The Role of Small and Medium Enterprises in Structural transformation and Economic Development

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Introduction

- Small and Medium Enterprises (SMEs) are defined based on different criteria like - employment, sales or investment.

- SMEs are percieved to play important role in both developed and developing economies :

  - Small enterprises enhance competition and entrepreneurship, and are a powerful force for poverty alleviation (World Bank Report, 1994, 2001).

  - SMEs make special contributions in developing economies to growth, employment, productivity and investment (World Bank Report, 2014; Beck et al., 2005).

  - The size of the SME sector plays an important role in structural transformation of the economy. (Gries and Naude, 2010; Dias and McDermott, 2006).

Introduction (Contd.)

- ▶ Promotion of Small and Medium Enterprises (SMEs) has therefore been considered an important policy instrument for dealing with persistence of poverty and inequality.

- ▶ For example:

  - ▶ Targeted support for SMEs by the Word Bank Group, with a gross expenditure of around \$3 *billion* per year over the period 2006 - 12.

  - ▶ India has several policies in place to protect, support and promote SMEs. With an outlay of Rs. 24124 crore in the 12th five year plan.

  - ▶ \$4.4 Billion was spent by China to support innovation by SMEs between 1999 and 2013. (Ministry of Finance, People's Republic of China, 2013).

Our Contribution

▶ This paper provides a theoretical framework to explain a channel through which SMEs can bring about structural change in production.

▶ We focus on the role of SMEs is as ancillary units.

▶ The Contribution of SMEs in our model is two-fold :

  ▶ As a middle sector in facilitating transition of workers out of low productivity cottage sector to high productivity modern sector.

  ▶ In influencing the optimal education choices of households through work-place effects.

▶ While the model highlights the role of SMEs in structural transformation, it also predicts that they may not always be successful in bringing about the transformation.

▶ The effectiveness of SMEs in bringing about structural transformation is constrained by the size of the skilled labour force.

▶ Thus the model puts into perspective the importance of a complementary education policy.

- ▶ General Equilibrium overlapping generations model with a finite population.

- ▶ A single final good is produced in the economy using two technologies:

    - ▶ A high productivity modern technology.

    - ▶ A low productivity cottage technology.

- ▶ The role of SMEs is as intermediate inputs providers to the modern sector.

Household-side of the Economy

- Each household comprises of a child and a parent.
- Individuals in this economy live for two periods, the first period as a child and the second as parent.
- The child does not make any consumption choices and only acquires education depending on the investment choices of the parents.
- Individuals are identical in terms of their abilities and differ only in terms of their education endowments.
- When the child grows up to be a parent and enters the labour market, she makes her own occupation choices depending on
    - Parent's endowment of education.
    - Market incentives.
- As a parent, an individual makes choices with regard to consumption and education investment for her child.

Choice Problem of the Households

▶ Parents maximize their utility over their households consumption (c_t) and their childs education level ($e_{t+1} \in [0, 1]$), given a budget constrained by their labour incomes.

▶ For simplicity a Cobb-Douglas utility function is used and the utility function is given by-

$$u_t = (c_t)^{1-\beta}(e_{t+1})^{\beta}$$

▶ β is the weightage that parents place on their child's education.

▶ For simplicity it is assumed that e_{t+1} also captures the actual level of investment in education.

▶ The optimal choice of education investment given the budget constraint, $c_t + e_{t+1} = y_t$, is

$$e_{t+1} = \beta y_t$$

▶ Lower investments in education come at the cost of lower earning potential for the child in the future.

Production Side

- A single final good is produced in the modern sector and the cottage sector.

- **The Cottage Sector**
  - The cottage sector uses unskilled labour.
  - The Production function is given by:

$$Y_{ct} = w_c L_t$$

  Here,
  w_c is the marginal productivity and also the wage.
  L_t is is the number of workers employed in this sector.

  - The sector provides no incentives for higher levels of education.

- **The Modern Sector**
  - This sector is at the frontier of technology and has high productivity.
  - Production process employs workers with the highest level of education $e = 1$ and productivity enhancing intermediate inputs.
  - The production function is CRS given by-

$$Y_{st} = AH_t + H_t^{1-\alpha}(\sum_{i=1}^{M_t} x_{it}^{\alpha})$$

    Here,
    H_t is the fraction of high skill employees.
    x_{it} is quantity of intermediate good of variety i.
    M_t is varieties of intermediate goods.
  - Each input is paid the marginal product.

▶ **Production of Intermediate Inputs**

   ▶ Entrepreneurs work very closely with the modern sector in providing productivity enhancing intermediate inputs.

   ▶ At any point of time there are M_t varieties of intermediate inputs monopolized by the entrepreneurs who create them.

   ▶ The production of the intermediate inputs uses the final good as an input. The price of the final good is normalized to 1.

