Women’s impact on development in India

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Abstract

India is the world’s largest democracy where 1 186 200 000 people live and almost half of these are women. So how does women’s situation affect India’s development. This essay focuses on secondary education, female labor force participation and active population growth and measures their affect on Human Development Index (HDI). The literature shows a positive effect of all explanatory variables on HDI. In other an effective resource allocation towards words women might be the key for India to reach higher living standards. It is indeed a question of effective resource allocation because women in India don’t enjoy the same freedoms and rights as men which will clearly affect the countries resource allocation and the HDI:

Keywords: women, development, education, labor force, active population
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Introduction

The question that I will try to answer in this essay is; how do active population growth, women’s labor force participation and female education in India affect the country’s development?

I will limit this essay to India in which I will mainly focus on women but in a context that applies for the country as a whole. The purpose of this essay is to see if and how women’s situation is important in the process of development in India and in which way it is affected. I am expecting some kind of effect because women constitute a little less than 50 percent of India’s population; but they don’t enjoy the same rights as men. This is what makes my question interesting; it can’t be efficient resource allocation when almost a half of the population isn’t given the same opportunities.

What if women did enjoy the same rights, how would it affect the country as a whole? It is also interesting because I will focus on the active population’s growth rate rather than the total population growth. This makes it easier to see whether the dependence burden is high or low which is important to the country’s economy as a whole.

Background

What is development and how do we measure it? In strictly economic terms development traditionally reflects a country’s economy which has been more or less static over a long period so that an increase in gross national income (GNI) is generated and sustained. An alternative to this interpretation of development but still in strict, traditional economic terms is the rate of growth in income per capita. Real GNI per capita (GNI cleared of inflation) has been used to estimate the aggregated well-being of the population. For a long time development was seen as a result of wealthy people consuming and believing that it would trickle-down to the masses.

The trickle-down effect didn’t happen. Instead we could observe increasing GNI per capita but unchanged living standards of the masses in the 1950’s and 1960’s. During the 1970’s the slogan for development was “Redistribution from growth” and development was redefined with consideration taken to poverty, inequality and unemployment. During the 1980’s and 1990’s the situation worsened. Some of the least developed countries experienced
underdevelopment, the Sub-Sahara population living on less than $1 a day increased with 50 million. This opened the eyes of many, among others the World Bank. In 1991’s World Development Report the challenge of development was said to be quality of life, which is a result of higher income but also better education, higher standards of health and nutrition and less poverty among other things. To achieve this structural social changes and institutional changes are needed. The report concluded that development must represent the entire range of changes in a social system that results in a better quality of life.

The Nobel price winner in economics Amartya Sen went beyond basic economic theory of utilization of commodities consumed to also consider what the consumer can and does do with the commodity. Sen simply says it is how each and every one of us uses and can use the goods that matters; an individualistic approach. The utility I get from a loaf of bread differs from your utility. It differs because of body size, activity level and health among other things. Just a simple commodity as bread can vary in utility from a person to another; this is what Sen calls functionings. Capabilities are the feeling a commodity evokes for example there is a utility from having a bike but another from bicycling. Sen acknowledges real income but reverses it and says instead that health and education are needed to turn the commodities into functionings. Sen’s view is what has inspired the United Nation’s Human Development Index (HDI) (Todaro and Smith, 2006).

**Human Development Index**

The HDI is developed by the United Nations Development Program. It first appeared in the Human Development Report in 1990. The HDI is an attempt to measure development in an alternative way, including living standards and an emphasis on socioeconomic factors. The HDI has a scale from zero to one, where zero is the lowest value and one the highest. With this scale, countries are ranked and grouped in three different groups; low human development 0.0 to 0.499, medium human development 0.50 to 0.799 and high human development 0.80 to 1.0.

Behind these scales lies data that is calculated for each country (Todaro and Smith, 2006). The data included is; life expectancy at birth, weighted average of adult literacy, adult literacy rate and combined gross school enrolment in primary, secondary and tertiary education as one and the third and last component is the logarithm of income (undp.org). When the educational part in HDI is calculated, a bigger emphasise is put on adult literacy than on combined gross
school enrolment in primary, secondary and tertiary school, this is to reflect the fundamental characteristic of an educated person. I won’t go in to the calculation further.

An advantage with HDI is that it shows how countries with low income levels can do better than expected and that countries with high income levels don’t necessarily achieve high development. This is illustrated in Figure 2.1 with India and Vietnam as an example. HDI stresses a broader view on development than just income. This difference between HDI and GDP per capita show how countries with similar GDP per capita can have a big difference in HDI because of how they use their wealth. Some even claim that some high income countries have experienced “growth without development” (Todaro and Smith, 2006).

