The Pakistan Development Review
Vol. XXI, No. 1 (Spring 1982)

Distortions in the Factor Market: Models and Realities

GUNNAR FLØYSTAD*

This paper confronts the theory of distortions in the factor market with empirical evidence. It is generally concluded that there would not be much to gain in terms of increased production for the economy as a whole from a technically efficient reallocation of labour and capital between industries. However, distortions in the factor market may be of importance in some sectors of the economy which means that imperfections in the factor market should be of concern for economic policy.

I. INTRODUCTION

The purpose of this paper is to give a short survey of the literature on the welfare effects of distortions in the factor market which to a large extent originated in dealing with important development problems of less developed countries. Then some basic assumptions in these models will be considered and analysed, including the assumption that the government has complete control over the distribution of income. Finally, we discuss the empirical evidence of distortions in the factor market and make some judgements as to the relevance of welfare models of distortions in the factor market for policy questions, especially for less developed countries.

II. A SHORT SURVEY OF THE LITERATURE ON THE WELFARE EFFECTS OF DISTORTIONS IN THE FACTOR MARKET[1]

The desire to raise the standard of living in less developed countries has in the postwar period given rise to a renewed interest in the economic arguments for protection. The traditional infant-industry argument for protection has been restated and expanded, and many new arguments for protection have been advanced by

*The author is on the faculty of the Norwegian School of Economics and Business Administration, Bergen (Norway). He gratefully acknowledges helpful comments from V. D. Norman, G. M. Gerhardsen, Ole Myrvoll, S. Guribye, Syed Nawab Haider Naqvi and B. Singh on an earlier version of this paper.

[1] For some excellent surveys of the literature on domestic distortions, from which this survey has strongly benefitted, see Chacholiades [7] chapter 20 and Magee [31].

several distinguished economists, perhaps especially by Hagen [20], Lewis [29], Myrdal [36] and Prebish [42]. These authors argue for protection because of the existence of external economies and factorprice differentials, which, in turn, give rise to domestic distortions (i.e. divergences between market prices and opportunity costs).

Thus, the theory of domestic distortions (including the theory of distortions in the factor market) is a direct outgrowth of the activity in the field of economic development and deals primarily with (a) the various distortions which prevent the market from reaching Pareto optimality, and (b) the policy that should be pursued in order to neutralize domestic distortions and achieve Pareto optimality.

The development of the theory of domestic distortions owes much Haberler's [18], classic paper. Additional important contributions were made by Corden [9], Fishlow and David [13], Hagen [20], Meade [34], Naqvi [37] and especially Bhagwati and Ramaswami [4]. The theory was restated and sharpened by Johnson [26] and systematized and generalized by Bhagwati [3].

A main conclusion in these studies is that trade intervention should not be used as a means of correcting domestic distortions. The policy should instead take place at the exact point at which distortions occur.

In this paper we shall be confining ourselves to deal with the distortions which originate in the factor market, in particular with wage differentials in the labour market which have been a main concern of the authors mentioned above.

Concern over wage differentials is not new, as is easily verified by the early works of Cairnes [8], Manoilesco [33], Ohlin [40;41] and Viner [48].

In the postwar period, the subject of factor-price differentials received a great deal of attention as a result of the interest in the economics of less developed countries. Thus, contributions have been made by Bhagwati and Ramaswami [4], Eckaus [12], Fishlow and David [13], Haberler [18], Hagen [20], Johnson [25;26], Lewis [29], and others.

Two different types of factor-price differentials are usually referred to in the literature. First, there may be a differential between the reward of a factor in different industries. Thus, it is usually assumed that wages in industry are higher than wages in agriculture by a margin which can not be accounted for by such factors as higher skills, disutility of urban living, investment in human capital (by training), and moving costs from the rural to the urban sector. Second, even though factor prices may be equal in all industries, factor rewards may not correspond to marginal productivity. Thus, wages may be equal between industry and agriculture, but wages in agriculture may be higher than the marginal productivity of labour as in Lewis [29] who assumes that wages in agriculture are equal to the average – not the

marginal – product of labour. Both of these types of factor-price differentials give rise to two distortions at the same time i.e.

$$\text{(a)} \quad MRS^{x}_{LT} \neq MRS^{y}_{LT}$$

$$\text{(b)} \quad MRS_{xy} = MRT^{f}_{xy} \neq MRT^{d}_{xy}$$

where MRS^{i}_{LT} = marginal rate of substitution of labour for land in industry i (i = X, Y), MRS_{xy} = the social marginal rate of substitution of X for Y in consumption, MRT^{d}_{xy} = the social domestic marginal rate of transformation, that is, the opportunity cost of X in terms of Y, and MRT^{f}_{xy} = the foreign marginal rate of transformation, that is, the marginal terms of trade.

As equations (a) and (b) show, factor-price differentials give rise to two major distortions. First, they prevent the equality between the marginal rate of substitution of labour for land in industry X and Y (that is $MRS^{X}_{LT} \neq MRS^{y}_{LT}$). Thus, one gets a misallocation of resources – the economy does not operate on the contract curve and the production possibilities curve is pulled in towards the origin (except at the intercepts). Second, factor-price differentials give rise to a divergence between the commodity market price ratio and the domestic marginal rate of transformation i.e. they give rise to the distortion: $MRS_{xy} = MRT^{f}_{xy} \neq MRT^{d}_{xy}$.

To prove this, consider the production functions $Y = Y(L_y, T_y)$ and $X = X(L_x, T_x)$ of industries Y and X, respectively, where L_i and T_i are labour and land, respectively, in industry i (i = X, Y). The total derivatives of these production functions are.

$$1. \quad dY = MPP_{Ly} \circ dL_y + MPP_{Ty} \circ dT_y$$

$$2. \quad dX = MPP_{Lx} \circ dL_x + MPP_{Tx} \circ dT_x$$

where MPP_{Li} and MPP_{Ti} stand, respectively, for the marginal physical product of labour and land in industry i (i = X, Y).

The total amount of land and labour is given and fully utilized. Thus

$$3. \quad dT_y = -dT_x = dT^2 > 0$$

$$4. \quad dL_y = -dL_x = dL^2 > 0$$

[2]To avoid misunderstanding, note that dT and dL are not changes in total land and labour, respectively. The symbols dT and dL without subscripts were introduced in order to write equation 5 as simply as possible.

