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High Growth and Stagnant Employment in India: A Macro-Theoretic Analysis

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Employment in the organized sector in India has been stagnant since 1991 even though GDP in general and organized sector in particular have grown at high rates. Obviously, there has been taking place labour saving technological and managerial changes along with growth in the organized sector. We are concerned here about how this kind of technological and managerial changes is likely to affect India. The objective of this kind of technological and managerial changes is to eliminate the bargaining strength of the workers and bring about a decline in the shares of workers of the organized sector in the output of the organized sector. This paper develops a simple macro model suitable for a country like India to show how these changes generate strong recessionary forces slowing down the growth rates of both the organized and the unorganized sector. It also seeks to suggest policies for generating employment in both the sectors.

Keywords: Organized Sector, Employment, Growth

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1. Introduction

The organized sector has grown at a high rate in India in the post-reform period, but employment in the organized sector has been completely stagnant (see Table 4). We

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find from Table 1 that GDP had grown at a high rate of around 6 percent per annum during 1994-5 – 2014-15. However, Table 6 reveals that the share of the organized sector in GDP increased from 36.8 percent in 1993-94 to 43.3 percent in 2003-04 and further to 45.1 percent in 2010-11. There are no reasons to believe that the trend has been reversed since 2010-11. Thus, the organized sector has grown at a higher rate than GDP. We also find from Table 3 that only 6 percent of the work force was employed in the organized sector in 2004-05. Table 5 shows that the work force and the labour force had grown at an average annual rate of around 2 percent. Thus, the share of work force employed in the organized sector has dwindled continuously, whereas the share of the organized sector in GDP has steadily increased. Given the steady high growth rate of output of the organized sector and the complete stagnation in its level of employment, the unit labour requirement has gone down steadily and rapidly. Obviously, this has been brought about by labour saving technological and managerial changes taking place in the organized sector. As should be the purpose of labour saving technological and managerial changes, the shares of workers of the organized sector in its output must have gone down along with the unit labour requirement of production even though money wage rate may have increased. A prima facie evidence of this phenomenon is given by the data of Table 7, which show that the share of wage income in the net value added in the organized manufacturing sector has steadily declined during the period under consideration.

This phenomenon of a secular decline in the share of workers' income in the GVA of organized manufacturing sector in India is quite well documented in the literature (see, for example, Abraham and Sasikumar [2017] and Kapoor [2016]). The objective of this paper is to examine the implications of the decline in the shares of skilled and unskilled workers in the organized sector's output on the output levels or the growth rates of the organized and the unorganized sector using a macro model suitable for India. The existing literature on Indian economy, however, does not address this issue. Hence, the present paper fills up an important gap in the literature. It also seeks to suggest policies that may generate employment in both the sectors. ILO (2009) has made an attempt at suggesting a strategy for generating employment in India. It has recommended massive investments in sectors, which are naturally employment intensive. However, it has not derived its strategy from a macro-theoretic model and, hence, left the issues such as those possible conflicts between the goal of employment generation and that of providing the masses with

the basic necessities of life in adequate quantities at affordable prices unexplored. We have addressed these issues here.

2. The Model

Let the economy be broadly divided into two main sectors: the unorganized or the traditional sector and the organized or the modern sector. In India, the organized sector is defined as the one that consists of all *non-agricultural enterprises* employing more than ten employees or more without power and five employees or

List of notations

A	Output of unorganized sector
A^D	the total demand for A
A^S	the supply function of the unorganized sector
β	the fraction of total labour supplied by hired (landless or material means less) workers
C_C	average and marginal propensities to consume the output of the organized sector of capitalists
C_{wA}	average and marginal propensities to consume the output of the unorganized sector of workers
C_{Wy}	average and marginal propensities to consume the output of the organized sector of workers
e	the exchange rate
$\bar{F}$	the exogenously given net inflow of foreign capital
G	Government purchase of Y
$I^A(\bullet)$	unorganized sector's investment demand for Y
$I(\bullet)$	Investment demand for Y
$\bar{K}$	The infrastructure capital in the unorganized sector
l_A	the unit labour requirement for producing A
l_g	the total amount of employment generated in the unorganized sector through various government employment guarantee schemes

l_y	the unit labour requirement (measured in terms of labour hours) to produce a unit of Y
L_0	the amount of labour time given by each worker in the given period
m	the fixed intermediate input requirement per unit of unorganized sector output
$NX(\bullet)$	Net export of organized sector
P	the price of the organized sector output
P_A	price of the output of the unorganized sector
P^*	P^* denotes the price of foreign goods
t	the income tax rate of producer's
t_w	the income tax rate of worker's
w	w is the money wage rate of the organized sector workers
w_A	the money wage rate in the A-sector
Y	Output of domestic organized sector
Y^*	Output of foreign organized sector

more with power. Thus, we define the organized sector as the one that consists of all large non-agricultural enterprises. The major feature of the organized sector is that it is an oligopoly. Producers in this sector set the prices and adjust their output to demand that comes forth at the prices set. The output in this sector is, thus, demand constrained. The unorganized sector, therefore, consist of all other non-agricultural enterprises (which are small) and agriculture. The latter is by far the dominant segment in the unorganized sector. The distinguishing feature of this sector is that the producers in this sector are credit constrained. They produce as much output as they can using the amounts of inputs they can purchase with the financial resources they have at their disposal and the markets clear through the adjustment in prices. We shall specify the features of the organized and the unorganized sector in detail below.

The Organized Sector:

The output of this sector is denoted by Y. It is produced with capital and labour. The stock of capital is given, as the model is a short-run one. Production of the

organized or the modern sector is highly import intensive and the production function is fixed coefficient.

In line with the tradition set by the structuralist writers such as Kalecki (1954), Rakshit (1983), Taylor (1982), Bose (1989), we assume that the output of the modern or the organized sector is demand determined. Producers set the prices of their products and adjust their outputs to demand that comes forth at the prices set. The price of the output of the organized sector is denoted by P and it is fixed and assumed to be equal to unity for simplicity. The major components of aggregate demand for Y are consumption, investment, net export, and the demand arising from the unorganized or the traditional sector for Y, as it uses the goods produced in the organized sector as intermediate inputs in its production. It uses the output of the organized sector also for purposes of investment.

The consumption demand for the output of the organized/modern sector comes from both the workers and the capitalists of the organized sector, although quite a large part of the wage income is spent on the mass consumption goods produced by the unorganized sector. The average and marginal propensities to consume the output of the domestic organized sector and its foreign substitutes of workers and capitalists are assumed to be different and they are denoted by C_{wy} and C_c respectively.

Investment demand of the organized sector for Y , as standard, is assumed to be a decreasing function of the interest rate. In case of India, an important determinant of the cost of investment is the exchange rate (e) as a large part of investment demand of the organized sector represents demand for imported capital goods. So, an increase in e raises the cost of investment and, hence, given expectations, reduces investment demand for Y. Organized sector's production is highly import intensive. An increase in e, therefore, generates a strong cost-push. The corporate sector in India is heavily indebted to foreigners. An increase in e raises debt service charges on external loans in domestic currency substantially. All these adverse supply shocks demoralize the investors and dampen investment demand. Data on exchange rates, growth rates and capital formation given in Tables 2 and 1 show that in all the years of recession (2011-12 – 2013-14) exchange rate increased substantially indicating a strong inverse relationship between the exchange rate, rate of capital formation and growth rate in India. For all these reasons, we think that

investment is highly sensitive to exchange rate in India. Hence, we have incorporated *e* as a determinant of investment and made it a decreasing function of *e*.

Besides the organized sector's investment demand for the organized sector's output, the unorganized sector also requires the organized sector's output for investment purposes. We have made the unorganized sector's investment demand a decreasing function of interest rate and an increasing function of the aggregate infrastructure capital of the unorganized sector, denoted $\overline{K}$, for reasons we shall explain shortly.

Investment demand is, thus, inversely related to both *r* and *e* and is an increasing function of $\overline{K}$. In India, RBI seeks to keep *r* at a target level through its Liquidity Adjustment Facility and open market operations. We, therefore, regard it as a policy variable of the RBI and denote its exogenously given value by $\bar{r}$.