Figure 2.1

Nothing is flawless, likewise HDI. The main critique has been aimed at the measurement of education; gross enrolment often overestimates the amount of schooling a person gets because HDI doesn’t take in consideration those who have started school (enrolled) and then along the way dropped out. Some critique has been aimed at the fact that the three components in HDI
are measured in different units and that it therefore is hard to see their separate effects. Another source of critique is the quality aspect; there is a big difference from an additional year of living healthy relative to being confined to bed. This aspect HDI doesn’t take into consideration (Todaro and Smith, 2006).

**Education in India**

Since 1960 there is universal elementary education in India for children between six and fourteen years. Primary and secondary schools that are part-owned by the government are free of charge but they aren’t considered to provide a high standard education. There are big regional differences in standards, as well as rural and urban standard differences. One example is the state Kerala where 90% of the population is literate while in the state Bihar the literacy is 39%. Another difference in education can be seen between female and male. The literacy for males is 75% and for females it is 64%. These differences mentioned above cause education to increase the inequalities rather than to decrease them.

Even though child labor is prohibited in India, it occurs and even though public financed school is free, poor families can’t afford due to the opportunity cost. Children can work on the farm and contribute to an immediate income increase instead of going to school which is free but then the family would be without the additional income that children can contribute to. This makes the private cost for poor families higher than for wealthier families, resulting in a lower school attendance and lower school performance for children from poor families. (Todaro and Smith, 2006)

When females marry they move from their native village. Because of this parents of daughter don’t have the same long-run incentives to invest in education as they have for their sons. Instead girls are often sent of to work. When males get married they stay with their parents and provide for and take care of them as they get older. This gives the parents incentives to invest in their son’s education, which sometimes is paid through the daughter’s employment (Todaro and Smith, 2006).

The Dravidian women in India are considered to be more independent than other women in India mainly because daughters inherit from their mothers. The Dravidian people came to India from Persia, Egypt, Iraq, Syria and Arabia (landguiden.se).
Empirical studies have shown that uneducated females hinder economic development and increase social inequalities. In most developing countries female education has a higher rate of return than the returns of male. The returns are even higher than investments in public infrastructure. Female education contributes to higher labor force participation among women, lower fertility and improved health and nutrition for children.

Educated mothers create better conditions for children to be educated and healthy than a higher income. A bad cycle is created when females aren’t educated; through the children of uneducated women and the children’s future and through them the country’s future. The cost of investing in girl’s education is more than covered through the positive side-effects from better health of children and other social benefits (Todaro and Smith, 2006).

India mostly invests in higher education and not in primary or secondary which a larger mass of people could benefit from. Through investments on female education India has taken a step towards reducing the educational gender gap and other measures have been taken towards reducing the regional differences (landguiden.se). Girls total education enrolment has steadily increased at all levels but it is still below 50% at all levels. (selected educational statistics 2004-2005). In 1986 the Indian government set a goal of 6% of GNP going to education but this aspiration hasn’t been reached yet (Cheney, Ruzzi and Muralidharan, 2005). In 2007 the Indian government spend 3.7% of GDP on education which is quite high compared to other LDC countries in Asia (landguiden.se). (note GNP and GDP are different measurements).

Another problem in India is the teachers. In a survey done by The Public Report of Basic Education (PROBE) from 1999 they observed that only half of the teachers actually were teaching. This issue results in a high drop out rate because children even after 4-5 years of public school education experience that they don’t learn enough. Teachers in India are well-paid since they are unionized but they are chosen on political affiliation criteria and not on knowledge or pedagogic criteria. In rural schools one teacher might be in charge of several primary classes with each class of 40 pupils on average. A new trend in primary schooling is low cost private schools both in urban and rural areas (Cheney, Ruzzi and Muralidharan, 2005).
Secondary Education in India

In recent studies it has been shown that secondary education is especially important for breaking the heritage of poverty from one generation to the next. The reasons many emphasize investment and promotion of secondary education is because its private marginal returns to additional education is the highest.

The big difference between male and female marginal return is because of females’ lower income at all levels of education, relative to males (see Figure 1.1). The relative disadvantages for females between primary and secondary are lower because a female’s income with secondary education is much higher than if she had primary education relative to males’ income difference for the same levels.

It isn’t only the income benefits that result from secondary education but also better health, gender equality and poverty reduction. Females getting secondary education bring additional benefits than those mentioned above; decreasing maternal and child mortality as well as bringing about increases in child education and slower population growth.
If we look at the social returns for females and males; females that have obtained secondary education have 40% social rate of returns and males 13% (Table 1.1). This fact justifies public investment in girl’s education.