Assuming perfect competition (ignoring the possibility that factors may not be remunerated according to their marginal productivity), we have: $W_x = p_x \cdot MPP_{Lx}$; $r_x = p_x \cdot MPP_{Tx}$; $W_y = p_y \cdot MPP_{Ly}$; and $r_y = p_y \cdot MPP_{Ty}$ where p_i, W_i and r_i are prices, labour costs to the employers per worker[3] and capital costs per unit of capital in industry i (i = X, Y). Substituting these assumptions into equations 1 and 2 and then forming the marginal rate of transformation in production, we have:

$$5. \quad -\frac{dY}{dX} = MRT^d_{xy} = \frac{\frac{P_x}{P_y}(W_y \cdot dL + r_y \cdot dT)}{W_x \cdot dL + r_x \cdot dT} = \frac{\frac{P_x}{P_y} \cdot \frac{r_y}{r_x}\left[\frac{W_y}{r_y} \cdot dL + dT\right]}{\frac{W_x}{r_x} \cdot dL + dT}$$

The equation above shows that if $r_x = r_y$ and $W_x \neq W_y$, then $MRT^d_{XY} \neq \frac{P_x}{P_y}$ and the ratio of the international price line will not be tangent to the shrunk in production possibilities curve.

A simple illustration may facilitate the understanding of the preceding discussion. Assume that the wage rate W_x in industry X is higher than the wage rate W_y in industry Y, that is $W_x > W_y$, but that the return on capital in each industry is equal, that is $r_x = r_y$. Thus, $(\frac{W}{r})_x > (\frac{W}{r})_y$. This implies that the economy is not on the contract curve, and therefore is on a shrunk in production possibilities curve. In the figure below, the solid curve AP_2B is the economy's true production possibilities curve (corresponding to being on the contract curve), while the broken curve AP_0P_1B is the economy's shrunk in frontier. The fixed international price ratio is illustrated by the absolute slopes of the parallel straight lines through P_0, P_1 and P_2. In an economy with a wage differential, therefore, the economy could produce at P_0 and consume at C_0. The economy fails to maximize national welfare because (a) it operates on the inferior frontier AP_0 P_1 B instead of the true frontier AP_2B and (b) it chooses on the inferior production possibilities curve a suboptimal point (P_0) instead of the optimal (P_1).

Both a tariff and a production tax (or subsidy) restrict the economy to operate on the inferior production possibilities curve A P_0 P_1 B. But whereas the effects of a tariff on welfare are uncertain (because of the distortions it creates in consumption), a production tax on Y and/or a production subsidy to X, at an appropriate rate to completely offset the divergence between MRT^d_{xy} and the international price ratio,

[3] Note that labour cost per worker will not necessarily be equal to wages received by workers because of subsidy or taxes on the use of labour.

$\frac{p_x}{p_y}$, can make the country better off. Thus, such production tax and/or production subsidy policy could make the country to produce at P_1 and consume at C_1.

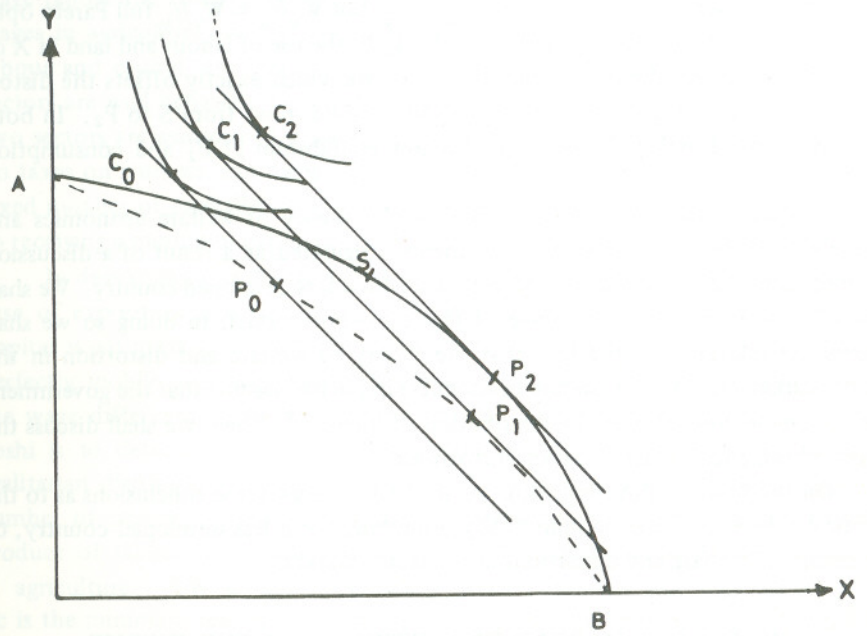

Figure 1

Full Pareto optimality, however, can only be achieved by means of appropriate taxes and subsidies on factor use. Here we must be careful. Recall that distortions in the factor market occured because $W_x > W_y$, while $r_x = r_y$. The fundamental equalities $W_x = W_y$ and $r_x = r_y$ can thus only be restored by (1) a subsidy to the use of labour in X; and (2) a tax on the use of labour in Y. The economy will then produce at P_2 and consume at C_2.

When a tax is imposed on the use of land in X or a subsidy to the use of land in Y, we have $W_x > W_y$ and $r_x > r_y$ even though we may have the equality $W_x/r_x = W_y/r_y$. Accordingly, in this case the economy may produce on its true production-possibilities curve, but at a suboptimal point such as S in Fig. 1. (Recall that in this case when $W_x/r_x = W_y/r_y$, we have from equation 5

$$MRT^d_{xy} = \frac{p_x}{p_y} \cdot \frac{r_y}{r_x} \text{ i.e.} \qquad MRT^d_{xy} < \frac{p_x}{p_y}$$

because $r_y/r_x < 1$ by assumption.)

We conclude that in the case $r_y = r_x$ and $W_x > W_y$ full Pareto optimality is restored by means of a subsidy to the use of labour in X and a tax on the use of labour in Y at a rate which exactly offsets the distortion. Such an optimal policy leads from a production equilibrium at P_0 to a production equilibrium at P_2 in Figure 1. However, if $W_x > W_y$ and $r_x > r_y$, but $W_x/r_x = W_y/r_y$ full Pareto optimality is restored by means of either a subsidy to the use of labour and land in X or a tax on the use of labour and land in Y at a rate which exactly offsets the distortion. In this case the production equilibrium would move from S to P_2. In both cases an optimal policy leads to production equilibrium at P_2 and consumption equilibrium at C_2.