As standard, the net export of *Y* (denoted *NX*) depends positively on the real exchange rate $p = eP^*/P$, (where P^* denotes the price of foreign goods), and foreign GDP (Y^*). It is also likely to depend negatively upon *C*, I and *G*, as they represent demand for both domestic and foreign goods. Thus, *G*, *C* and *I* enter as arguments in the net export function. Organized sector's workers' consumption demand for organized sector's output and its foreign substitutes is likely to be much less import intensive than capitalists' consumption demand. Hence, for simplicity and without any loss of generality, we only keep capitalists' consumption demand as an argument in the net export function. Similarly, unorganized sector's investment demand for *Y*, which we denote by I^A, is unlikely to be much import intensive. Following an increase in $\overline{K}$, which consists in rural electrification, setting up of flood control and irrigation facilities, investments in land reclamation and R&D that generates better seeds, production techniques, implements etc., producers in the unorganized sector will be induced to make complementary investments in facilities and implements such as new electric connection, pump sets, tube wells, better implements etc., as the increase in infrastructure capital relaxes crucial constraints operating on production. Import intensity of these investments is negligible and may, therefore, be ignored. For this reason, we have not incorporated I^A in the net export function. The organized sector also supplies the unorganized sector with intermediate inputs such as fertilizer, pesticide etc. Even though India has to meet a part of its fertilizer requirement with import, import intensity of the intermediate

input demand of the unorganized sector is much less than those of *I*, *G* and capitalists' consumption. Hence, we have not explicitly considered intermediate input demand of the unorganized sector as a determinant of net export. This we have done for simplicity and without any loss of generality. Accordingly, *Y* is given by

$$Y = C_{W\dot{y}}.\left[w\frac{l_y}{L_0}Y(1-t_w) \right] + C_C.\left[\left(Y - w\frac{l_y}{L_0}Y \right)(1-t) \right] + I\left(\underset{-}{\bar{r}},\underset{-}{e}\right) + I^A\left(\underset{-}{\bar{r}},\underset{+}{\overline{K}}\right) + G + NX\left(\frac{P^*e}{P},\underset{+}{C_c}(1-t).\left(1-w\frac{l_y}{L_0}\right)Y,\underset{-}{I}\left(\bar{r},e\right),\underset{-}{G},\underset{+}{Y^*}\right) + mA \quad (1)$$

In (1), *w* is the money wage rate of the organized sector workers which, as is standard in the Keynesian tradition or Keynes-Kalecki tradition, is assumed to be fixed in the short run. l_y is the unit labour requirement (measured in terms of labour hours) to produce a unit of *Y* and L_0 is the amount of labour time given by each worker in the given period. Hence, the number of workers needed to produce *Y* is given by $\frac{l_y Y}{L_0}$. Total wage payment to labour is $w.\frac{l_y Y}{L_0}$, which is also the real wage income of the organized sector workers, since the price of the organized sector output denoted by *P* is assumed to be equal to unity. In the structuralist tradition developed on the lines set by Keynes and Kalecki, the organized sector is assumed to be an oligopoly in consonance with reality. In such a scenario, prices display marked rigidity on account of oligopolistic interdependence among producers captured in a certain way in the kinked demand curve oligopoly model. In the Keynes-Kalecki (structuralist) tradition, producers set the prices on the basis of cost. We have, however, made prices rigid and independent of cost for analytical simplicity. Had we made *P* an increasing function of the cost of production, our results would have been stronger.

Workers pay taxes at the rate t_w on their income. $c_{W\dot{y}}.\left[w\frac{l_y}{L_0}(1-t_w) \right]$ is the total consumption demand of the workers for the output of the organized sector and its foreign substitutes. (Since most of the workers are poor, we assume for simplicity and without any loss of generality that it represents demand for the output of only

the domestic organized sector). After wage payments, the residue accrues to the producers as profit, as we have disregarded other factor payments for simplicity, i.e., we have assumed outstanding debt of the capitalists to the workers to be zero for simplicity. This does not matter, as the outstanding debt of the capitalists to the workers is fixed in the short period under consideration. So, the income of the producers is $\left[Y - w\frac{l_y Y}{L_0}\right]$ and if they pay tax at the rate *t* on their income, their disposable income is $\left[Y - w\frac{l_y Y}{L_0}\right](1-t)$. Therefore, their total consumption demand for Y is $C_c.\left[Y - w\frac{l_y Y}{L_0}\right](1-t)$. We assume that quite a large part of it represents demand for foreign goods. Hence, we have made net export a decreasing function of capitalists' consumption demand. Signs of other partial derivatives of the *NX* function are quite self-evident.

Aggregate investment demand is decomposed into two components: $I(\bar{r}, e)$ and $I^A(\bar{r}, \overline{K})$, which give investment demands of the organized and the unorganized sectors respectively.

m denotes the fixed intermediate input requirement per unit of unorganized sector output. Therefore, total intermediate input requirement of Y of the unorganized sector is given by *mA*, where *A* is the total output of the unorganized sector.

The Unorganized Sector

The output of the unorganized sector is denoted by *A*. In what follows we shall seek to identify the factors that determine supply of and demand for *A*.

Supply of *A*

The unorganized sector is comprised of small rural and urban enterprises but the most dominant segment of this sector is agriculture. This sector absorbs most of the unskilled workers of the country. Its production function is fixed coefficient and the output of this sector is denoted by A which is produced with land, labour, capital and intermediate inputs bought from the organized sector. The stocks of land and capital used in the unorganized sector are given. In contrast with the tradition set by

structuralist writers such as Rakshit (1982), Taylor (1983), we have assumed the production function to be fixed coefficient even in agriculture for analytical simplicity. This assumption will not affect our results qualitatively. This assumption helps us capture in a simple way the fact that how much of the fixed amount of land and capital the producers in the unorganized sector can utilize depends crucially on the resources they have in their command to purchase intermediate inputs from the organized sector and labour.

Land usage can be increased with investments in agriculture which include investments in irrigation, electrification, flood control facilities, improvement in rural connectivity, land reclamation, agricultural research etc. This kind of investment is land augmenting as it enhances the usage of the same plot of land in a year and enables usage of more land for purposes of production. The infrastructure capital in the unorganized sector is denoted by K. The amount of land available to the unorganized sector is an increasing function of K. As K is given in the short run, we denote it by $\overline{K}$. As an increase in $\overline{K}$ makes possible greater number of cropping on the same plot of land or cultivation of new land leading to larger levels of production and income, it induces (and also makes it possible by relaxing the credit and thereby the resource constraint for) the unorganized sector's producers to undertake larger amount of complementary investment.

As most of the producers of the unorganized sector are financially weak and, therefore, subject to severe credit constraint, their purchasing power depends crucially on the relative price of their output in terms of the goods produced in the organized sector given by P_A/P, where P_A denotes price of the output of the unorganized sector. A ceteris paribus increase in P_A/P enables the producers of the unorganized sector to purchase more intermediate inputs from the organized sector and labour and, thereby, allow them to bring more land under production in agriculture and, in general, to produce more. (This is possible in case of agriculture because of multiple cropping within a given period). Therefore, the supply of output of the unorganized sector is an increasing function of (P_A/P).

Most of the production in the unorganized sector is carried out with the help of family labour and the unorganized sector workers also supplement their income by working outside their family firms in relatively larger firms that use both family

labour and hired labour. There also exists large scale surplus labour in the unorganized sector. Hence, given everything else, if the government provides employment at the wage prevailing in the unorganized sector through employment guarantee schemes, it will augment unorganized sector's producers' income enabling them to buy more intermediate inputs from the organized sector and, thereby, bring more land under cultivation in agriculture and, in general, produce more. Let l_g be the total amount of employment generated in the unorganized sector through various government employment guarantee schemes. Hence, the supply function of the unorganized sector may be written as

$$A^S = A\left(\underset{+}{\frac{P_A}{P}}, \underset{+}{\overline{K}}, \underset{+}{l_g}\right) \tag{2}$$

A part of this supply of *A* is used for self consumption by the producers of *A*. Family enterprises keep the part of the produce that they consider absolutely necessary for survival for self consumption. However, for simplicity and without any loss of generality, we do not explicitly consider that part and assume the whole of the supply of *A* to be the marketable surplus of the unorganized sector.