   ▶ The objective of the entrepreneur is given by-

$$w_{it} = \max_{x_{it}}[\ p_{it}x_{it} - x_{it}\ ]$$

   ▶ The maximization problem of the entrepreneur yields the following optimal level of production-

$$x_{it}^* = \alpha^{\frac{2}{1-\alpha}} H_t$$

- The quantity produced of each intermediate good is the same at the optimum i.e. $x_{1t} = x_{3t} = \ldots = x_{it}$.

- The price at the optimum level of production is given by-

$$p_t = \frac{1}{\alpha}$$

- The income of entrepreneurs is-

$$w_{lt} = \Pi H_t \ \ , \ where \ \Pi \ = \ (1 - \alpha) \alpha^{\frac{1+\alpha}{1-\alpha}}$$

- Wages of high skill workers is-

$$w_{st} = A + \frac{\Pi}{\alpha} M_t$$

Occupation Choice

- The two factors that determine occupation choice in this model are-
    - Education endowment by the parents.
    - Wages in each sector.
- If $e_t = 1$ then the worker can join the modern sector if the incentives are right.
- If $e_t \in [0, 1)$ then they have to choose between entrepreneurship and cottage sector.
- The cottage sector offers sure employability but low wages.
- Being an entrepreneur requires workers to spend τ fraction of total labor time in trying to come up with an intermediate input.
- Existence of wage uncertainty, as not every workers who attempts to be an entrepreneur is successful and unsuccessful workers have to return to the cottage sector.

Occupation Choice(Contd.)

- The probability of success is $p(\bar{e}_t)$. Further we make a simplifying assumption that the probability of success $p(\bar{e}_t) = \bar{e}_t$.

- The expected wages in the intermediate goods sector

$$E[wage] = p(\bar{e}_t)w_{lt} + [1 - p(\bar{e}_t)](1 - \tau)w_c$$

- Workers with education less than 1 find it profitable be entrepreneurs iff -

$$E[Intermediate\ Goods\ Sector\ Wage] \geq w_c$$

- Workers with education level equal to 1 will choose to join the modern sector iff-

$$w_{st} \geq E[Intermediate\ Goods\ Sector\ Wage]$$

1. $A > w_c$, The modern sector is always more productive than the cottage sector.

2. $\beta A \geq 1$ *and* $\beta w_c \leq 1$, Parents in the modern sector always invest adequately in children's education.

3. $A < \Pi$, if each individual works in the modern sector the potential entrepreneurial income is higher.

Dynamics of Education, Employment and Incomes

▶ The dynamics of transformation is described by the evolution of employment in the modern sector (H_t) and the average level of education in the economy $(\overline{e}_t)$.

▶ Education level of the child is given by-

$$e_{t+1} = \begin{cases} \beta \ w_{st}, & \text{If } e_t = 1 \text{ and in the modern sector.} \\ \beta \ w_{lt}, & \text{If in the intermediate inputs sector.} \\ \beta \ w_{ct}, & \text{If the parents work in the cottage sector.} \end{cases}$$

▶ The total number of workers in the economy is normalized to one.

▶ Each workers is employed in one of the three sectors hence the following must be true-

$$H_t + M_t + L_t = 1$$

Dynamics(Contd.)

- At any point of time t the economy has a distribution of education such that h_t fraction of workers have education level 1 and the remaining $1 - h_t$ fraction of agents have some education level lying between zero and one.

- The average level of education at any point of time t is given by,

$$\overline{e}_t = h_t \cdot 1 + \int\limits_{0}^{1-h_t} e_{it} di.$$

- The average education $\overline{e}_{t+1}$ at any point of time $t+1$ is-

$$\overline{e}_{t+1} = \beta w_{st} \cdot H_t + \beta w_{lt} \cdot M_t + \beta w_{ct} \cdot L_t$$

Dynamics(Contd.)

Condition A: The workers with education level less than 1 will become entrepreneurs iff-

$$E[\text{Intermediate Goods Sector Wage}] \geq w_c$$
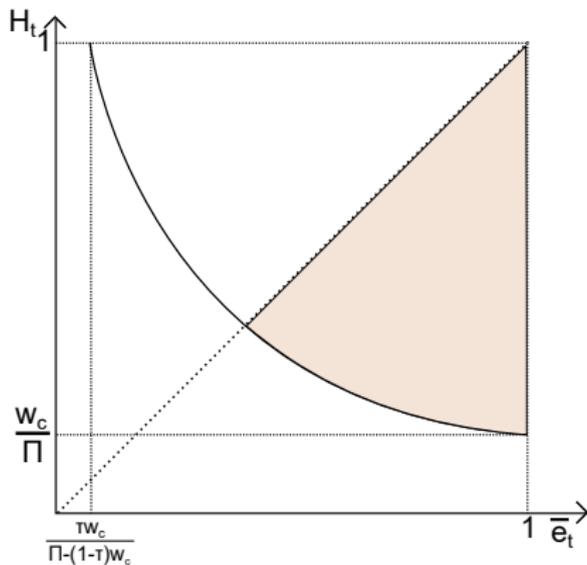
Dynamics(Contd.)