We have now given a short survey of the theory of welfare economics and distortions in the factor market. This theory originated as a result of a discussion of what might be an optimal policy, especially for a less developed country. We shall now discuss the practical relevance of this distortion model. In doing so we shall discuss the relevance of the fact that the theory of welfare and distortion in the factor market (as do most welfare economics) implicitly assume that the government is in complete control over the distribution of income.[4] Then, we shall discuss the empirical evidence of factor market distortions.

On the basis of this discussion we shall try to draw some conclusions as to the practical relevance for economic policy, especially for a less developed country, of the theory of welfare and distortions in the factor market.

III. FACTOR MARKET DISTORTIONS AND THE INCOME DISTRIBUTION PROBLEM

The assumption of total government control over the distribution of income may be of doubtful relevance in analysing the optimal policy response to any market distortion. But, as pointed out by Anand and Joshi [1], the unrealism is particularly glaring in the case of certain factor market distortions. Thus, it would be very peculiar if the government was completely free to tax unionised workers and reduce their post-tax incomes below their wages to any extent it chooses. This would imply either that trade union activity is directed solely at maintaining the price of labour without any regard to the post-tax incomes of union members or that unionised workers suffer from perfect "tax illusion" and do not notice any difference between pre-tax and post-tax incomes. Neither of these alternatives is likely.

One important problem raised by Anand and Joshi, then, is whether it is a feasible and optimal policy for government intervention to correct factor market distortions to such an extent that the shrunk in production possibilities curve is

[4] Without this assumption the standard community indifference curves used by international trade theorists would be without any welfare significance (see Samuelson [44;46]).

moved outwards all the way to the true or maximum production possibilities curve when there are constraints on the possibilities of taxing labour income.

In their paper, Anand and Joshi investigate a standard dual economy (agriculture and industry) model with a factor price distortion in the form of a minimum wage (above the competitive wage) set by trade unions in the industrial sector, while wages in agriculture are competitively determined. The two factors of production, labour and capital, are fixed and inelastic in supply. Production functions in both sectors are well behaved. Goods prices are fixed by international trade, so that the two sectors are assumed to produce the same good, viz. foreign exchange. There are no taxes on workers, and the government can only tax profits in industry. There is a fixed number of capitalists who supply the entire capital stock inelastically, subject to receiving a minimum net income. The model is static and there is no saving.

In developing this model Anand and Joshi make the additional simplication for ease of exposition that the marginal product of labour in agriculture is constant. Capital is assumed to be immobile between sectors. Labour, on the other hand, is perfectly mobile and fully employed. Workers migrate between sectors because of the wage differential between the two sectors. The problem raised by Anand and Joshi is to determine optimum employment in industry, subject to a goal of an egalitarian distribution of income. Fig. 2 illustrates the relevant points. OQ is the number of capitalists, while 00′ is the total labour force. MM′ shows the marginal product of labour in industry, while mm′ shows the marginal product of labour in agriculture. OW is the exogenously given minimum real wage in industry. 0c is the minimum real net income that each capitalist receive. Laissez-faire (i.e. no government intervention) with a factor price distortion in the form of a minimum wage in the industrial sector equal to OW leads to employment 0L in industry and 0′L in agriculture. Profits in industry equals MJW.[5] However, maximum production at international prices requires that the country produces at Z with employment $0L^0$ in industry and $0'L^0$ in agriculture. This will result in a net gain in output of JZH and requires a subsidy of KZ per man in industry. The two crucial questions Anand and Joshi now rise are the following: (i) Is it feasible to reach Z, and (ii) is it desirable to reach Z?

(i) If workers cannot be taxed, it is feasible to reach Z if maximum government revenue from taxing profits exceeds the cost of the subsidy. The feasibility condition is $MmZ - 0Q\ C'c > WmZK$ which implies that we must have $MWJ - 0QC'c > KJZ$. If agricultural workers can be taxed, the condition becomes $MWJ - 0QC'c + 0'm'ZL^0 > KJZ$.

(ii) If the distribution of income is considered to be of no importance, the country should attain Z, or move as far towards Z as the tax revenue permits. However, with an egalitarian social welfare function it may not be desirable to reach

[5] All fixed costs are assumed to be zero.