Demand for *A*

The unorganized sector supplies principally the mass consumption goods, which belong to the category of necessities. So demand for *A* of a small number of rich organized sector producers and large landlords is likely to be fixed and, therefore, is ignored here for simplicity. The demand for *A* mainly comes from the organized sector workers and unorganized sector workers who do not have any family enterprises. For simplicity we assume that the latter spend all their income on *A*, while the former spend a fraction C_{wA} of their income on *A*.

Most of the output of *A* is produced in small firms using family labour and only a small fraction of output originates in the large firms. Let β be the fraction of total labour supplied by hired (landless or material means less) workers. Let l_A be the unit labour requirement for producing *A*. Therefore, the total labour required to

produce A is $(l_A A)$. Now, since l_g denotes employment in the employment guarantee program in a given period, total employment in the unorganized sector is $(l_A A + l_g)$ and the total wage income is $w_A.(l_A A + l_g)$, where w_A denotes the money wage rate in the *A*-sector. So, hired unorganized sector's workers' demand for A is $\frac{\beta w_A (l_A A + l_g)}{P_A}$. We assume w_A to be fixed. This assumption is standard in the Keynesian tradition. This also conforms to reality in the short run. On the other hand, total wage income of organized sector workers is $w\frac{l_y Y}{L_0}$ and their consumption demand for A is $C_{wA}.w(1-t_w)\frac{l_y Y}{L_0}$. So, the total demand for A is

$$A^D = \frac{C_{wA}.w(1-t_w)\frac{l_y}{L_0}Y}{P_A} + \frac{\beta w_A (l_A A) + \beta w_A l_g}{P_A} \qquad (3)$$

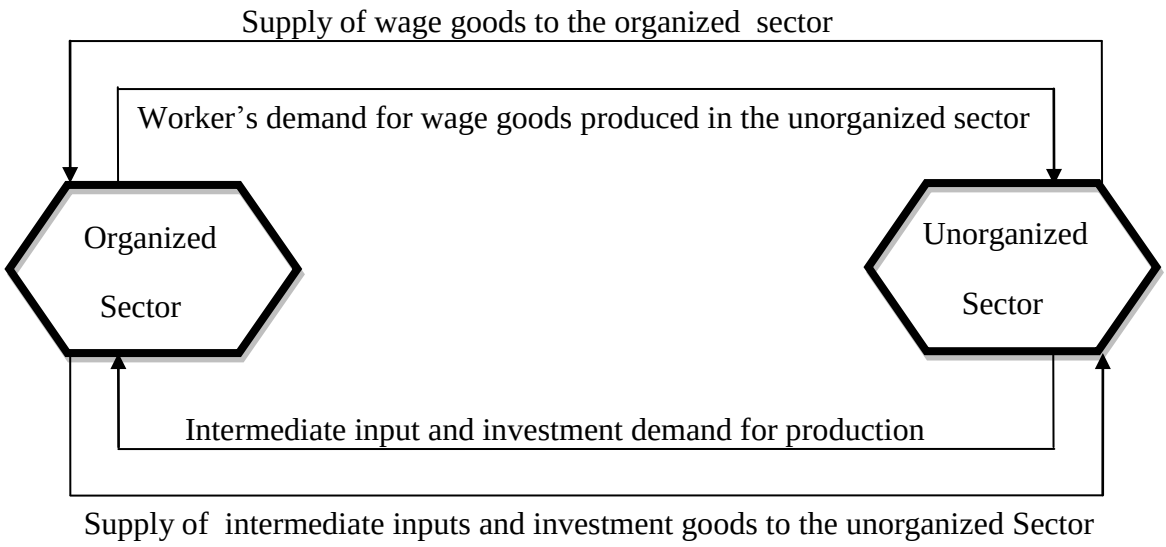
The producers of the unorganized sector produce as much as they can with the resources they have at their disposal for purchasing intermediate inputs and labour and sell off their output at whatever prices they can do it. Producers do not have any control over either the aggregate output or the price. The price of A is, therefore, market clearing. The unorganized sector, accordingly, is in equilibrium when supply of A and demand for A become equal, i.e., when the following equation is satisfied:

$$\left(1 - \frac{\beta w_A l_A}{P_A}\right) A\left(\underset{+}{\frac{P_A}{P}}, \underset{+}{\bar{K}}, \underset{+}{l_g}\right) = \frac{C_{wA}.w(1-t_w)\frac{l_y}{L_0}Y}{P_A} + \frac{\beta w_A l_g}{P_A} \qquad (4)$$

The LHS of (4) gives the net supply of A, which is defined as the supply of A net of the internal demand for A that production of A directly generates. Note that, for (4) to be satisfied for positive values of Y and l_g, $\frac{\beta w_A l_A}{P_A}$ has to be less than unity. We, therefore, assume this to be the case. If this were not the case, no producers would have produced A.

Following the structuralist tradition, we assume here that P_A clears the *A*-market. We have also ignored foreign trade in the output of the unorganized sector for simplicity. The inter-relationship between the organized and the unorganized sector is presented in the form of a flow chart (see Chart 1).

Chart 1



The Foreign Exchange Market:

The BOP consists of trade surplus and net inflow of foreign capital. The latter is assumed to be exogenously given for simplicity. The equilibrium in the foreign currency market is given by the following equation:

$$NX\left(\underset{+}{\frac{P^{*}e}{P}},\underset{-}{C_c}\left(1-t\right)\left(1-w\frac{l_y}{L_0}\right)Y,\underset{-}{I}\left(\underset{-}{\bar{r}},e\right),\underset{-}{G},\underset{+}{Y^{*}}\right)+\bar{F}=0 \qquad (5)$$

where, *NX*, as we have already mentioned, stands for net export and $\bar{F}$ denotes the exogenously given net inflow of foreign capital.

The specification of our model is now complete. It consists of four equations (1), (2), (4) and (5) in four endogenous variables *Y*, *A*, P_A and *e*. We solve them as follows. Solving (5) for *e*, given the policy parameters and the exogenous variables, we get

$$e = e\left(C_C(1-t).\left(1 - w\frac{l_y}{L_0}\right)Y, \bar{r}, G, Y^*, \bar{F} \right) \qquad (6)$$
$$\underset{+}{} \quad \underset{-}{} \quad \underset{+}{} \quad \underset{-}{} \quad \underset{-}{}$$

Signs of partial derivatives of (6) are quite self-evident from (5).

Substituting (2), (5) and (6) into (1), we get

$$Y = C_{W\dot{y}}.\left[\left\{w\frac{l_y}{L_0}Y\right\}(1-t_w)\right] + C_C.\left[\left(Y - w\frac{l_y}{L_0}Y\right)(1-t)\right] +$$
$$I\left(\bar{r}, e\left(C_c(1-t).\left(1 - w\frac{l_y}{L_0}\right)Y, \bar{r}, G, Y^*, \bar{F}\right)\right) + I^A(\bar{r}, \bar{K}) + \qquad (7)$$
$$\underset{+}{} \quad \underset{-}{} \quad \underset{+}{} \quad \underset{-}{} \quad \underset{-}{}$$
$$G - \bar{F} + mA\left(\frac{P_A}{P}, l_g, \bar{K}\right)$$

We can solve (4) and (7) for the equilibrium values of *Y* and P_A. The solution is shown in Figure 1, where AA and YY represent (4) and (7) respectively. The solution corresponds to the point of intersection of these two schedules. In section A.1 in the appendix, we have derived the slopes of the YY and AA schedules and derived the stability condition. We have sown there that both YY and AA are upward sloping and the equilibrium is stable if YY is steeper than the AA schedule.

