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Wage Inequality, Welfare and Downsizing

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Abstract

By making use of a simple model, this paper examines the impact of downsizing on skilled-unskilled wage inequality and welfare. The paper shows that downsizing increases wage inequality and its effect on welfare is positive but the relative well-being of the unskilled workers declines.

Key Words: Wage inequality, monopolistic competition, downsizing

JEL Classification: J31; O15

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1. Introduction

Economic growth experienced by the world economy in the past two decades can be attributed to trade liberalisation or globalisation. Economic prosperity enjoyed by the world economy has resulted in increased interest in examining the income distributinal changes. It is interesting to note that despite strong economic growth experienced by India, the ruling partly lost the 2004 general election because of the perception that economic growth has mostly benefited the rich. A number of theoretical and empirical studies have recently examined various aspects of wage inequality. These studies include Davis (1998), Feenstra and Hanson (2003), Marjit, Beladi and Chakrabarty (2003), Das (2005), Marjit and Kar (2005), Anwar (2006) and Wälde and Weiß (2007).

Das (2005) has considered the impact of trade liberalization on inequality within and across North-South countries. Trade liberalisation in this study reduces the Samuelsenian transport cost associated with trade in manufactured products. It is shown that a marginal trade liberalisation increases (decreases) skilled-unskilled wage inequality in North (South). Marjit and Kar (2005) have examined the impact of emigration on skilled-unskilled wage inequality within the context of a small open economy. The model utilised by Marjit and Kar can be viewed as relevant to a developing economy. They have shown that emigration of skilled as well as unskilled labour can increase or decrease the wage gap between the skilled and unskilled workers. The direction of the movement of the wage gap crucially depends on relative capital intensity of the industrial and agricultural sectors.

Anwar (2006) has extended the existing work by demonstrating that in the presence of specialisation-based external economies, emigration of either skilled or unskilled labour increases wage inequality even if the agricultural and industrial sectors were equally capital intensive. Wälde and Weiß (2007) have considered an economy where Cournot competition
prevails. They have shown that that, due to downsizing, the factor that loses in relative terms can also lose in real terms.

Competitive pressures arising from rapid globalisation have resulted in shrinking profit margins, which is forcing firms to reduce the cost of production. Wälde and Weiβ (2007) have argued that increased push for cost cutting is forcing firms to consider ways of reducing overhead cost, which includes the administrative or fixed cost. Following Wälde and Weiβ, within the context of this paper, a decrease in the fixed cost is viewed as downsizing. This paper attempts to extend the existing literature by focusing on the impact of downsizing on wage inequality.

A simple Ricardian model is presented in section 2. The model is used to examine the impact of downsizing on wage inequality in section 3. The last section contains some concluding remarks.

2. A Simple Model

Consider a small open economy that produces one agricultural (Z) and one industrial (Y) good. The agricultural good is produced by means of unskilled labour whereas the industrial good is produced by means of skilled labour and the output of industry (X). The X-industry can be viewed as providing a large number of varieties of producer services. Producer services industry is subject to internal economies of scale. The production functions for Y and Z are as follows:

\[ Y = L_0^{1-n} \left[ \sum_{i=1}^{n} x_i \right]^{\frac{n}{n+n}} \]

\[ Z = L_{xz} \]

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1. See Wälde and Weiβ (2007) and references therein.
Where \( \alpha \) and \( \delta \) are parameters in the range \([0,1]\); \( x_i \) is the output of the \( i \)-th variety produced by industry \( X \); \( n \) is the number of varieties produced; \( L_s \) and \( L_u \) respectively are skilled and unskilled labour used in industry \( Y \) and \( Z \).

The above formulation captures the factor intensity differentials in an extreme fashion – the agricultural sector is unskilled labour intensive. Since the production technology of the agricultural good exhibits constant returns to scale with respect to unskilled labour and the economy under consideration is small, the unskilled wage rate is fixed.

Production of each variety of producer services involves fixed and variable cost as follows:

\[
c(w_s, r, x_i) = [\mu + \lambda x_i](w_u^\theta w_s^{1-\theta})
\]

Where \( w \) and \( w_s \) respectively are the unskilled and skilled wage rates; \( \mu \) and \( \lambda \) are parameters and \( \theta \) lies in the range \([0, 1]\).