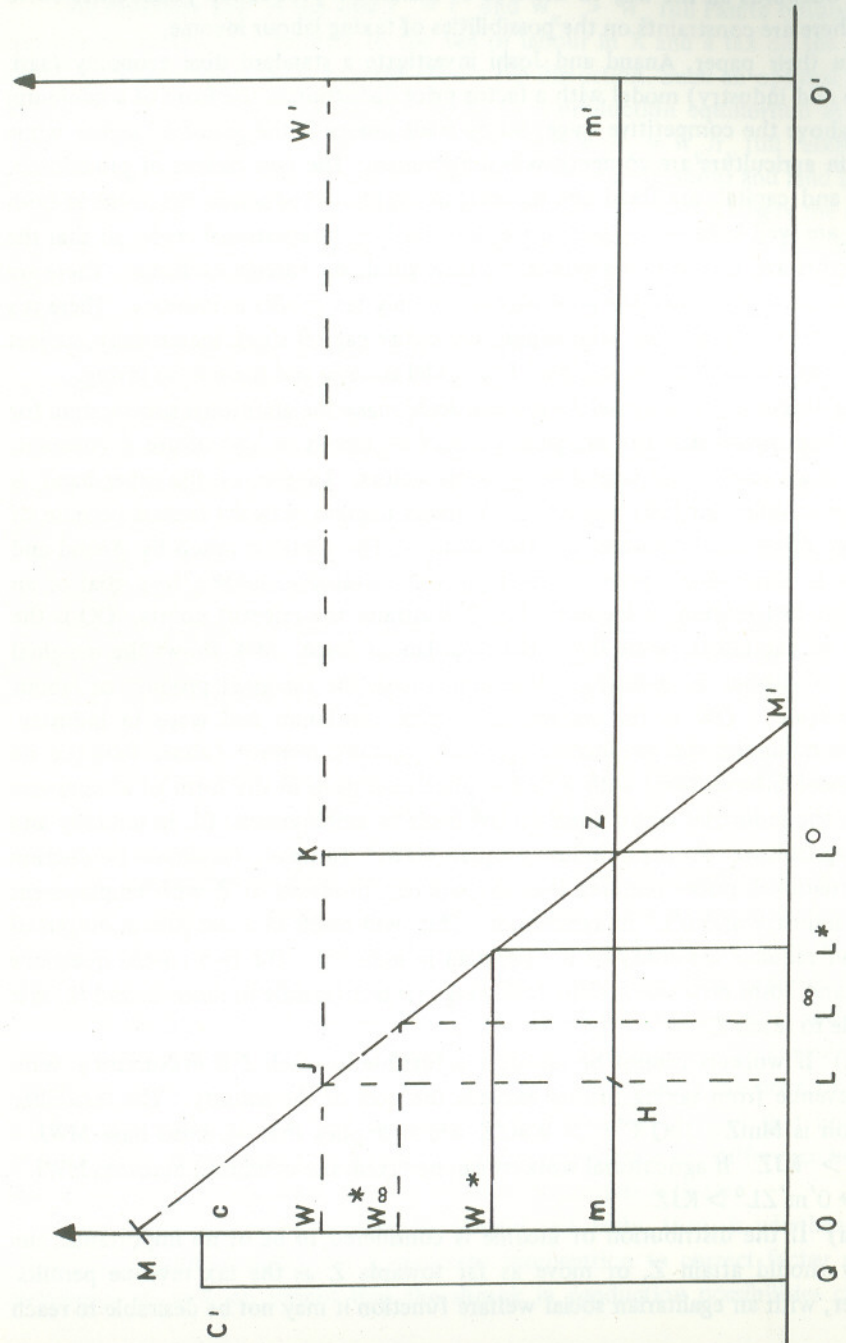

Figure 2

Z even if the tax revenue could make such a move possible. In this case, there will be a trade-off between production at international prices and equity. Thus, revenue (MWJ – 0QC'c) could either be used to subsidize manufacturing employment (implying a gain in production), or it could be used as a lump-sum transfer to the agricultural workers. Maximum production at Z (through an employment subsidy of KZ per worker in industry) and equality of labour incomes (through an income subsidy of KZ per worker in agriculture) at the same time can only be achieved when (MWJ – 0QC'c) $\geq$ KJZ + KZ m'W'.

However, when this condition is not met there will be a conflict between production and equity. Thus, moving towards Z by increasing industrial production by means of an employment subsidy is no longer an unqualified social benefit because this will reduce the surplus available for redistribution to the poor agricultural workers.

In order to analyse exactly where production and employment in such a situation will have to take place, Anand and Joshi use a symmetric additive welfare function as shown in equation 1.

$$\Pi = L \circ U(W) + (N - L) \circ U(y) + Q \circ U(c) \quad \ldots \quad (1)$$

In the equation above, we have the following symbols

L	=	employment in industry
W	=	industrial sector minimum wage
N	=	total labour force (assumed fixed)
y	=	income per capita in the agricultural sector, defined as

$$y = m + \frac{f(L) - WL - cQ}{N - L} \quad \ldots \quad \ldots \quad (2)$$

where we have the following additional symbols

m	=	marginal product in the agricultural sector
f (L)	=	the production function in the industrial sector
c	=	minimum net income of each capitalist
Q	=	total number of capitalists (assumed fixed).

Thus in equation 2 [f (L) – WL – cQ] is the industrial surplus available and used as an income transfer to the agricultural workers.

In equation 1 U (•) is the social valuation of individual income and satisfies $U'(\bullet) > 0$ and $U''(\bullet) \leq 0$

The problem is to choose industrial employment L^* so as to maximise social welfare Π, which implies setting $\delta\Pi/\delta L = 0$. Thus a necessary condition for optimum is

$$U(W) - U(y) + (N - L)\,U'(y) \cdot \frac{\delta y}{\delta L} = 0 \quad \ldots \quad \ldots \qquad (3)$$

$\delta y/\delta L$ can be substituted from equation 2. Thus, by differentiation of this equation, we have

$$\frac{\delta y}{\delta L} = \frac{f'(L) - W}{N - L} + \frac{f(L) - WL - cQ}{(N - L)^2}$$

$$= \frac{1}{N - L}\,(f'(L) - W + y - m)$$

Inserting this equation into equation 3 gives

$$f'(L) = W^* = W - \frac{U(W) - U(y)}{U'(y)} - (y - m) \qquad \ldots \qquad (4)$$

Equation (4) shows the marginal product of labour in industry maximising the social welfare function, i.e. the value of the shadow wage W^*.

To determine the limits for the shadow wage rate W^*, Anand and Joshi assume the following social valuation function $U(\cdot)$

$$U(y) = \begin{cases} \dfrac{1}{1 - \epsilon}\,y^{1 - \epsilon}, & \epsilon \geq 0 \\ \log y, & \epsilon = 1 \end{cases}$$

Inserting this equation into equation 4, we have

$$W^* = W - \frac{y}{1 - \epsilon}\left[\left(\frac{W}{y}\right)^{1 - \epsilon} - 1\right] - (y - m)$$

When $\epsilon = 0$, society puts the same weight on the income of every person, i.e. the society does not worry about the distribution of income, we have

$$W_0^* = m$$

This result corresponds to maximum production at international prices at Z in Fig. 2. When $\epsilon \to \infty$ social value is only placed on the income (s) of the worst off. Thus

$$W_\infty^* = W - (y - m) = (W - y) + m$$

This corresponds to a solution in which the surplus per worker in the agricultural sector is maximized. In general, for $0 < \epsilon < \infty$, the shadow wage W^* lies between the two extreme limits W_0^* and W_∞^*. The optimal employment associated with these limits of the shadow wage rate is given by L^0, and L^∞, respectively, in Fig. 2. Thus the upper limit of industrial employment is at Z. In this case, it is optimal to increase industrial employment until the value of output at world prices is maximum.

In general, optimal industrial employment will be somewhere between $0L^\infty$ and $0L^0$, and $0L^*$

What are, then, the implications of the analysis by Anand and Joshi for the Bhagwati-Ramaswami-Srinivasan model with a proportional wage differential between sectors? The Bhagwati-Ramaswami-Srinivasan equilibrium is, as pointed out in section II, characterized by the following two features: (a) the equilibrium would lie along a "shrunk-in" production possibilities curve corresponding to the wage distortion; and (b) the marginal rates of transformation between goods domestically and through trade would differ. On the basis of the analysis by Anand and Joshi we conclude that, in general, optimum welfare would imply $W^* \geq m$. Thus optimum would, in general, involve only partial off-setting of the wage distortion and would lie on a new production possibilities curve outside the old one, but still inside the maximum one (corresponding to being on the contract curve). Features (a) and (b) would continue to exist.