3. Effect of Labour Saving Technological Progress

As we have already pointed out, employment in the organized sector has been stagnant since 1994 even though GDP in general and the output of the organized sector in particular have grown at high rates (see Tables 1 and 6). Obviously there has been taking place labour saving technological and managerial changes along with the growth in *Y*. Clearly, given the sustained growth in the output of the organized sector at a high rate and the complete stagnation in employment in the

organized sector, the labour saving technological and managerial changes referred to above brought about a secular decline in the unit requirement of both skilled and unskilled labour. Thus, l_y has declined steadily and L_0 must have increased.

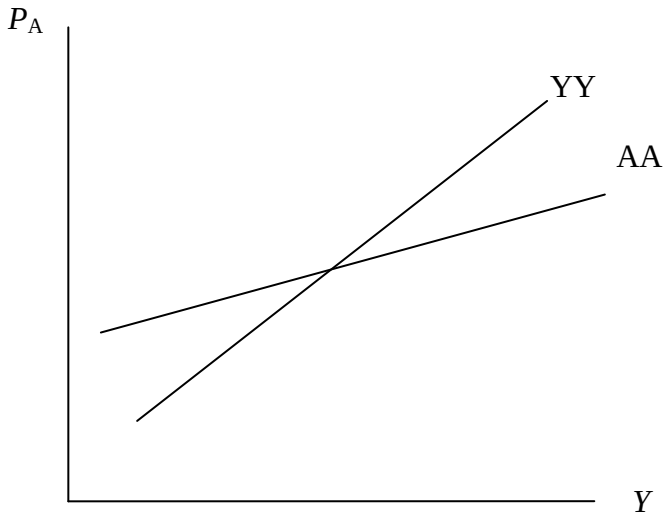


Figure 1: Derivation of the Equilibrium Values of Y and P_A

Obviously, as should be the major purpose of these labour saving changes, there must have taken place a sustained decline in the share of workers in the output of the organized sector, i.e., $w\frac{l_y}{L_0}$ must have declined steadily all through the period under consideration, even though nominal wage rate may have increased. As we have already mentioned, we get prima facie evidence in support of this conjecture from the data of Table 7 . We shall examine the implications of this decline in the organized sector's workers' share on both *Y* and *A*. In section A.2 in the appendix, we have derived mathematically that a fall in $w\frac{l_y}{L_0}$ reduces both *Y* and *A*. We shall explain the intuition of the result below.

Following a fall in the share of workers in the output of the organized sector, their consumption demand for the domestic organized sector's output goes down, while

capitalists' consumption demand increases. However, the major part of the latter, if not the whole of it, is likely to represent demand for imported goods. Hence, at the initial equilibrium (Y, P_A, e), consumption demand for the domestic organized sector's output is likely to go down. On the other hand, the increase in consumption demand for imported goods creates a BOP deficit inducing a rise in *e*. The increase in *e* is unlikely to produce much of an impact on the real exchange rate, as the rise in *e* is likely to substantially raise *P*, since India's production is highly import intensive. (To avoid analytical complications, we have not made *P* an increasing function of *e*). In India, the rise in exchange rate improves net export principally through its dampening impact on investment, which lowers demand for not only domestic investment goods but also imported capital goods. Thus, at the initial equilibrium (Y, P_A), there is likely to emerge a large excess supply of *Y* in countries like India. The decline in the workers' income in the organized sector also reduces demand for unorganized sector's output creating an excess supply of *A* at the initial equilibrium (Y, P_A). Thus, P_A will fall reducing *A* and, thereby, contributing to the excess supply of *Y*. *Y*, will, therefore, also begin to decline. P_A, *A* and *Y* will, accordingly, go on falling until the new equilibrium is reached. The above discussion yields the following proposition.

Proposition 1: *Following a fall in the share of organized sector workers in the output of the organized sector due to technological and managerial changes, if import intensity of consumption of the capitalists and the exchange rate sensitivity of investment are sufficiently large, conditions that are highly likely to be satisfied in reality in India, both Y and A will contract. Thus, growth rates of both Y and A will contract under the conditions specified above.*

Let us explain in brief why a fall in the values of *Y* and *A* indicate decline in the growth rates of *Y* and *A*. The purpose of the kind of static macro models presented here is to explain the actual short period growth rates and inflation rates. The model represents an economy in a given period. Output and price levels of the previous period are given and known in the period under consideration. Hence, determination of the output and price level in the given period amounts to determination of the growth rate of output and the inflation rate from the previous period to the given period. Thus, our model states that, given everything else, following a decline in the organized sector's workers' share in the organized sector's output, growth rates of *Y* and *A* would be less than what they otherwise would have been. One can see in this

context Romer (2000, 2012). More precisely, this model identifies the rate of growth in the share of the organized sector's workers in the output of the organized sector as an important determinant of the growth rates of Y and A and the rate of inflation in P_A. The growth rates of Y and A and the rate of inflation in P_A have been found to be decreasing functions of the rate of growth in the shares of the organized sector workers in organized sector's output.

4. The Effect of an Increase in $\overline{K}$

The organized sector employed only 6 percent of the workforce in 2004-05 in India and it grew since then without generating any employment. The labour force, however, grew at the rate of almost 3 percent during 1999-2000 – 2004-2005 (see Tables 3, 4 and 5). There is no reason to suppose that these trends have changed much since then. Therefore, one can safely presume that almost all the workforce is employed in the unorganized sector. Since there is likely to be large scale surplus labour in the unorganized sector given the dominance of family enterprises and self-employed people, growth in the unorganized sector may be the most important way of generating gainful employment. We, therefore, examine here how an increase the stock of infrastructure capital in the unorganized sector is likely to affect the economy. We shall carry out this comparative static exercise using Figure 2, where initial equilibrium (Y, P_A) corresponds to the point of intersection of YY and AA schedules representing (7) and (4) respectively. Following an increase in $\overline{K}$, as follows from (4), there emerges excess supply of A at any given (Y, P_A) on the initial AA schedule (since $\frac{\beta w_A l_A}{P_A}$ is less than unity) . To restore equilibrium in the A sector at any given Y, P_A has to be lowered. Note that P_A need not be lowered to the level that restores output of the unorganized sector to its initial level, since a ceteris paribus fall in P_A also raises demand for A (see (4)). Thus, AA shifts downward. The new AA schedule is labeled AA_1 in Figure 2. Let us now focus on YY. Corresponding to any given (Y, P_A) on the initial YY, there now emerges an excess demand for Y . This happens for two reasons. First, the increase in the supply of A raises the intermediate input demand for Y from the A-sector. Second, there takes place an increase in investment demand of the A sector (see (7)). The increase in investment demand is given by $I\frac{A}{\overline{K}}d\overline{K}$.

Thus, at any given (Y, P_A) on the initial YY, there emerges an excess demand of $\left(mA_{\overline{K}} + I\frac{A}{\overline{K}}\right)d\overline{K}$. Hence, to restore equilibrium in the Y-sector, at any given Y, P_A has to be lowered. If P_A is lowered to the level that restores supply of A to its initial level, excess demand for Y is not removed on account of the larger investment demand of the A sector (see (7)). Thus, to restore equilibrium in the Y-sector, P_A