Public schools haven’t met the increased demand for secondary education instead they are an option for those who can’t afford private schools and for those in rural areas where private schools haven’t established. The access to secondary education has increased as the demand for secondary education has increased and private unaided schools have established to meet this demand. The demand for secondary education is forecasted to increase as poorer families that can’t afford private unaided schools increase their demands for secondary education.

Over the ten last years girls’ secondary school enrolment in India has been 35% while boys’ has been 45%, a big difference when taken girl’s marginal rate of return compared to boys’ into consideration. In some rural areas the difference in boys and girls secondary school enrolment can be even higher but only in the state of Kerala girls’ enrolment in secondary school is higher than that of boys.

**Female Labor Force Participation**

The education system and the labor force interplay with each other. In India the demand for skilled and semi-skilled labor force is increasing both in rural and urban areas as well as abroad (Secondary education in India). The effects are both negative and positive. One negative effect is that the employer chooses the ones with the highest educational level even though the job doesn’t require this higher educational level. This fact forces people to study more but still get a job that requires lower skills than obtained (Todaro and Smith, 2006).

<table>
<thead>
<tr>
<th>Table 1.1/</th>
<th>Impact of Female Education on Health Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Level of Females</td>
<td>Fertility Rate</td>
</tr>
<tr>
<td>None</td>
<td>3.55</td>
</tr>
<tr>
<td>&lt; 5 years</td>
<td>2.45</td>
</tr>
<tr>
<td>5–7 years</td>
<td>2.51</td>
</tr>
<tr>
<td>8–9 years</td>
<td>2.23</td>
</tr>
<tr>
<td>10–11 years</td>
<td>2.08</td>
</tr>
<tr>
<td>&gt; 12 years</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: National Family Health Survey III (2007)
The informal sector is unorganized, unregulated and unregistered, and grooving in developing countries. The informal sector employment isn’t represented in the labor force statistics. The informal sector emerges as the population grows (both through population growth and migration) and it gets harder for the formal sector to absorb the labor force, especially in urban areas. It is a competitive sector where profits are zero.

People working in the informal sector have little or no formal education, they use labor-intense rather than capital-intense technology, they are unskilled and don’t have any easy access to financial capital. (Todaro and Smith, 2006). In India nine out of every ten women work in the informal sector if we don’t consider women working in agriculture. This home-based work makes it easier for women to combine work and family and enables that the whole family can help out, including the children (Lim, 2003). Women in India working in the informal sector have organized themselves through the trade union Self Employed Women’s Association (SEWA) registered in 1972. This organization is a forum for women in the informal sector to achieve full employment and attain social security. The organization provides women with credits, child care, health care and insurance among other things. This way of organizing has been spread around the world, for example South African Self-Employed Women’s Union (sewa.org)

Women are the main labor supply in the informal sector since the formal sector is mainly dominated by men. This makes women especially vulnerable since the informal sector doesn’t provide any social protection. Women in the informal sector don’t need much or no money to start their production and since their production is labor intense even a small investment have a high marginal rate of return. In households where the head is a woman the children have higher drop out rates from education since they are more likely to working (Todaro and Smith, 2006).

The beedis (tobacco rolling) industry in India employs 5 million workers and an estimated 90% of these are women working for US$ 1/day if they roll 1000 bedies that same day. This work is usually home-based which makes it easier for the women to engage their daughters in the work (Lim, 2003).
Literature Review

A front figure on the subject of women and their role in development is Ester Boserup and her book *Woman’s role in economic development* from 1970. This book highlights women’s important role in industry and agriculture. Boserup makes a forecast which in some aspects has proven to be accurate. Her writing on gender division of labor and what motivates actors in development has proven to be highly accurate. What Boserup couldn’t predict are the effects of globalisation, HIV/AIDS and the effects of climate change.

Boserup’s main idea was that; as economic wealth increased it would trickle down to the poor. The liberalisation of markets has resulted in inequalities in income, both within the country and among countries. Boserup’s forecast of liberalization and globalization’s effect on women was different from what we have experienced. Boserup meant; as industries would build up they would drive home manufacturers out of business, resulting in an increased female unemployment; which isn’t quite accurate in the case of India.

The feminization of labor has evolved in two ways; through the increase of women in paid work and the increased demand for a more flexible work force of both men and women through the informal sector for example. Boserup was right about women’s position in the industry though; that if they were hired in the modern sector it would be for the unskilled, low wage jobs. Women’s increase in paid work hasn’t decreased their share of unpaid work, for example caring for other household members. The unpaid work affects women’s paid work negatively and might even cause girls in the household to be taken out of school to help around at home.