IV. THE EMPIRICAL EVIDENCE OF DISTORTIONS IN THE FACTOR MARKET

We now turn to the question of how important factor market distorations may be in the real world. If it can be shown that distortions in the factor market is of some empirical importance, then the previous analysis, including the analysis by Anand and Joshi, may be of importance for economic policy.

In dealing with the empirical evidence of distortions in the factor market, however, it is important to be aware of the fact that a differential in the factor rewards may not be due to a genuine distortion. Thus as pointed out by Bhagwati and Ramaswami [4], we do not have a genuine distortion in the factor market if a wage differential is due to e.g. "(1) a utility preference between occupations on the part of the wage-earners, or (2) a rent (on scarce skills), or (3) a return on investment in human capital (by training), or (4) a return on investment in the cost of movement (from the rural to the urban sector)". There is a genuine distortion, however, if a wage differential is attributable to e.g. "(5) trade-union intervention, or (6) prestige-cum-humanitarian grounds ("I must pay my man a decent wage") that fix wages at varying levels in different sectors". Thus, the previous analysis of distortions in the labour market applies, strictly speaking, only to distortions produced by e.g. reasons (5) and (6).

In the capital market a genuine distortion may not exist if a differential in the return on capital is due to a (7) risk premium, but may represent a genuine distortion if (8) the government or the banking system intervene in a discriminatory way in the capital market as it may happen with the interest rate facing the "modern" and "traditional" sector in many less developed countries.

Thus any observed differential in the return to a factor of production may be caused by both a genuine and a non-genuine distortion in the factor market. However, in empirical investigations it will usually be impossible to separate these two type of distortions, and one way to interpret an observed differential to a factor of production is that this differential is due exclusively to a genuine distortion in the factor market. To the extent that this may not be true, the genuine efficiency losses may both be less or greater than what has been estimated from existing empirical investigations, perhaps most likely less than these investigations show.

Only few empirical studies of the efficiency losses due to distortions in the factor market have so far been made. Thus, Harberger [22] has studied the cost of distortions in the labour market in the Chilean economy and concluded that the reallocation of labour would not raise national welfare by more than 15 percent. Dougherty and Selowsky [11] have examined the effects of wage differentials between industrial sectors for labour of equal quality in Columbia, and concluded that losses, due to misallocation of labour between sectors, were unlikely to be serious and most likely less than 2 percent of total output. However, these studies only consider the distortions that may exist in the labour market, and do not consider the loss in economic efficiency that may be due to distortions in the capital market. One reason why so few empirical studies of distortions in the factor market are available may be that data of both labour and capital in the different sectors and the return to these factors of productions only to a small extent have been available. One country for which such data have been available, however, is Norway, and I shall reproduce some of the results of a quite detailed empirical investigation of distortions in the factor market for this country Flϕystad [15].

Table 1 shows the return to labour and capital in Norway in the years 1955, 1961 and 1965 and the ranking of industries according to the return to these factors of production. The table is confined to the Manufacturing and Construction industries.

In table 1 the industries are classified in sheltered, import-competing and export industries. The prices on the commodities in the sheltered industries are not assumed to be affected by prices in the international market but by internal supply and demand, while the prices in the export and import-competing industries are supposed to be determined by the international market. The sector-specification used in this paper is with some minor modifications the same as in the model used to evaluate the consequences of an income settlement in Norway.[6]

[6] See, e.g., Aukrust [2].

Table 1

The Return to Labour and Capital, the Ranking of Industries According to the Return to these Factors of Production in 1955, 1961 and 1965, and the Increase of These Factors of Production in the Period 1955 – 1965. Return to Capital per one N. kr. of the Value of the Capital Equipment. Wages Per Man-Year in N. kr.

Industry	Return on Capital			Ranking of Industry According to the Return on Capital			Average Annual Rate of Increase	Wages Per Man-year			Ranking of Industry According to the Level of Wages			Average Annual Rate of Increase
	1955	1961	1965	1955	1961	1965	Capital	1955	1961	1965	1955	1961	1965	Labour
Sheltered Industries														
1. Food	.161	.099	.107	7	11	14	4.7	8.871	13.785	18.736	16	15	14	0.3
2. Beverages	.281	.184	.108	3	3	13	5.1	12.121	17.143	22.500	6	7	7	2.0
3. Wood and cork products, furniture and fixtures	.098	.083	.118	13	15	10	4.2	10.189	14.765	20.000	14	14	13	−1.5
4. Printing, publishing and allied industries	.107	.214	.205	12	1	1	4.3	11.038	16.098	17.554	12	10	15	4.3
5. Leather and rubber products	.096	.090	.119	15	14	8	2.0	11.379	15.385	20.556	10	12	11	−1.3
6. Non-metallic mineral products	.124	.137	.119	10	7	8	8.5	11.641	17.025	22.419	9	9	8	−0.5
7. Construction	.770	.145	.149	1	6	5	15.5	12.675	17.797	25.046	3	4	1	0.2
Import-competing Industries														
8. Tobacco	.273	.096	.000	4	12	17	7.3	11.053	15.263	20.556	11	13	11	−0.5
9. Textiles	.058	.092	.088	17	13	15	0.5	8.906	12.737	17.293	15	16	16	−1.5
10. Footwear, other wearing apparel and made-up textile goods	.226	.157	.150	5	5	4	2.8	8.371	12.287	16.638	17	17	17	−2.4
11. Iron, metalware and machine industries	.158	.129	.129	8	8	7	4.9	12.048	17.201	23.014	7	6	6	2.0
12. Electrical machinery etc.	.207	.185	.161	6	2	2	7.6	12.258	18.042	24.294	4	2	4	2.7
13. Transport equipment and repairing	.070	.081	.151	16	16	3	3.9	11.868	17.292	23.453	8	5	5	1.6
14. Miscellaneous manufacturing	.301	.177	.143	2	4	6	11.3	10.893	15.873	21.053	13	11	10	1.1

– Continued –

Table 1. – (Continued)

Industry	Return on Capital			Ranking of Industry According to the Return on Capital			Average Annual Rate of Increase	Wages Per Man-year			Ranking of Industry According to the Level of Wages			Average Annual Rate of Increase
	1955	1961	1965	1955	1961	1965	Capital	1955	1961	1965	1955	1961	1965	Labour
Export Industries														
15. Basic metal industry	.098	.118	.116	13	9	11	7.1	13.529	18.722	24.508	1	1	2	2.7
16. Paper and paper products	.140	.028	.023	9	17	16	4.5	12.186	17.143	21.628	5	7	9	0.4
17. Chemical and products of chemicals, petroleum and coal	.124	.109	.114	10	10	12	4.0	12.752	17.832	24.473	2	3	3	0.9

Source: *National Accounts 1950–1966*, Central Bureau of Statistics, Oslo 1968, tables 11 and 12, and capital, employee and employer figures obtained directly from Central Bureau of Statistics, Oslo.