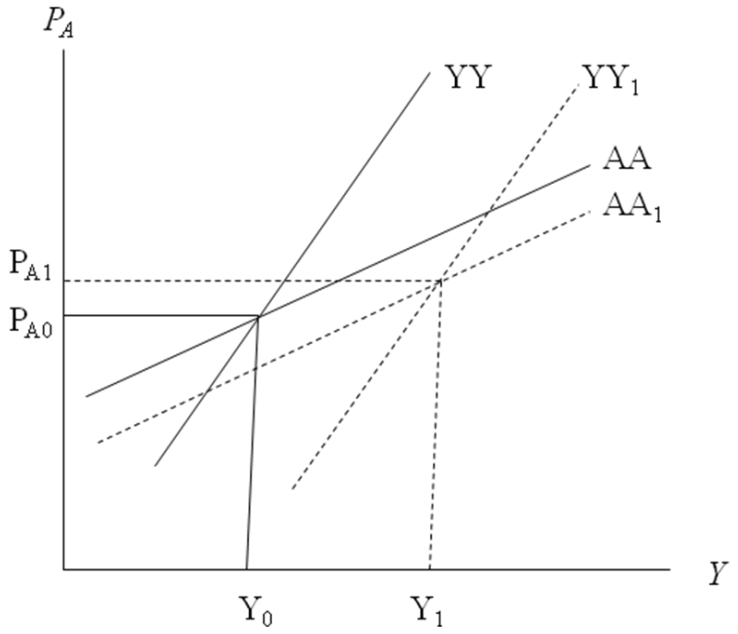


Figure 2: Effect of an Increase in $\overline{K}$

has to be lowered even below that level. Therefore, downward shift in the YY schedule will be larger than that of the AA schedule. The new YY schedule is labeled YY_1. Y will, therefore, be larger in the new equilibrium. Direction of change in P_A is, however, ambiguous. If P_A is higher or the same as before, A must be larger (see (2)). If P_A is less, A has to be greater to satisfy (4), since Y is larger. Hence, A must be larger in the new equilibrium. Accordingly, growth rates of both Y and A will go up. Employment in both the sectors will increase too.

The adjustment process may now be explained as follows. An increase in $\overline{K}$ consists in, for example, electrification of new areas, expansion of irrigation, flood control facilities, larger investment in R&D that yields better seeds, farming practices, better implements etc. Therefore, an increase in $\overline{K}$ induces the unorganized sector's producers to undertake complementary private investment, for example, in new electric connections, implements etc. Import intensities of these investments in India are practically nil. The increase in infrastructure capital enables the farmers and other producers, who are not resource constrained, to bring more land under production and, thereby, produce more *A* and demand more intermediate inputs from the organized sector. Thus, at the initial equilibrium Y, P_A and *e*, there emerges excess supply of *A* and excess demand for *Y*. P_A will fall to restore equilibrium in the A-sector. As P_A falls, supply of *A* falls, while demand for *A* rises (see (4)). Hence, equilibrium in the A-sector will be restored at a higher level of *A*. Thus, even at this lower P_A, there will still exist excess demand for *Y* at the initial equilibrium *Y*. Hence, *Y* will expand raising demand for *A*. Thus, *Y* and P_A will go on rising until the new equilibrium is reached.

The above discussion yields the following proposition:

Proposition 2: *An increase in* $\overline{K}$ *in the unorganized sector will bring about an increase in the growth rates of outputs of both the sectors and increase employment levels in both the sectors.*

We have proved this proposition mathematically in section A**.**3 in the appendix.

Since more than 95 percent of the work force is engaged in the unorganized sector, as follows from our above discussion, raising $\overline{K}$ is the most important way of generating employment.

8. Conclusion

India has abundant supplies of skilled and unskilled labour. Policy makers' complete apathy to providing every member of the labour force with suitable quality jobs has led to an extremely unfortunate situation. The organized sector, the fastest growing sector of the economy contributing almost half of the GDP, not only employed just six percent of the workforce in 2004-05, but also grew without

creating any employment since 1994-95. Obviously, along with growth, there has been taking place in the organized sector labour displacing technological and managerial changes. Clearly, the purpose of these changes was to eliminate the bargaining strength of the workers and bring about a secular decline in the share of workers in the output of the organized sector. Labour saving managerial and technological changes allow growth to occur without generating any employment. On the other hand, growth in labour force creates a vast pool of unemployed workers destroying the bargaining strength of the workers. This kind of technological and managerial changes are, therefore, the surest way for the capitalists to increase their share in GDP at the cost of the workers. Our paper shows that, redistribution of income from workers to capitalists in the organized sector is highly likely to bring about contraction in the levels of employment and output in both the sectors. The reason may be stated as follows. Following the redistribution of income stated above, workers' consumption demand for the organized sector's output will fall, while capitalists' consumption demand will increase. However, most of the additional consumption demand is likely to constitute demand for imported consumption goods as capitalists represent a miniscule class of extremely rich people. Hence, consumption demand for the organized sector's output will fall. The additional import demand will raise the exchange rate and, thereby, will make foreign goods including foreign capital goods dearer. Since in India investment demand is highly import intensive, cost of investment will go up and lower investment demand. The fall in consumption and investment demand will lead to a contraction in the output of the organized sector. Again, a fall in organized sector's workers' income will reduce demand for the output of the unorganized sector's output as well. Hence, output and employment in the unorganized sector will contract too.

If capitalists are given a free hand in choosing their technology, as has been done under the New Economic Policy (NEP) adopted by India in 1991, labour saving technological and managerial changes will go on occurring and jobless growth will be a chronic phenomenon. This kind of technological and managerial changes is harmful for India in another way also. India is a capital poor and labour abundant economy. Its earning of foreign exchange is also meager relative to its needs. This is evidenced by its very large current account deficits every year (see Table 8). This is financed by large capital inflows (see Table 1). India's dependence on large capital inflows makes its position extremely vulnerable as a large reduction in

capital inflows can perpetrate a severe economic crisis just the way it did in 1990-91. One can derive this from our model also by examining the impact of a large fall in $\bar{F}$). The crisis of 1990-91 forced India to give up its Nehru-Mahalanobis strategy and adopt NEP. The kind of technological and managerial changes occurring in the organized sector is highly import intensive and is continuously increasing the import intensity of India's production.

Every civilized society should provide every citizen with suitable gainful employment and should devise strategies to be self-reliant to retain its policy making autonomy. To achieve these goals, government should closely monitor investment proposals and accept those that are labour intensive and have the prospect of lowering capital and import intensities of investment and production. It should disapprove investment proposals that displace labour and are intensive in capital and imported components unless they have the prospect of lowering India's import intensity of production and investment to such an extent that their adoption is warranted. Low interest rate not only hurts workers who are net lenders but also encourages capital intensive investment by lowering capital cost of investment. This point should be taken into reckoning. Without careful vetting of investment proposals by the government, the problem of jobless growth cannot be resolved. This kind of government intervention is out of place under NEP and foreign investors may resent such measures creating severe instability. In what follows, we shall, therefore suggest alternative strategies that may be permissible under NEP on the basis of the results derived in the paper.

We have already pointed out that the unorganized sector employs more than 95 percent of India's labour force and produces mass consumption goods such as food, clothing and shelter for the masses. It is the responsibility of every government in a civilized society to provide every citizen with adequate access to food, clothing, shelter, education and health care. To achieve this objective and that of providing everyone with suitable gainful employment, the government should devise a strategy that would bring about growth in the unorganized sector at the maximum possible speed. This is all the more necessary, since incidence of poverty, malnutrition and hunger in India is one of the highest in the world (see IFPRI(2017), IFPRI stands for International Food Policy Research Institute). To achieve this, the government should, as we have shown in our paper, invest on a massive scale in infrastructure in the unorganized sector, which employs most of the

workers and produce the vital mass consumption goods. This paper derives the result that an improvement in infrastructure in the unorganized sector gives a boost to production in the unorganized sector and raises unorganized sector's demand for intermediate inputs and capital goods produced in the organized sector and both of these lead to an expansion in the levels of output and employment in both the sectors.

