males and females who have completed secondary education in the particular year. (Log GDP per capita, Primary education of adults in the Lee and Barro model)

$R_t$  denotes school resources – pupil-teacher ratio, average teacher salary, educational expenditure per pupil in secondary education, school length in year  $t$ .

$\epsilon_{jt}$  denotes unmeasured factors influencing quality.

In addition, Exponential Trend was fitted to study the growth of enrolments, completion and graduation rates in India as well as Tamil Nadu. It has also helped in analyzing the changes with respect to other parameters like institutions, teachers, Pupil Teacher Ratios, public expenditure on secondary education etc.

## **Model for Analysis of Primary Data**

The researcher has chosen an econometric model developed and used by Hanushek and Woessmann (2011) as the variables and the instruments employed in the model appear to be most suitable for the current study.

$$T = a_0 + a_1F + a_2R + a_3I + a_4A + e$$

T – Outcome of the educational production function test scores of mathematics, science and reading achievement. The vector F captures facets of students and family background characteristics, R is a vector measure of school resources, I refers to institutional features of school and education systems and A refers to individual ability.

The modified form of the model to be used for the study is as follows

$$P = a_0 + a_1A + a_2F + a_3I + a_4T + e$$

P- Outcome of educational production process as measured by overall percentage of marks in Pre Board examination A-Student related or Individual factors, F- Family factors, I- School related factors T-Teacher related factors. The Ordinary Least Squares model has been used to find the factors affecting performance of students.

## **Limitations of the Study**

As Standardized tests or assessments have not been conducted in Tamil Nadu on a continuous basis, the study had to limit itself to performance in the Pre Board examinations and treat the same as learning outcomes.

Primary survey was carried out in only one district due to time and resource constraints.

Tools of analysis like Hierarchical Linear modelling or the fixed effects approach could not be adopted due to data limitations.



## **Conclusions**

The analysis of secondary data shows that in Tamil Nadu institutional growth rate has been higher than that of enrolment growth rate. Institutional growth has facilitated the increase in enrolments. The rate of growth in students passing standard XII has been greater than that of enrolments and completion. Micro level evidence based on the primary study in Chennai shows most of the teacher related variables like teacher support exert a positive influence on performance. Individual characteristics of gender, subject chosen, and attendance exert positive influences on marks obtained. Family and school related variables like social category, management type do have a significant impact on performance.

## **Chapter Scheme**

Chapter I brings out the importance of secondary education and its role in India. It also spells out the objectives and hypotheses and the methodology.

Chapter II presents a detailed review of literature and analytically comprehends it to the methodology used in the study.

Chapter III provides an over view of education in India and Tamil Nadu. It throws light on the constitutional provision for secondary education in India and also policy perspective of the government of Tamil Nadu. It also explains the structure of secondary education and administration in Tamil Nadu.

Chapter IV deals with the analysis of secondary data focussing on enrolment, growth of schools and teacher availability and examines the completion and graduation rates in secondary education in India and Tamil Nadu. The determinants of the graduation from school in Tamil Nadu have also been analysed.

Chapter V presents the results of the primary survey conducted in Chennai district. It furnishes a profile of the sample respondents and proceeds with an analysis of the factors determining the performance of standard XII students.

Chapter VI summarises the findings and conclusions, besides giving some suggestions.