Note: that computed remuneration to the employers was included in the wage figures and deducted from the total factor income figures in obtaining the return on capital figures. Computed remuneration to the employers was assumed to be the man-years performed, multiplied by wages per man-year obtained by the employees.

As shown in table 1, return on capital varies considerably between industries and the ranking of the return on capital by industry is quite different in 1955, 1961 and 1965. Moreover, it is also very likely that figures showing the return on capital for the whole postwar period would have shown considerable instability due to great fluctuations in the non-wage income.

Also the wages vary considerably between industries, but the wage structure has been much more stable than the structure of the return on capital. Thus, the difference between the ranking of wages in any industry in two different years in table 1 does not exceed 3 in more than 1 out of 17 industries. Moreover, the National Accounts show that the wage structure has been remarkably stable in the whole postwar period.

As shown in table 1, there seems to be a fairly clear relationship between the level of wages and the increase in employment. Thus, the 10 industries which in 1965 were paying the highest salaries had with one exception an increase in employment in the period 1955–1965, while the remaining industries paying least had with two exceptions a decrease in employment. The scant information available seems to suggest that it is not likely that the differences in wage level per man-year in the different industries can be explained to a large extent by differences in the skill composition between industries. Thus, the Norwegian Wage Statistics indicate that wages for the same type of skill in the different industires varied more or less in the same way as did total wages per man-year.[7]

The empirical evidence of the return to labour and capital indicates that the distortions in the factor market may be quite severe. This seems to be especially true for the return on capital.

In order to estimate the efficiency losses due to distortions in the factor market, I have estimated the technically efficient allocation of labour and capital in the 17 industries in table 1 in 1965. In doing so I used the following equations:

No. of equations

16 $$\frac{\frac{\delta X_1}{\delta L_1}}{\frac{\delta X_1}{\delta K_1}} = \frac{\frac{\delta X_2}{\delta L_2}}{\frac{\delta X_2}{\delta K_2}} = \ldots\ldots = \frac{\frac{\delta X_{17}}{\delta L_{17}}}{\frac{\delta X_{17}}{\delta K_{17}}} \quad (1)$$

16 $$X_2{}^{\circ} = X_2\,(K_2, L_2), \ldots\ldots$$
$$X_{17}{}^{\circ} = X_{17}\,(K_{17}, L_{17}) \quad (2)$$

2 $$K_1 + K_2 + \ldots\ldots + K_{17} = K_{\circ} \text{ and}$$
$$L_1 + L_2 + \ldots\ldots + L_{17} = L_{\circ} \quad (3)$$

where X_i, K_i and L_i are factor income, capital, and labour, respectively, in sector no i. $X_2{}^{0}$ ..... $X_{17}{}^{0}$ are factor income in sectors 2 .... 17, and K_0 and L_0 total

[7]See, [39].

capital and labour, respectively, in 1965. The production functions in equation 2 are assumed to show constant returns to scale.

In the system above we have 34 equations and 34 unknowns viz. $L_1 \ldots . L_{17}$ and $K_1 \ldots . K_{17}$ and the system is determined. Moreover, since labour and capital in all sectors have been determined from the equations above, factor income in sector no. 1 can be estimated by means of the production function for this sector (not shown in equation 2 above). The system above implies that the factor income in sector no. 1 is maximized subject to a given factor income in the other sectors and total labour and capital in all sectors in 1965.

In estimating a technically efficient situation, production functions showing constant return to scale and alternative elasticities of substitution between labour and capital were used. Thus, if the elasticity of substitution between labour and capital was assumed to be equal to one a Cobb-Douglas production function was used. If the elasticity of substitution between labour and capital was assumed to be different from one a CES production function of the type introduced by Arrow *et al.* was assumed. Moreover, in estimating the parameters in these production functions, it was necessary to use the wage/capital income ratios in the different industries in 1965. However, these wage/capital income ratios may fluctuate quite a lot from year to year, and in computations the ratios existing in 1955 and 1961 were also assumed to see the impact on the results.

The factor income in the 17 industries in table 1 was for several industries maximized one by one, subject to the factor income in the other industries and the total labour force and capital stock as observed in 1965. It appears that the results are not very sensitive to the industry in which the factor income is maximized.[8]

Table 2 shows the factor income in the Chemicals and products of chemicals etc. industry in 1965 if the factor income in this industry is maximized. The computations were run for alternative magnitudes of the elasticity of substitution between labour and capital σ_i assumed equal in all industries as well as for alternative wage/capital income ratios Z_i and alternative assumptions about how much of total depreciation is due to production and capital stock, respectively. Since, however, the results of the computations were not very sensitive to the type of depreciation function assumed, the discussion below will be confined to the case where depreciation is only due to production.[9]

As shown in table 2, the increase of factor income from a technically efficient reallocation of labour and capital between industries is to be between 100 and 400 mill. N.kr. depending on the elasticity of substitution between labour and capital,

[8] See Flϕystad [14] where I also reproduce the results for maximizing the factor income in the Paper and paper products industry.

[9] For details as to how these computations were made, see Flϕystad [15].

and the wage/capital income ratios assumed. This corresponds to an increase of total factor income in the 17 industries in table 1 of between 0.7 and 3%.[10]

Table 2

Factor Income in the Chemicals, etc. Industry in 1965, and the Factor Income in this Industry if Maximized in the Same Year Mill. N.kr.

	Factor Income				
		Maximized			
		σ_i			
	Observed or Computed	0.5	0.8	1.0	1.25
Z_{1955}[a]	1170	1289	1360	1408	1467
Z_{1961}[a]	1111	1273	1360	1412	1473
Z_{1965}[a]	1126	1317	1403	1453	1508

[a] The computations for 1965 were run using 1955, 1961 and 1965 wage/capital income ratios, respectively. Therefore, the table shows factor income in 1965 using these alternative wage/capital income ratios. Note that in using the wage/capital income ratios for 1955 and 1961, it was necessary to use computed factor income for 1965 as a reference for a comparison with the maximized figures of factor income, since using these wage/capital income ratios imply that the return on capital in 1965 has to yield. For more details, see Flϕystad [15].