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Table 1

Growth Rate of GDP, Net FDI, Foreign Portfolio Investment, Government Consumption and Gross Fiscal deficit (GFD)

Year	Growth Rate of GDP at Factor Cost (At constant prices Base 2004-05)	Net FDI (US $ Million)	Net Portfolio Investment (US $ Million)	Total (US $ Million)	Government Consumption (in Rs bn)	GFD[1] (% of GDP)	Rate Of GDCF[2]	Rate Of NDCF
2000-01	5.3	3270	2590	5860	3247.27	5.65	24.6	16.7
2001-02	5.5	4734	1952	6686	3323.69	6.19	24.6	16.5
2002-03	5.0	3157	944	4101	3317.53	5.91	25.4	17.3
2003-04	8.1	2388	11377	13765	3409.62	5.48	27.3	19.5
2004-05	7.0	3712	9291	13003	3545.18	3.88	32.8	25.5
2005-06	9.5	3033	12492	15525	3860.07	3.96	34.9	27.8
2006-07	9.6	7693	6947	14640	4005.79	3.38	36.2	29.2
2007-08	9.6	15891	27434	43325	4389.19	2.54	39.0	32.2
2008-09	6.7	22343	-14032	8311	4845.59	5.99	35.6	27.9
2009-10	8.4	17965	32396	50361	5517.02	6.48	38.4	30.9
2010-11	8.4	11305	30292	41597	5843.52	5.87	39.8	32.5
2011-12	6.5	22006	17171	39177	6345.59	5.89	38.8	31.1
2012-13	4.5	19819	26891	46710	6620.33	5.06	38.9	30.9
2013-14	4.7	21564	4822	26386	6873.89	4.85		

Source: RBI. Note: [1]Gross fiscal deficit, [2]Gross domestic capital formation

Table 2

Exchange Rate of the Indian Rupee vis-a-vis the US Dollar (Monthly average)

Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average	Year/ Month	US $ Average
2008		Oct	46.7211	Jul	44.4174	Apr	54.4971
Jan	39.3737	Nov	46.5673	Aug	45.2788	May	55.1156
Feb	39.7326	Dec	46.6288	Sep	47.6320	Jun	58.5059
Mar	40.3561	2010		Oct	49.2579	Jul	60.0412
Apr	40.0224	Jan	45.9598	Nov	50.8564	Aug	64.5517
May	42.1250	Feb	46.3279	Dec	52.6769	Sep	64.3885
June	42.8202	Mar	45.4965	2012		Oct	61.7563
Jul	42.8380	Apr	44.4995	Jan	51.3992	Nov	62.7221
Aug	42.9374	May	45.8115	Feb	49.1671	Dec	61.7793
Sep	45.5635	June	46.5670	Mar	50.3213	2014	
Oct	48.6555	Jul	46.8373	Apr	51.8029	Jan	62.1708
Nov	48.9994	Aug	46.5679	May	54.4735	Feb	62.3136
Dec	48.6345	Sep	46.0616	June	56.0302	Mar	61.0021

2009		Oct	46.7211	Jul	55.4948	Apr	60.3813
Jan	48.8338	Nov	46.5673	Aug	48.3350	May	59.3255
Feb	49.2611	Dec	46.6288	Sep	54.3353	June	59.7143
Mar	51.2287	2011		Oct	52.8917	Jul	60.0263
Apr	50.0619	Jan	45.3934	Nov	54.6845	Aug	60.9923
May	48.5330	Feb	45.4358	Dec	54.6439		
June	47.7714	Mar	44.9914	2013			
Jul	48.4783	Apr	44.3700	Jan	54.3084		
Aug	48.3350	May	44.9045	Feb	53.7265		
Sep	48.4389	June	44.8536	Mar	54.5754		

Source: RBI

Table 3

Sectoral Shares in Work Force (2004-05)

	Organised Sector	Unorganized sector
Percentage of Workforce Employed 2004-05	**6**	**94**

Source: NSSO 61st Round

Table 4
Employment in the Organized sector (in million)

Year	Growth Rate Of GDP At Constant (2004-05) Prices	Number of Workers Employed
1994-95	**6.4**	**27.53**
2000-01	**5.3**	**27.79**
2001-02	**5.5**	**27.20**
2003-04	**8.1**	**26.45**
2004-05	**7.0**	**26.46**

2005-06	**9.5**	**26.96**
2006-07	**9.6**	**27.24**
2007-08	**9.6**	**27.55**
2008-09	**6.7**	**28.18**
2009-10	**8.4**	**29.00**
2010-11	**8.4**	**29**
2011-12	**5.3**	**29.65**

Source: RBI

Table 5
Labour Force, Work force and Unemployment (in million)

	1993-94	1999-00	2004-05	1999-00 to 2004-05 Point to point annualised Growth rate
Labour Force	387.94	406.05	469.06	2.93
Work Force	374.45	397.00	457.82	2.89
Number of Unemployed	7.49	9.05	17.24	

Source: NSSO and Report of the Task Force on Employment Opportunities (Planning Commission)

Table 6

Contributions of the Organized Sector and the Unorganized Sector to the Value added of Major Sectors of Production and NDP

	1993-94		2003-04		2010-2011	
Industry	**Organized**	**Unorganized**	**Organized**	**Unorganized**	**Organized**	**Unorganized**
Agriculture, Forestry and Fishing	3.5	96.5	4.1	95.9	5.8	94.2
Mining, manufacturing	64.2	35.8	60.5	39.5	64.5	35.5
Electricity, construction and services	47.1	58.9	53.1	46.9	42.2	51.8
NDP	36.8	63.2	43.3	56.7	45.1	54.9

Source: CSO (2005): National Accounts Statistics 2005, Government of India and National Accounts Statistics 2012, Government of India

Table 7
Share of Wage in the Net Value Added of the Organized Manufacturing Sector

Year	Wage/NVA	E/NVA
1990-91	25.60837619	39.962135
1991-92	24.77360615	38.24844028
1992-93	23.62322467	38.68204933
1993-94	19.89892122	32.3853645
1994-95	20.29125577	32.5677205
1995-96	20.06521796	32.36510722
1996-97	16.87517837	29.48901451
1997-98	17.89320363	31.46523061
1998-99	17.06744177	30.67889995
1999-2000	16.97329792	30.8718755
2000-2001	19.26644502	35.3141847
2001-2002	19.01443998	35.38379755
2002-2003	17.22701817	32.00533666
2003-04	15.01709971	28.74386123
2004-05	12.94119363	24.78039248
2005-06	12.07694285	23.73090671
2006-07	11.19244953	22.42742604
2007-08	10.59613904	21.89461019
2008-09	11.32545249	24.52627358
2009-10	11.64315067	24.82748124
2010-11	12.1556146	26.01504869
2011-12 (R)	13.08202487	28.13385202
2012-13	13.01676982	27.94267692

Source: Annual Survey of Industries, Ministry of Statistics and Programme Implementation.
Where W= WAGES TO WORKERS, E=TOTAL EMOLUMENTS and, NVA= NET VALUE ADDED.

Table 8

Current Account Deficit in India

Year	Current Account deficit as percentage of GDP
1990-91	-1.9998
1991-92	-0.62084
1992-93	-1.37644
1993-94	-0.40951
1994-95	-0.76373
1995-96	-1.45941
1996-97	-1.54423
1997-98	-1.66313
1998-99	-2.31185
1999-00	-2.99618
2000-01	-1.36458
2001-02	-1.66333
2002-03	-1.79484
2003-04	-2.50363
2004-05	-4.23108
2005-06	-6.01654
2006-07	-6.79758
2007-08	-7.77917
2008-09	-10.0627
2009-10	-8.48273
2010-11	-7.45697
2011-12	-10.4807

2012-13	-11.245
2013-14	-7.82023
2014-15	-7.32151
2015-16	-6.21191
2016-17	-5.21381

Source: RBI, Directorate General of Commercial Intelligence and Statistics.

Appendix

A.1 Stability of equilibrium

The aggregate planned demand for *Y* as given by the R.H.S. of equation (7) in the text is denoted by $\overline{E}$. $\overline{E}$ is a function of P_A and *Y*, given the exogenous variables such as $\frac{wl_y}{L_0}, \overline{K}, t, l_g$ and *G*, among others. Thus, we can rewrite equation (7) as

$$Y = \overline{E}\left(\underset{+}{Y}, \underset{+}{P_A}\right) \tag{A.1}$$

Equation (A.1) can be rewritten as

$$E = \overline{E}(Y, P_A) - Y = 0 \tag{A.2}$$

where, E denotes excess demand for Y.

We rewrite (A.2) as

$$E\left(\underset{+}{Y}, \underset{+}{P_A}\right) = 0, E\left(\underset{+}{Y}, \underset{+}{P_A}\right) \equiv \overline{E}\left(\underset{+}{Y}, \underset{+}{P_A}\right) - Y \tag{A.3}$$

Let us now explain the signs of the partial derivatives of $E(\bullet)$.