Condition B: Workers with education level $1(h_t)$ will join the modern sector iff

$$w_{st} \geq E[\text{Intermediate Goods Sector Wage}]$$
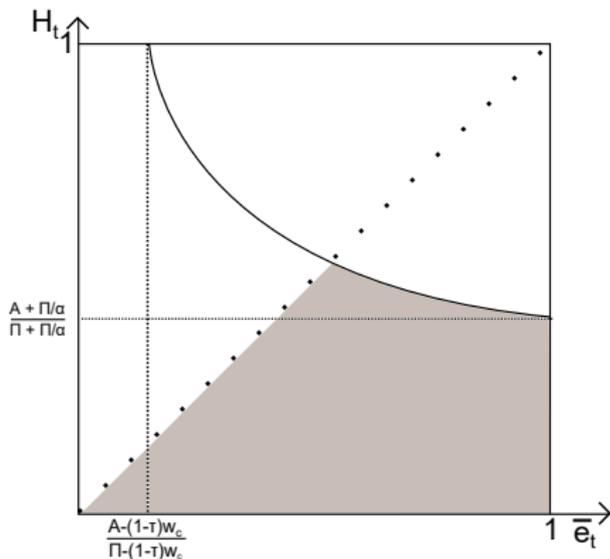
Condition A and B combined:
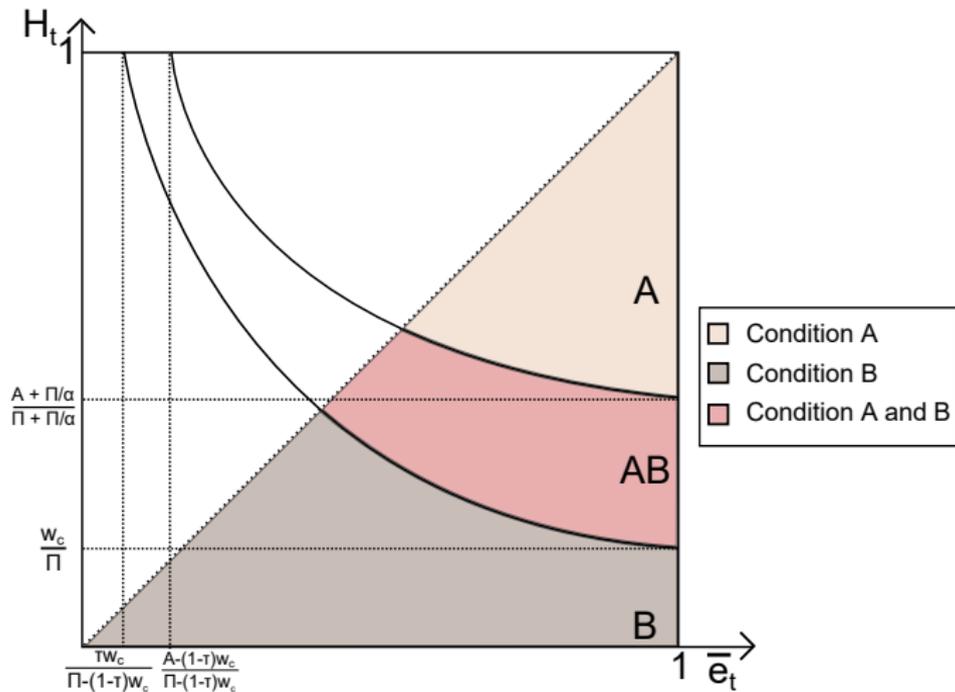
Inferences from the Model

- ▶ **Proposition 1:** *Presence of an intermediate inputs sector does not bring about complete structural transformation in economies where the initial size of the educated agents and the concomitant scale of the modern sector is below a minimum level.*

- ▶ **Proposition 2:** *The economies where the initial size of the educated agents and the concomitant scale of the modern sector exceeds the minimum scale will undergo complete structural transformation with an increase in the income generated in the economy and complete equality in education, occupation choices and incomes.*

▶ **Proposition 3:** *Economies are more likely to undergo the structural transformation in the presence of the intermediate inputs sector if parents place a lot of importance on their children's education or if associating with the large scale enterprises helps increase the importance that parents place on the education of their children vis a vis current consumption.*

▶ **Proposition 4:** *An economy where the intermediate inputs sector is more profitable, keeping all other things the same, is more likely to undergo structural transformation.*