When girls are taken out of school their likelihood to raise skills will decrease and the likelihood of being poor increases for these girls (Boserup 1970). Boserup points to the importance of educations role of preparing the workforce for changes in labor demand.

Another important point is the big educational differences between urban and rural labor and that something has to be done in order to decrease the gap between girl’s and boy’s education enrolment. Education is also important from a democratic point of view. Boys and girls need knowledge about the democratic system for them to be active participants in the society.
Concerning women’s political participation at local, regional and state level Boserup doesn’t mention much but it is still important in making policies to meet the needs of women. Political participation isn’t the only way to for women’s voices to be heard. Networks are playing an important role in many developing countries today. An informal sector organization in India Self Employed Women’s Association (SEWA), founded in 1972 strives for better terms of employment for women. SEWA helps women run their own organizations, form co-operatives, and bargain collectively in the market place.

*Woman’s role in economic development* has inspired many others to write and research on the subject of gender equality; among others the UN Decade for Women (1976-1986).

In an article Bloom and Freeman (1986) explain thoroughly how fertility and mortality affect population growth and that it will take at least ten to 15 years for a population growth from a year of interest to be felt in the labor force in developing countries. An increased population growth due to fertility increase will create a bigger dependency burden than a decrease in mortality. A decline in mortality doesn’t only affect a particular age group but is distributed among the entire population. A decline in mortality can also be seen as an increase in life expectancy which gives incentives to invest in human capital, because peoples active years in the labor force can increase. Bloom and Freeman (1986) also discuss the problems with a high dependency burden.

There are two kinds of dependency burdens. The first one is a result of a big young population and the second is a result of a big elderly population. In India there is a big young population creating an economic dependency burden because they are “non-productive members of society” and the working population (usually those between 15 and 64) must provide for these individuals (Todaro and Smith, 2006).

In a more up-to-date article Bloom, Canning and Malaney (2000) focus on Asia and how GNP per capita is negatively affected from a total increase in population growth but that a population increase in the working-age population affects GNP per capita positively.

In an article by Sundaram and Vanneman (2007), the conclusion is that women’s participation in the labour force in India contributes to less gender equality because it has a negative effect on girl’s literacy. Sundaram and Vanneman (2007) argue that where many women are
working, there are also many girls working, making it harder for girls to find time for school (if they attend one), creating a bigger difference between girl’s and boy’s literacy in these regions. Parents’ short sigh is the reason behind Sundaram and Vanneman (2007) argument. Parents are short-sighted because they need the additional income and since their daughters often move from their native community when they marry, they don’t have the incentives to invest in girls’ education as they have for boys’. Sundaram and Vanneman (2007) on page 138: “These calculations reveal that when boys’ literacy levels have reached 93%, the gender gap in literacy begins to decline.”

Sundaram’s and Vanneman’s (2007) article is interesting because many other researchers find a linkage between women’s education level and fertility. One of them is P. N. Mari Bhat (2002), who claims that in the initial stages of the demographic transition the education of women have a negative effect on fertility but as the demographic transition develops this effect is weakened and instead fertility has a negative effect on education, especially for girls. P. N. Mari Bhat’s (2002) research has shown that it isn’t because of literacy increase that the fertility has gone down but because of illiterate women’s reproductive behaviour. What was also found was that illiterate parents who are able to regulate their fertility; send more children to school and the greatest beneficiary is the first-born daughter.

**Development theories**

After World War II the interest for poor countries increased but the economists in the developing world stood tool-less and were caught off guard. What they did have was the experience from the Marshall plan. Through the Marshall plan the Unites States of America financed and assisted technically a war-torn Europe, with the aim to rebuild and modernize the economies of Europe. The economist of this time could also see their own countries development; where countries had also started off as undeveloped agricultural societies.

**The Harrod-Domar Growth Model**

Savings are necessary for an economy to replace depreciated capital for example buildings, machines and materials. But for an economy to grow the net addition to the capital stock has to grow through new investments. This model assumes a capital-output ratio or in other words a direct relationship between investment and GDP (K/Y=k), a savings ratio which is a fixed proportion of national output(s=sY). The third assumption is that new investments are
determined by the level of total savings. The expression that we end up from these assumptions is $\Delta Y/Y = s/k$, where the left-hand side represents rate of change or rate of growth of GDP.

What the Harrod-Domar growth model is trying to say is that in the absence of government, the growth rate of the national income will be directly or positively related to the savings ratio and negatively or inversely related to the economies capital-output ratio. Put simply in order to achieve economic growth, countries have to save and invest a specific proportion of GDP. If they want higher economic growth they have to save and invest more.