From (7), we get

$$E_Y = C_{wy}.(1-t_w)\frac{wl_y}{L_0} + C_c.(1-t)\left(1-\frac{wl_y}{L_0}\right) - (-I_e).e_{\overline{C}}.\overline{C}_Y - 1 < 0,\ 0 < \frac{wl_y}{L_0} < 1,\ \ e_{\overline{C}} > 0, \overline{C}_Y > 0 \tag{A.3i}$$

where, $\overline{C} \equiv C_c(1-t).\left(1-w\frac{l_y}{L_0}\right)Y$, $\overline{C}_Y = C_c(1-t).\left(1-w\frac{l_y}{L_0}\right)$.

Let us explain the sign of E_Y. Note that $\frac{wl_y}{L_0}$ is the share of wage income in *Y*. Hence, it is positive but less than 1. Let us now derive the value of e_Y. Taking total differential of (5) in the text treating all exogenous variables as fixed and solving for $\frac{de}{dY}$, we get

$$\frac{de}{dY}\left(\equiv e_Y\right)=\frac{\left(-NX_{cc}\right)C_c\left(1-t\right)\left(1-w\frac{l_y}{L_0}\right)}{NX_p\frac{\partial\left(\frac{P^*e}{P}\right)}{\partial e}+\left(-NX_I\right)\left(-I_e\right)}>0 \qquad \text{(A.3ii)}$$

Let us explain the expression on the RHS of (A.3ii). NX_{cc} measures the change in net export per unit increase in capitalists' consumption. It is negative as a part (if not the whole) of the unit increase in capitalists' consumption represents additional demand for imported goods. Thus, the numerator gives the fall in net export that a unit increase in *Y* leads to as it raises capitalists' income. BOP, therefore, goes into deficit. To remove it, *e* has to rise so that net export is restored to its initial equilibrium value. The denominator gives the increase in net export due to a ceteris paribus unit increase in *e*. A unit increase in *e* raises net export in two ways. First, it raises net export by raising the real exchange rate given by the first term in the denominator. However, this term is likely to be small in India. Since production in India is highly import intensive, an increase in *e* raises *P* substantially. Hence, the effect of an increase in *e* on the real exchange rate is likely to be insignificant. (For simplicity, we have not made *P* an increasing function of *e* in our model). However, as we have already argued, in India investment is likely to be highly sensitive to exchange rate and an increase in *e* raises net export mainly by lowering *I* quite a large part of which represents demand for imported goods. This explains the sign of e_Y. It is, therefore, clear that E_Y is negative.

$$E_{P_A}=mA_{p_A}>0,\ p_A\equiv\frac{P_A}{P} \qquad \text{(A.3iii)}$$

(*P* is fixed and equal to unity by assumption).

Similarly, we can write (4) in the text as

$$D \equiv A^D - A^S = D\underset{-}{\left(P_A}, \underset{+}{Y}\right) = 0 \qquad \text{(A.4)}$$

Let us explain the signs of the partial derivatives of (A.4). From (4), we get

$$D_Y = C_{wA}.(1-t_w)\frac{wl_y}{L_0}\frac{1}{P_A} > 0 \qquad \text{(A.4i)}$$

and

$$D_{P_A} = -\left(C_{wA}.(1-t_w)\frac{wl_y}{L_0}Y + \beta w_A l_g\right)\left(\frac{1}{P_A^2}\right) - \left[\left(1-\frac{1}{P_A}\beta w_A l_A\right)A_{p_A} + A\beta w_A(l_A)\frac{1}{P_A^2}\right] < 0$$

(A.4ii)

The first term on the RHS gives the fall in demand for *A* per unit rise in P_A, while the second term gives the rise in the supply of *A*. Both lead to a fall in the excess demand for *A*.

The solution of (4) and (7) or that of (A.3) and (A.4) is shown diagrammatically in the text in Figure 1, where YY and AA schedules represent (A.3) (or (7)) and (A.4) (0r (4)) respectively. The equilibrium values of Y and P_A correspond to the point of intersection of the two schedules. Their slopes in the (Y, P_A) plane are given by

$$\left(\frac{dP_A}{dY}\right)_{YY} = \frac{-E_Y}{E_{P_A}} > 0 \qquad \text{(A.4iii)}$$

and

$$\left(\frac{dP_A}{dY}\right)_{AA} = \frac{-D_Y}{D_{P_A}} > 0 \qquad \text{(A.4iv)}$$

The adjustment mechanisms of Y and P_A may be written as follows:

$$\frac{dY}{dt} = \alpha.E(Y, P_A),\ \alpha > 0 \qquad \text{(A.5)}$$

$$\frac{dP_A}{dt} = \beta.D(Y, P_A),\ \beta > 0 \qquad \text{(A.6)}$$

Linearising $E(\bullet)$ and $D(\bullet)$ using Taylor's series in the neighborhood of the equilibrium values of Y and P_A denoted by Y_0 and P_{A0} respectively, we rewrite equations (A.5) and (A.6) as follows:

$$\frac{dY}{dt} = \alpha.E_Y.(Y - Y_0) + \alpha.E_{P_A}.(P_A - P_{A0}) \qquad \text{(A.7)}$$

$$\frac{dP_A}{dt} = \beta.D_Y.(Y - Y_0) + \beta.D_{P_A}.(P_A - P_{A0}) \qquad \text{(A.8)}$$

We can write (A.7) and (A.8) as

$$\begin{bmatrix} \frac{d(Y - Y_0)}{dt} \\ \frac{d(P_A - P_{A0})}{dt} \end{bmatrix} = \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \begin{bmatrix} E_Y & E_{P_A} \\ - & + \\ D_Y & D_{P_A} \\ + & - \end{bmatrix} \begin{bmatrix} (Y - Y_0) \\ P_A - P_{A0} \end{bmatrix} \qquad \text{(A.9)}$$

From (A.9) it follows that the equilibrium is stable if

$$E_Y + D_{P_A} < 0 \qquad \text{(A.10)}$$

And

$$\begin{vmatrix} E_Y & E_{P_A} \\ - & + \\ D_Y & D_{P_A} \\ + & - \end{vmatrix} (\equiv \Delta) > 0 \qquad \text{(A.11)}$$

From (A.3i) and (A.4ii) it follows that (A.10) is satisfied.

(A.11) is satisfied if

$$\frac{-E_Y}{E_{P_A}} > \frac{D_Y}{-D_{P_A}} \qquad \text{(A.12)}$$

The LHS and RHS of (A.12) represent the slopes of YY and AA respectively (see (A.4iii) and (A.4iv). Thus, for the equilibrium to be stable, the slope of YY has to be greater than that of AA.

We also give another interpretation of (A.12). (A.12) implies

$$E_Y + E_{P_A}\frac{D_Y}{-D_{P_A}} < 0 \qquad \text{(A.13)}$$

The first term of the expression on the LHS of (A.13) gives the fall in excess demand for *Y* per unit increase in *Y*, when *e* adjusts to keep BOP in equilibrium and P_A remains unchanged. Let us now explain the second term. When *Y* increases, demand for *A* rises at the initial equilibrium P_A. P_A as a result will rise and equilibrate the *A*-market. Per unit increase in *Y*, P_A will go up by $\frac{D_Y}{-D_{P_A}} > 0$ raising supply of *A* and, thereby, demand for *Y* by $E_{P_A}\frac{D_Y}{-D_{P_A}} > 0$. Thus, the expression on the LHS of (A.13) gives the change in the excess demand for *Y* per unit increase in *Y* when *e* and P_A adjust to keep the BOP and the A-market in equilibrium. Therefore, (A.13) implies that, when *Y* increases and *e* and P_A adjust along with the increase in *Y* to keep the BOP and the A-market in equilibrium, excess demand for *Y* should fall. Alternatively, when *Y* declines and *e* and P_A adjust along with the decrease in *Y* to keep the BOP and the A-market in equilibrium, excess supply of *Y* should fall.