This increase in the factor income seems to be quite independent of the wage/capital income ratios used. However, there is a clearly positive correlation between

[10] Total factor income in the 17 industries in table 1 was in 1965 14.689 Mill. N.kr. See CBS [38], table 11.

the factor income and the elasticity of substitution between labour and capital. This is due to the fact that a low elasticity of substitution between labour and capital results in a lesser reallocation of labour and capital than does a high elasticity.[11]

The technically efficient or optimal allocation of labour and capital between industries was especially sensitive to alternative wage/capital income ratios used. This is shown in table 3 and 4 where we reproduce the results of the computations for $\sigma_i = 1.25$ assumed equal in all industries.

From tables 3 and 4, it follows that one has to be very careful in drawing any conclusions about how labour and capital should be reallocated between industries in order to get a more technically efficient allocation of labour and capital, since the question about whether the actual labour and capital in one industry is less or more than what should be an optimal allocation of labour and capital heavily depends on prices on products and inputs, and thereby also on the wage/capital income ratios. Thus, in 6 out of 16 industries in table 3 (the Chemicals and product of chemicals etc. industry where the factor income was maximized is excluded), an industry which with the 1965 wage/capital income ratios had too much or the right amount of labour as compared to the optimal situation, had with the 1961 wage/capital income ratio too little labour, while two industries which with the 1965 wage/capital income ratio had too little labour with the 1961 wage/capital income ratio had too much labour. Similar conclusions also hold true for capital.

In table 5, we have computed the marginal return to labour and capital in a technically efficient situation for alternative magnitudes of the elasticity of substitution between labour and capital assumed equal in all industries, and compared the results with the observed figures.

The computations in this table were run for the wage/capital income ratios existing in the different industries in 1965.

As seen from table 5 the optimal return to labour and capital is quite independent of the magnitude of the elasticity of substitution between labour and capital. Thus the difference between optimal wages computed for the lowest and highest alternative of the elasticity of substitution between labour and capital did only differ by more than 300 N. kr. in a few industries, while for capital the difference is seldom more than 10%.

As seen from table 5, the actual wages are quite close to optimal wages. Thus, 15 out of 17 industries showed a difference between actual and optimal wages of less than 10% for the highest alternative of the elasticity of substitution between labour and capital, while only 9 out of 17 industries had a difference between actual and optimal return on capital of less than 10%.

[11] For more details as to these results, see Flϕystad [15].

Table 3

Actual Labour in 1965, Optimal Labour in 1965 = 100. The Factor Income in the Chemicals etc. Industry is Maximized for the Highest Alternative of the Elasticity of Substitution between Labour and Capital viz. 1.25. 1955, 1961 and 1965 Wage/Capital Income Ratios, Respectively. (Optimal Labour in Each Industry in 1965 = 100.)

	Industry	1955 Wage/Capital Income Ratios	1961 Wage/Capital Income Ratios	1965 Wage/Capital Income Ratios
	Sheltered Industries			
1.	Food	119,6	105,7	103,5
2.	Beverages	178,3	128,1	95,3
3.	Wood and cork products, furniture, and fixtures	91,9	95,9	103,5
4.	Printing, publishing and allied industries	103,9	144,8	135,3
5.	Leather and rubber products	92,1	96,7	103,6
6.	Non-metallic mineral products	81,6	98,5	100,0
7.	Construction	109,7	99,8	100,9
	Import-competing Industries			
8.	Tobacco	120,0	94,7	100,0
9.	Textiles	90,0	107,4	98,9
10.	Footwear, other wearing apparel, and made-up textile goods	115,5	114,5	112,7
11.	Iron, metalware, and machine industries	104,6	104,8	101,6
12.	Electrical machinery etc.	109,2	114,4	109,2
13.	Transport equipment and repairing	91,9	95,7	105,7
14.	Miscellaneous manufacturing	122,4	115,5	107,9
	Export Industries			
15.	Basic metal industries	77,2	96,8	93,8
16.	Paper and paper products	96,3	76,9	76,6
17.	Chemicals and products of chemicals, petroleum and coal	72,9	72,2	69,5

Table 4

Actual Capital in 1965, Optimal Capital in 1965 = 100. The Factor Income in the Chemicals etc. Industry is Maximized for the Highest Alternative of the Elasticity of Substitutions between Labour and Capital viz. 1.25. 1955, 1961 and 1965 Wage/Capital Income Ratios, Respectively. (Optimal Capital in Each Industry in 1965 = 100.)

	Industry	1955 Wage/Capital Income Ratios	1961 Wage/Capital Income Ratios	1965 Wage/Capital Income Ratios
	Sheltered Industries			
1.	Food	79,4	90,0	93,7
2.	Beverages	74,7	81,1	106,4
3.	Wood and cork products, furniture and fixtures	163,0	124,0	89,4
4.	Printing, publishing, and allied industries	85,4	45,7	50,2
5.	Leather and rubber products	139,3	116,2	91.5
6.	Non-metallic mineral products	175,7	102,3	99,7
7.	Construction	49,8	103,0	86,9
	Import-competing Industries			
8.	Tobacco	79,5	112,8	∞
9.	Textiles	162,7	83,0	103,9
10.	Footwear, other wearing apparel, and made-up textile goods	56,5	54,2	57,7
11.	Iron, metalware, and machine industries	87,1	84,4	93,9
12.	Electrical machinery etc.	82,9	74,5	81,7
13.	Transport equipment and repairing	190,2	132,2	82,3
14.	Miscellaneous manufacturing	64,4	67,1	78,6
	Export Industries			
15.	Basic metal industries	157,8	103,9	107,7
16.	Paper and paper products	104,0	455,7	555,0
17.	Chemicals and products of chemicals, petreolum and coal	87,5	79,3	80,8

Table 5

Wages and Return on Capital in 1965, Wages and Return on Capital Computed from the Production Function Using 1965 Data of Labour and Capital, Wages and Return on Capital in the Optimal Situation for Alternative Magnitudes of the Elasticity of Substitution between Labour and Capital, and the Relative Marginal Return to Labour and Capital (The Relative Marginal Returns to These Factors of Production in the Electrical Machinery etc. = 100) for an Elasticity of Substitution between Labour and Capital Equal to 1.25. Factor Income in the "Chemicals and Products of Chemicals etc." Industry is Maximized. Wages per Man-year in N. kr. Return on Capital per One N. kr. of the Value of the Capital Equipment