The main obstacles to development in poor countries are the relatively low levels of new capital formation. A solution to this is to attract foreign aid or foreign investments to fill the gap between domestic investment and the investment needed in order to reach a certain economic growth rate. This feature of the Harrod-Domar model justified a massive capital transfer and technical assistance from developed countries to less developed countries (Todaro and Smith, 2006).

**Lewis Two-Sector Model**

Lewis theory of development was developed by Nobel price winner W. Arthur Lewis and further developed by John Fei and Gustav Ranis. The model assumes two sectors; a traditional, overpopulated rural sector characterized by zero marginal labor productivity. This situation generates surplus labor because it can be withdrawn without any effect on the output. The second sector is an urbanized, high-productive modern industrial sector to which workers are recruited from the traditional sector. This model’s focus is this transfer of labor as well as the growth of output in the modern sector. This is achieved through expansion of the modern sector. The speed at which this happens is determined by the rate of industrial investment and capital accumulation in the modern sector. These investments are made through profits and the assumption that all profits are reinvested and that urban sector wages are fixed at this wage the supply curve of rural worker is perfectly elastic. Lewis also assumed that the urban sectors wages would be 30% higher than average traditional sector wages, creating an incentive for traditional sector workers to transfer (Todaro and Smith, 2006).
The Solow Growth Model

The Solow growth model is a traditional neoclassical growth theory. It is a development of the Harrod-Domar model, introducing a second factor; labor and a third independent variable, technology, to the growth equation (Todaro and Smith, 2006). Solow’s growth model is a dynamic model that illustrates changes in the economy over time. Solow’s growth model incorporates savings, population growth and technology and shows how these macroeconomic measures vary and affect an economy’s growth and output over time. The model assumes a closed economy, diminishing marginal product of capital and constant returns to scale in the production function, we also assume that a person’s income is divided between consumption and savings. In the model savings equal investment which increases the capital stock but as the capital stock is used over time it depreciates.

The fundamental feature in Solow’s growth model is the long-run equilibrium; steady-state. In steady state the capital stock per woker is steady over time and if an economy isn’t in steady-state the forces of investment and depreciation will drive it to a steady-state equilibrium. If the economy is below steady-state the capital stock will increase because investments exceed depreciation, driving the economy forward. If the economy is above steady-state the capital stock will decrease since it is depreciating so investments aren’t made at the same pace as capital is depreciating.

Savings in the Solow growth model causes the economy to grow until it reaches steady-state. In other words it is a temporary growth caused by increased savings. A higher saving rate increases investments which makes the capital stock bigger and creates a new steady-state which has a higher level of output. Empirical studies show that countries with high investment rates have in most cases a high income.

In the steady-state we want a savings rate that maximizes consumption assuming that people value this more than leisure. The steady-state value of capital where this condition is fulfilled is called the Golden Rule level of capital. This condition is met where the slope of the production function curve is equal to the slope of the depreciation curve (including the attenuation of capital intensity caused by population growth). The slope of the production function curve is the marginal product of capital per worker.
The second effect on growth in the Solow model is population growth. Population growth affects growth through the per-worker capital stock and as population increases the capital stock per worker decreases. The term break-even investment illustrates how much investment is needed to keep the capital stock per worker constant as it gets depreciated and spread on more and more people. An increase in population growth will shift the depreciation curve upwards and reduce the capital intensity temporarily.

According to Solow countries with high population growth will have lower GDP per capita than those who have low population growth, everything else equal. This hypothesis has made the World Bank recommend a fertility decline in developing countries where population growth is high. The World Bank’s recommendation is to educate women about birth-control and to increase women’s access to the labor market in order to make the fertility rate to go down. Other perspectives on population growth’s effect on GDP per capita have been presented by Thomas Robert Malthus’s Malthusian Model and Michael Kremer’s Kremerian Model.

**Criticism**

Each theory has its strengths and weaknesses.

The Lewis theory of investment had the Marshall plan as a role model. The Marshall plan worked for Europe because the nations in Europe had the conditions; institutions, an educated work force and efficient government bureaucracy among other things, which made it possible to transform this foreign aid/investment into output. The focus on investment isn’t wrong, in fact it is necessary for economic growth but it isn’t sufficient. Both Harrod-Domar’s model assume the same conditions in underdeveloped nations as in Europe (Todaro and Smith, 2006).