A.2 Derivation of the Effect of a Decline in the Share of Organized Sector Workers on *Y* and *A*

Taking total differential of (A.3) and (A.4) treating all exogenous variables other than $w\frac{l_y}{L_0}$ as fixed, we get

$$E_Y dY + E_{P_A} dP_A = -\varepsilon_1 \equiv -\frac{\partial E}{\partial\left(\frac{wl_y}{L_0}\right)} d\left(\frac{wl_y}{L_0}\right) \qquad \text{(A.14)}$$

$$D_Y dY + D_{P_A} dP_A \equiv -\varepsilon_2 = -\frac{\partial D}{\partial\left(\frac{wl_y}{L_0}\right)} d\left(\frac{wl_y}{L_0}\right) \qquad \text{(A.15)}$$

From (7) and (5) in the text, we get

$$\varepsilon_1 \equiv \frac{\partial E}{\partial\left(w\frac{l_y}{L_0}\right)} d\left(w\frac{l_y}{L_0}\right) = \left[\left[\left(C_c(1-t) - C_{wy}(1-t_w)\right)\right]Y - \left(-I_e\right)\left(\frac{\left(-NX_{CC}\right)C_c(1-t)}{NX_p\frac{\partial p}{\partial e} + \left(-NX_I\right)\left(-I_e\right)}\right)\right]\left(-d\left(\frac{wl_y}{L_0}\right)\right)$$

(A.16)

From (A.16) it is clear that $\varepsilon_1 < 0$ (when $d\left(w\frac{l_y}{L_0}\right) < 0$), if $C_{wy}(1-t_w)$ is larger than $C_c(1-t)$. Even if $C_{wy}(1-t_w)$ is less than $C_c(1-t)$, $\varepsilon_1 < 0$, if consumption of capitalists is sufficiently import intensive so that $\left(-NX_{cc}\right)$ is sufficiently large and investment is sufficiently sensitive to exchange rate; conditions which, we think, are quite likely to be satisfied in Indian context. Capitalists in India are extremely rich. According to a report recently published by Oxfam India (2018), only 1 percent of Indians own 73 percent of India's wealth. This estimate has been made on the basis of declared assets. If undeclared assets were taken into account, the inequality in the distribution of wealth would have been much more extreme. Obviously, the capitalists belong to the richest 1 percent of Indians and, therefore, also command the major part of GDP. Hence, they partake of the best of the consumption items available globally. Since, the finest consumption items are produced abroad, $\left(-NX_{CC}\right)$ is likely to be almost unity. We have also pointed out that $\frac{\partial p}{\partial e}$ is likely to be very small in India. Under these conditions

$\left[\left(-I_e\right)\left(\frac{\left(-NX_{CC}\right)C_c\left(1-t\right)}{NX_p\frac{\partial p}{\partial e}+\left(-NX_I\right)\left(-I_e\right)}\right)\right]$ will be approximately equal to $\left[\left(\frac{C_c\left(1-t\right)}{\left(-NX_I\right)}\right)\right]$,

where $\left(-NX_I\right)<1$. Thus, in Indian conditions, as should be clear from the discussion made above, ε_1 is highly likely to be negative.

$$\varepsilon_2=\frac{\partial D}{\partial\left(w\frac{l_y}{L_0}\right)}d\left(w\frac{l_y}{L_0}\right)=\frac{Y}{P_A}C_{wA}\left(1-t_w\right)\left[d\left(w\frac{l_y}{L_0}\right)\right]<0,\ \text{since}\ d\left(w\frac{l_y}{L_0}\right)<0 \tag{A.17}$$

From (A.14) and (A.15), we get

$$dY=\frac{\begin{vmatrix}-\varepsilon_1 & E_{P_A}\\ + & +\\ -\varepsilon_2 & D_{P_A}\\ + & -\end{vmatrix}}{\Delta}<0 \tag{A.18}$$

$$dP_A=\frac{\begin{vmatrix}E_Y & -\varepsilon_1\\ - & +\\ D_Y & -\varepsilon_2\\ + & +\end{vmatrix}}{\Delta}<0 \tag{A.19}$$

Since $\Delta>0$ (see (A.11)), $dY<0$ and $dP_A<0$, if $\varepsilon_1<0$ (A.20)

$dA=A_{p_A}dP_A<0$ (A.21)

A.3 Effect of an Increase in $\overline{K}$

We shall derive mathematically the effect of an increase in $\overline{K}$. Taking total differential of (A.3) (or (7) in the text) and (A.4) (or (4) in the text) treating all exogenous variables other than $\overline{K}$ as fixed, we get

$$E_Y dY+E_{P_A}dP_A=-\varepsilon_3\equiv-E_{\overline{K}}d\overline{K} \tag{A.22}$$

$$D_Y dY + D_{P_A} dP_A \equiv -\varepsilon_4 = -D_{\overline{K}} d\overline{K} \qquad \text{(A.23)}$$

where,

$$\varepsilon_3 \equiv E_{\overline{K}} d\overline{K} = \left\{ I \frac{A}{\overline{K}} + mA_{\overline{K}} \right\} d\overline{K} > 0 \quad \text{(from (7) in the text)} \qquad \text{(A.24)}$$

Let us now focus on ε_4.

$$\varepsilon_4 = \frac{\beta w_A l_A}{P_A} A_{\overline{K}} d\overline{K} - A_{\overline{K}} d\overline{K} < 0 \qquad \text{(A.25)}$$

(since $\frac{\beta w_A l_A}{P_A} < 1$, see (4) in the text)

From (A.22) and (A.23), we get

$$dY = \frac{\begin{vmatrix} -\varepsilon_3 & E_{P_A} \\ - & + \\ -\varepsilon_4 & D_{P_A} \\ + & - \end{vmatrix}}{\Delta} \qquad \text{(A.26)}$$

From (A.26) it follows that, since $\Delta > 0$ (see (A.11)

$dY > 0$ if absolute value of the vertical shift of YY is larger than the absolute value of the vertical shift of AA, that is,

$$\frac{\varepsilon_3}{E_{P_A}} > \frac{-\varepsilon_4}{-D_{P_A}} \quad () \qquad \text{(A.27)}$$

We shall now show that (A.27) is satisfied.

Substituting the values of ε_3, ε_4, D_{P_A} and E_{P_A} given by (A.24), (A.25), (A.4ii) and (A.4iii) respectively into (A.27) and multiplying both sides by A_{P_A}, we have

$$\frac{\varepsilon_3}{E_{P_A}} A_{P_A} = \frac{\left\{I_{\bar{K}} + mA_{\bar{K}}\right\} d\bar{K}}{mA_{P_A}} A_{P_A} = \left(\frac{I_{\bar{K}}}{m} + A_{\bar{K}}\right) d\bar{K} > \frac{\left(1 - \frac{\beta w_A l_A}{P_A}\right) A_{\bar{K}} d\bar{K}}{\left(1 - \frac{\beta w_A l_A}{P_A}\right) A_{P_A}} A_{P_A} = A_{\bar{K}} d\bar{K} > \frac{-\varepsilon_4}{-D_{P_A}} A_{P_A} =$$

$$\frac{\left(1 - \frac{\beta w_A l_A}{P_A}\right) A_{\bar{K}} d\bar{K}}{\left(C_{wA}.(1-t_w)\frac{w l_y}{L_0} Y + \beta w_A l_g + A\beta w_A (l_A)\right)\left(\frac{1}{P_A^2}\right) + \left[\left(1 - \frac{1}{P_A}\beta w_A l_A\right) A_{p_A}\right]} A_{P_A}$$

(A.28)

From (A.28) it is clear that (A.27) is satisfied.

From (A.22) and (A.23), one can easily deduce that the sign of dP_A is ambiguous. However, one can easily prove that whatever be the direction of change in P_A, A will be larger in the new equilibrium. If P_A is higher, as follows from (2) in the text, A must be larger. If P_A is the same or lower, as follows from (4) in the text, A must be larger to satisfy (4), since Y is larger.