Because of the presence of fixed cost, the production of each variety of producer services \( x_i \) is subject to internal economies of scale. Due to identical production functions and an equalisation of factor prices between sectors, all varieties produced are equally priced. Free entry and exit of firms implies that each firm earns zero economic profit in the long run. The focus is on a symmetric equilibrium where \( X \) equals \( nx \). Accordingly, the production function for good \( Y \) can be written as

\[
Y = L_s^{1-\alpha} X^\alpha n^{\frac{\alpha}{1-\delta}}
\]

From the point of view of each firm in \( Y \) industry, the number of varieties supplied is given. Accordingly, at the firm level there constant returns to scale but at the industry level
there are economies of scale. The economies of scale arise from the fact that \( \frac{\alpha (1 - \delta)}{\delta} \) is positive but assumed to be less than unity. The services sector produces a large number of varieties of producer services, the price elasticity of demand for each variety is \( \frac{1}{1 - \delta} \).

The following condition determines the equilibrium output of the industrial good.

\[
1 = \Theta \left[ \frac{w_x^{-\alpha} p^\alpha}{n^{\frac{n-1}{n}}} \right]
\]  

(1)

where \( \Theta = \alpha^{-\alpha} (1 - \alpha)^{(1-\alpha)} \) and \( p \) is the price of \( x \).

The right-hand side of equation (1) is the unit cost of production whereas the left-hand side is the unit price, which has been set equal to unity.

The presence of internal economies in the services sector implies that a single firm under monopolistic competition will produce each variety. If the services sector is active in equilibrium then the following condition holds:

\[
\delta p = \lambda w_x^{-\alpha} w^\theta
\]  

(2)

Equation (2) is the profit maximisation condition, which shows that marginal revenue equals marginal cost. By making use of equation (2), the zero profit condition which determines the optimal number of varieties produced can be written as follows:

\[
(1 - \delta) p x = \mu w_x w^\theta
\]  

(3)

The market clearing conditions for skilled and unskilled labour are as follows:

\[
(1-\theta) [\mu + \lambda x] \left[ \frac{w_x}{w} \right]^\theta + \Theta(1 - \alpha) \left[ \frac{w_x}{p} \right]^\alpha \left[ \frac{Y}{n^{\frac{n-1}{n}}} \right] = L_s
\]  

(4)
\[ Z + \theta n \left[ \mu + \lambda \frac{w^*}{w} \right]^{(1-q)} = L_w \]  

(5)

The left-hand side of equation (4) and (5) respectively are the demand for skilled and unskilled labour, whereas the right hand side is the supply which is assumed to be fixed. The market clearing condition for the services sector is as follows:

\[
\left( \Theta \alpha \right) \left[ \frac{w^*}{p} \right]^{1-q} \left[ \frac{Y^*}{n^{\alpha+1-q}} \right] = n x
\]

(6)

The left-hand side of the above equation is the demand for producer services, whereas the right hand side is the aggregate supply. By making use of equations (2) and (3), the following expression for the output of each variety of producer services can be derived.

\[ x = \left[ \frac{\mu}{\lambda} \right] \left[ \frac{\delta}{1 - \delta} \right] \]

(7)

Equation (7) shows that a decrease in the fixed cost decreases the production of each variety.

3. Wage Inequality and Downsizing

Since the agricultural good is produced by unskilled labour, the unskilled wage rate is fixed. By combining equations (1) and (2), it can be concluded that an increase in the number of varieties produced increases the skilled wage rate as follows, where a circumflex is used to denote proportional changes.

\[
\bar{\hat{w}} = \left[ \frac{\alpha (1 - \delta)}{\delta \left[ \frac{\alpha (1 - \delta)}{\alpha (1 - \delta) + (1 - \alpha)} \right] \hat{n}} \right]
\]

(8)
An increase in the number of varieties produced increases the productivity of the industrial sector which leads to increase in the skilled wage rate.