Lewis’s assumption of reinvestment of profits isn’t bullet proof. There is a possibility for the one obtaining the profit to invest in labor saving capital rather than duplication of the existing capital, as is assumed. The second assumption of Lewis of surplus labor in the rural sector isn’t empirically true. Today surplus labor is more an issue for the urban sector. Another unrealistic assumption is diminishing returns in the modern industrial sector once again empirics show something else; increasing returns in fact.
Critique towards the neoclassical growth model of Solow is that competitive markets don’t exist nor would they be desirable for LDC from a long term economic and social perspective. Perfect information doesn’t either exist and there are externalities, both positive and negative. Neoclassical growth theory needs to be modified to fit the economies of the developing world.

**Method**

I have done a quantitative data analysis of data collected from various sources; the World Bank’s World Development Indicators (WDI) and GenderStata, International Labor Organisation (ILO), United Nations Development Program (UNDP) and some data on education my mentor Thomas Lindh has provided me with from the Vienna Yearbook of Population Research.

I have worked with time series data in EViews 6, an econometric/statistical program recommended for time series data. I will use the output, interpret it and draw my on conclusion from this linear model:

\[
\log(Y) = -1.558 - 0.294\log(X2) - 0.157\log(X3) + 0.362\log(X4) + 0.124d + u
\]

Where \(\log(Y)\) is the logarithm of human development index HDI (UNDP), \(\log(X2)\) represents the logarithm of active population growth rate (WB GenderStat), \(X3\) is logarithm of females between 15-64 labor force participation rate (ILO) and \(X4\) is the logarithm share of female enrolment in secondary education, gross (WDI). \(d\) is the dummy which corrects for the outlier in the education variable. I have logged the variables in order to interpret the coefficients as elasticities. I will use these variables to see the effect of active population growth, female education and labor participation on the Human Development Index.

The data that I have for the different variables are retrieved from different sources. Some of the data wasn’t annual so I had to interpolate.

I have used data for the time period 1980-2006 and ordinary least squares (OLS) in EViews. OLS is an attractive statistical tool for regression analysis when the underlying assumptions hold. Even when the assumptions don’t hold literally it is a robust estimation method. OLS it
minimizes the difference between the estimated equation and the observed values from a population or in other words the sum of residuals is minimized (Gujarati, 2003).

I have chosen HDI as opposed to GDP per capita to reflect India’s development. The human development index reflects life expectancy, adult literacy, combined gross enrolment for primary, secondary and tertiary education, and logarithm of income to reflect the diminishing importance of income with increasing GDP. Life expectancy reflects both health and mortality which are important factors of development. Because of this argument I have chosen HDI rather than GDP per capita as a measure of development.

Education as mentioned above (both in background and literature review) is a very important factor for development, both theoretically and empirically. Even though education is included in the HDI I have chosen to present female secondary education as a separate variable because research and empirical studies have shown that the importance of female education and especially secondary education differ from the general level of these variables.

The data for women in the labor force I have retrieved from the International Labor Organization and it accounts only for the formal sector, the informal sector isn’t included. The informal sector is an important source of employment for women but not a socially safe employment. The data of female labor force is important in the sense that it shows women’s advance in the formal sector. As mentioned before the formal sector is mostly dominated by males.

Figure 3.1
As is illustrated in Figure 3.1, HDI and female school enrolment in secondary school as percentage of gross enrolment have a positive trend. A strange dip occurs in 1998 to 27% in female secondary enrolment as percentage of gross. It might be an error in the data or change in procedure of how they calculate female secondary school enrolment as a percentage of gross enrolment. This drop in 1998 can be treated as an outlier and controlled through creating a dummy for 1998 which eliminates the influence of this outlier on the regression result.

Through the Breusch-Godfrey test I have found autocorrelation between the residuals and also because the Durbin-Watson is above 0.5 and close to one there is negative autocorrelation. There are procedures to come to terms with autocorrelation, for example through a Newey-West correction. White’s test for heteroskedasticity I’ve run and concluded that there is heteroskedasticity. One way to deal with heteroskedasticity is through robust standard errors but it works best with a large sample. The Ramsey RESET test tests for misspecification and there is no evidence that the model is misspecified. I have used Augmented Dickey-Fuller test to test for stationarity and there is no evidence of unit roots.
All my estimated parameters except for female education aren’t significant at a 5% significance level but since I only have 27 observations in my data, it isn’t reliable. The measure of goodness of fit $R^2$ is high 0,95 (see Appendix: Estimation Output).