The impact of downsizing on the number of varieties produced is as follows:

\[ \hat{n} = \left[ \frac{\alpha(1-\delta) + (1-\alpha)}{\Omega} \right] \hat{\mu} \]  \hspace{1cm} (9)

where \( \Omega = \alpha(1-\theta) + (1-\alpha) - \theta \left( \frac{\alpha(1-\delta)}{\delta} \right) > 0 \)  \hspace{0.5cm} (2)

\( \Omega \) is positive as long as the size of economies of scale is sufficiently small which also ensures stability of equilibrium. Equation (9) shows that downsizing (i.e., a decrease in the fixed cost) increases the number of varieties produced and hence its effect on the skilled wage rate is positive. Because downsizing has no effect on unskilled wage rate, it leads to increased skilled-unskilled wage inequality. It is also clear that downsizing leads to an increase in the level of wage inequality due to the presence of economies of scale in the industrial good sector. In other words, downsizing has no effect on the level of skilled-unskilled wage inequality when \( \frac{\alpha(1-\delta)}{\delta} \) is zero.

The framework of this paper also allows one to examine the impact of downsizing on welfare. It is well-known that welfare of a small open economy can be measured by its aggregate real income, which can be calculated by dividing the nominal income by an exact consumer price index. Total income of the economy under consideration consists of skilled and unskilled labour income. Downsizing increases skilled wage rate and it has no effect on unskilled wage. In addition, downsizing decreases the consumer price index through an increase in the number of varieties produced. Accordingly, it can be argued that downsizing increases the welfare of both skilled and unskilled workers but the relative well-being of unskilled workers falls.

\(^2\) An excellent discussion of the stability conditions can be found in Wong (1995).
While the focus of this paper is on the impact of downsizing, the framework can also be used to examine the impact of trade liberalisation on wage inequality. The economy under consideration takes the price of the agricultural good determined in international market as given. The agricultural good is produced by means of unskilled labour alone. Accordingly, the unskilled wage rate varies with the price of the agricultural good ($q$). In other words, $\hat{\omega} = \hat{q}$. By making use of the model presented in section two, the impact of variation in the price of the agricultural good on skilled wage rate, the number of varieties of the intermediate good produced can be determined as follows.

$$\hat{n} = \left[ \frac{\theta}{\Omega} \right] \hat{q} \tag{10}$$

$$\omega_s = \left[ \frac{\theta}{\Omega} \right] \left[ 1 + \frac{\alpha(1-\delta)}{\delta} \right] \hat{q} \tag{11}$$

Equations (10) and (11) indicate that a decrease in the price of the agricultural good increases the number of varieties produced and hence the skilled wage rate rises. The impact of a change in the price of the agricultural good on the wage gap is as follows:

$$[\hat{\omega}_s - \hat{\omega}] = -\left[ \frac{1}{\Omega} \right] \hat{q} \tag{12}$$

Equation (12) shows that a decrease in the price of the agricultural good (which could for example be attributed to a reduction in tariff) increases the skilled-unskilled wage inequality. The size of the inequality is higher due to the presence of economies of scale in the industrial sector.

4. Concluding Remarks

3 The model presented in this paper does not explicitly include a tariff. However, it is clear that a reduction in tariff is equivalent to decrease in the price of the agricultural good in the domestic market (Assuming that the agricultural good is exportable).
A number of recent studies have examined the determinants of skilled-unskilled wage inequality. Within the context of a Ricardian model where labour is the only primary factor, this paper focuses on the role of downsizing arising from trade liberalisation and globalisation. The paper considers a small open economy that produces one industrial and one agricultural good. The industrial good is produced by means of skilled labour and a large number of varieties of producer services. Producer services are produced by means of unskilled and skilled labour whereas the agricultural good is produced by means of unskilled labour.

The paper shows that downsizing increases the number of varieties produced by the services sector which increases the skilled wage rate. On the other hand, downsizing has no effect on unskilled wage rate and hence the level of wage inequality increases. Downsizing increases welfare because of increase in the skilled wage rate. In other words, in relative terms, downsizing makes unskilled workers worse off. The paper also shows that a decrease in the price of the agricultural good also increases the skilled-unskilled wage gap.

References