**Results**

<table>
<thead>
<tr>
<th>Dependent Variable: LOG(HDI)</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-1.558865</td>
<td>1.024732</td>
<td>-1.521776</td>
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<td>0.3341</td>
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<td>DUMMY</td>
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<td>4.22920</td>
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R-squared: 0.966397
Adjusted R-squared: 0.949706
S.E. of regression: 0.023936
Sum squared resid: 0.012695
Schwarz criterion: -4.221298
Hannan-Quinn criterion: -3.398682
Durbin-Watson stat: 1.139262
Prob(F-statistic): 0.000000

$log(Y) = -1.558 - 0.294log(X2) - 0.157log(X3) + 0.362log(X4) + 0.124d + u$

My interpretation of the estimated output is as follows; if there was no effect from female labor force participation, the rate at which the active population grows and female secondary enrolment as a percentage of gross, then the logarithm of HDI would be -1,56, that is a HDI=$\exp(-1.56)=0.20$

The active population growth rate has a negative effect on HDI. When the active population growth rate increases with one percent the HDI should on average decrease with 0,294. This result is insignificant at 5% significance level, which means that active population growth rate doesn’t have any clear effect on HDI or in other words on development as some would suggest.

Also female labor force participation has a negative effect on HDI according to my data. HDI would decrease with 0,157 when the female labor force participation increases with 1 %.
data for X3 isn’t significant at 5% significance level. This means that as suggested by others, according to my data there is no affect of women in the formal sector on development.

Female school enrolment has a positive affect though and is significant at 5% significance level in my data. I interpret it as the gross enrolment is increased by one percent HDI will increase by on average 0.326. This result is in line with what both theory and empirics show.

Interesting to see is how the female labor force participation rate increases up until 1991 and then slowly starts to fall. The registered labor force participation accounts only for formal sector. One possible explanation of this slow but steady decrease is that more women are finding employment in the informal sector. If this is the case, then it is even more interesting because as female labor force participation has slowly but steadily decreased the HDI has slowly but steadily increased. I am implying that the informal sector has been increasing but still the HDI has been increasing almost at the same pace. Another reason maybe that male’s participation has increased in the formal sector.

Another observation I have made from the figure above is that female secondary school enrolment as percentage of gross has had a higher growth rate than HDI has. I am referring to the gap between HDI and edu which has decreased but where education has grown faster.

To see the active population growth rate more clearly I have incorporated a separate graph showing the data. As you can see the active population growth has a negative trend implying that fertility over time has gone down. It becomes clearer why active population growth has a negative impact on HDI in my model; it might be a case of reversed causality rather than an actual negative effect in the regression.

**Figure 4.1**
Active population growth rate has decreased since the 1980’s as Bloom and Freeman (1986) say; it will take ten to fifteen years for an increase in population growth to be felt in the labor force, so as well in the active population growth rate. The data presented in figure 4.1 is a result of fertility and health 15 years ago. Yet again women have a big impact on these factors and through education these growth rates can be decreased; implying multicollinearity in the model but not perfect multicollinearity.

I will try to apply these results on the development theories that I have discussed above and interpret the results. The common thing between the mentioned development theories is their emphasis on investment and savings. In my model I haven’t included this variable, so I will look at what the respective theory has to say about my variables and I will try to interpret that.

The Lewis Two-Sector growth model can be applied to India to some extent because there is a migration from rural to urban areas and it is the work opportunities that attract migrants which Lewis suggest. But in the urban areas the informal sector has been formed due to the formal sector’s inability to absorb the labor force. I would say that this informal sector can be labelled as Lewis classifies the traditional sector. If you compare what I have written about the informal sector on page 11 with what characterizes the traditional rural sector you will see
the similarities. What I am implying is that a traditional sector has been formed in urban areas.

In the Solow growth model the only thing that can increase output when an economy is already in steady-state is technological progress, $g$. This is how Solow explains sustained growth and persistently rising standards. Technological progress increases the effectiveness of the labor force. Although the Solow growth model’s capital is mostly interpreted as physical capital, human capital has many similarities with physical capital. Both increase our ability to produce goods and services. Many studies have shown that human capital is at least as important as physical capital when we try to understand the differences in living standards worldwide. One way to apply this is to have a broader interpretation of capital, including both physical and human capital (Mankiw, 2007)

Education or human capital is technological progress. In my model; an increase in secondary school enrolment for females as percentage of gross, will increase the HDI, create development. This is what Solow suggests as well.

**Conclusion**

The World Bank’s recommendation for fertility to decline is to educate women about birth-control and to increase women’s access to the labor market. That is in a way what I have tried to portray because I have included both education and labor regarding women and tried to see the effect of these two factors on development. Even though my data analysis can’t completely settle the issue, it does indicate that female education is important for development in India which is consistent with alternative convincing sources.

Interesting to see has been how important education is both, theoretically, empirically and in my model. Many researchers point to India’s reduced fertility even though there hasn’t been an increase of literacy or education to the same extent and they point to women’s interactions with each other, sharing experiences and knowledge between one another. Of course SEWA comes to mind because it creates a forum for self-employed women to help themselves.

The Indian government should make policies in favor of facilities for child care could make a difference for women that want to enter the labor force. Today this is solved by relatives that
take care of the children, mostly women. But child care facilities would make it possible for these female relatives to also enter the labor force.

Another suggestion which also has to do with care, elderly care, which is today, is solved for through female relatives, mostly daughters- in-law. Once again SEWA comes to mind, they provide child care for their members for example. But it is still important for the government to take actions and these suggested facilities would create an employment opportunity for women, since there are mostly women in these professions.

The differences in India between rural and urban, and regional areas are also an issue that has to be dealt with. Perhaps the government should invest more in rural areas and regions that don’t perform as well relative to others; since the invisible hand of the market isn’t meeting these demands.

If the suggested measures are taken I believe that India would allocate its resources more effectively and the difference between HDI and GDP per capita would decrease. The Indian government has to see the possibilities in people in order to make an efficient resource allocation. This opinion isn’t based on the results from this essay but rather on my own opinions regarding the situation as a whole.

Through this essay I believe I have shown the importance of women in the economy. Women’s education and labor participation are very important to how their children will progress and through the children we can help to create a better future but the key to the future goes through the mothers of these children.

In my opinion, when it comes to population trends, we should not apply the developed countries’ experience in the demographic transition on today’s developing world. This is clearly seen in development theories from the 1950’s to 1990’s. As Sen says it isn’t how many commodities we consume but what we can and what we do with the commodities that matter. It seems comprehensive to apply different measures on every individual case, especially with today’s diversity within a country as India but I am optimistic and believe in economics as a subject.
For others that might take an interest in this subject, I would advise to apply for a minor field study in the country of interest. If I would have thought of this subject earlier I would have definitely applied for minor field studies in India. A suggestion for how to develop this essay is to include the informal sector and collect sample data from own observations when in India. Perhaps a focus on a specific city or region would be meaningful to have. Because the informal sector is a big source of employment for many people especially women and it would be interesting to see its effect on HDI. Another suggestion is to have a different theoretical framework, for example an endogenous growth theory where technology and capital accumulation is explained.

The literature has shown and I conclude; female education is important in creating a positive cycle from decreasing fertility to increasing the health and education of children which will later in life pass it on to their children, creating a positive cycle and to raise standard of living and growth.
References

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http://www.onlinewomeninpolitics.org/suffr_asia.htm, Online Women in Politics, 2010-01-10
http://www.sewa.org/, Self Employed Women’s Association, 2010-01-14

Appendix

**Republic of India (Bharat)**

**Capital:** New Delhi

**Constitution:** republic, federal state

**Population**\(^1\): 1 186 200 000

**GDP per capita**\(^2\): 1 032 US dollar

**Language:** 300 different languages, Hindi is as the state language as well as 17 other languages, English is the official language

**Religion:** Hindu, Muslim, Sikh, Christian

**Currency:** rupee

**Share of population women**\(^3\): 48,1%

**Share of population in cities**\(^2\): 29%

**Life expectancy women**\(^4\): 66,5 years

**Life expectancy men**\(^5\): 63 years

**Ability to read and write**\(^4\): 60,5% (2006)

**Women able to read and write**\(^4\): 48%

**Men able to read and write**\(^4\): 73%

**Share of GDP on education**\(^5\): 3,7%

**Share of GDP on defence**\(^5\): 2,5%

**Industries:** textile and provisions, coal and steel production, high-tech industries, IT, agriculture

**Agriculture’s share of GDP**\(^6\): 18%

**Industry’s share of GDP**\(^6\): 28%

**Poll:** 58% in 2004’s parliamentary election

**Next parliamentary election:** 2014

**Women’s right to vote:** 1950

**Share of women in parliament**\(^5\): 8%

**Share of population living on less than 2 dollars a day**\(^6\): 79,9%

\(^1\) 2008

\(^2\) 2009

\(^3\) 2006

\(^4\) 2007

\(^5\) 2005

\(^6\) 1999/2000
**Estimator output**

Descriptive statistics

<table>
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<tr>
<th></th>
<th>HDI</th>
<th>POP</th>
<th>LABCR</th>
<th>EDU</th>
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<td>0.024400</td>
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Jarque-Bera: 1.741645  1.299081  1.331132  2.291503
Probability: 0.416607  0.522312  0.513982  0.317369

Sum: 13.69900  0.594700  9.942000  8.865000
Sum Sq. Dev: 0.075058  5.35E-05  0.003235  0.162853

Observations: 27  27  27  27