Industry	Return Capital 1965	Computed Returns on Capital *	Return on Capital in the Optimal Situation σ_i 0.5	0.8	1.0	1.25	Wages 1965	Computed * Wages	Wages in the Optimal Situation σ_i 0.5	0.8	1.0	1.25	Relative Returns Electrical=100 σ_i=1.25
Sheltered Industries													
1. Food	0.107	0.107	0.098	0.099	0.100	0.101	18736	18725	19598	19446	19355	19251	73.9
2. Beverages	0.108	0.108	0.110	0.112	0.113	0.114	22500	22437	22124	21889	21754	21608	83.0
3. Wood and cork products, furniture and fixtures	0.118	0.118	0.104	0.106	0.107	0.108	20000	20000	20765	20668	20608	20539	78.9
4. Printing, publishing and allied industries	0.205	0.205	0.108	0.112	0.115	0.118	17554	17560	21597	21897	22103	22367	85.9
5. Leather and rubber products	0.119	0.119	0.106	0.108	0.110	0.111	20556	20516	21310	21192	21120	21038	80.8
6. Non-metallic mineral products	0.119	0.119	0.114	0.116	0.117	0.118	22419	22404	22921	22705	22577	22435	86.2
7. Construction	0.149	0.149	0.126	0.129	0.131	0.133	25046	25046	25309	25276	25259	25236	96.9
Import-competing Industries													
8. Tobacco	0.000	0.000	0.102	0.105	0.107	0.108	20556	20556	20528	20554	20555	20556	79.0
9. Textiles	0.088	0.088	0.087	0.088	0.089	0.090	17293	17287	17349	17248	17118	17123	65.8
10. Footwear, other wearing apparels and made-up textile goods	0.150	0.150	0.091	0.093	0.095	0.097	16638	16630	18178	18232	18268	18313	70.3
11. Iron, metalware and machine industries	0.129	0.129	0.118	0.120	0.121	0.123	23014	23017	23581	23470	23402	23326	89.6

– Continued –

Table 5 – *(Continued)*

	Industry	Return Capital 1965	Computed Returns on Capital*	Return on Capital in the Optimal Situation σ				Wages 1965	Computed Wages*	Wages in the Optimal Situation				Relative Returns Electrical=100
				σ_i 0.5	0.8	1.0	1.25			σ_i 0.5	0.8	1.0	1.25	σ_i=1.25
12.	Electrical machinery etc.	0.161	0.161	0.131	0.134	0.136	0.137	24294	24311	26312	26195	26121	26034	100.0
13.	Transport equipment and repairing	0.151	0.151	0.123	0.126	0.128	0.129	23453	23453	24724	24636	24581	24516	94.2
14.	Miscellaneous manufacturing	0.143	0.143	0.112	0.115	0.116	0.118	21053	21097	22527	22460	22416	22366	85.9
	Export Industries													
15.	Basic metal industries	0.116	0.116	0.119	0.121	0.122	0.123	24508	24508	23881	23609	23454	23288	89.5
16.	Paper and paper products	0.023	0.023	0.077	0.083	0.087	0.092	21628	21622	15457	16310	16846	17459	67.1
17.	Chemicals and products of chemicals, petroleum and coal	0.114	0.114	0.118	0.120	0.121	0.122	24473	24473	23703	23425	23268	23099	88.7

Source: for base year: National Accounts 1950 – 1966, Central Bureau of Statistics, Oslo 1968, tables 11 and 12, and capital, employee and employer figures obtained directly from Central Bureau of Statistics, Oslo.

**Note:* that computed return to labour and capital using 1965 data is independent of the elasticity of substitution between labour and capital.

Also, as seen from table 5 there is a quite significant difference in the marginal return to labour and capital between industries in a technically efficient situation. As shown in the last column, the marginal returns to labour and capital is less than 80% of the marginal returns in the Electrical etc. machinery, where the marginal returns in a technically efficient situation is the highest, in 6 out of 17 industries. These results refer to an elasticity of substitution between labour and capital equal to 1.25,.but other alternatives of this elasticity would have given similar results, indicating that quite serious distortions may exist in the factor market even in a technically efficient situation.[12]

The optimal return to labour and capital also varies significantly between industries for alternative wage/capital income ratios assumed. This is shown in tables 6 and 7 where we show the optimal return to labour and capital for alternative wage/capital income ratios, and for an elasticity of substitution between labour and capital equal to 1.25. The difference still found in the marginal return to labour and capital in an optimal situation between industries are not very surprising given the fact that the wage/capital income ratios are fluctuating quite a lot from year to year. Thus, it would most likely only happen by chance that the marginal returns to labour and capital would become equal in the different industries. This, however, indicates that the conclusions of quite serious distortions in the factor market which were found in the technically efficient situation for 1965 using the 1965 wage/ capital income ratios do not have to be significantly modified when other wage/ capital income ratios are assumed.

From the analysis in this section, we may conclude:

(a) The return to labour and capital varies quite a lot between industries in the Norwegian economy as it also may do in many other countries.[13] The structure of wages seems quite stable over time, while the structure of the return on capital is quite unstable mostly due to business cycles. This may indicate that quite important distortions exist in the factor market although they may not necessarily be due to genuine distortions.

(b) However, there would not be much to gain in terms of increased production from a technically efficient reallocation of labour and capital between industries. The maximum possible increase in production seems to be at most 3% of output.

This last conclusion is not very sensitive to alternative assumptions of the magnitude of the elasticity of substitution between labour and capital as well as to assumptions of alternative depreciation functions and wage/capital income ratios.

[12] However, these differences in the marginal return to labour and capital between industries may not be due to genuine distortions in the factor market as our previous discussion may indicate.

[13] See Fløystad [16].

Table 6

Actual and Optimal Wages in 1965. The Factor Income in the Chemicals etc. Industry is Maximized for the Highest Alternative of the Elasticity of Substitution between Labour and Capital viz. 1.25. 1955, 1961, and 1965 Wage/Capital Income Ratios, Respectively. Wages per Man-year in N. kr.

Industry	Actual	1955 Wage/Capital income Ratios	1961 Wage/Capital Income Ratios	1965 Wage/Capital Income Ratios
		Optimal	Optimal	Optimal
Sheltered Industries				
1. Food	18736	21626	19568	19251
2. Beverages	22500	36230	27271	21608
3. Wood and cork products, furniture, and fixtures	20000	18699	19350	20539
4. Printing, publishing, and allied industries	17554	18089	23575	22367
5. Leather and rubber products	20556	19286	19956	21038
6. Non-metallic mineral products	22419	19086	22161	22435
7. Construction	25046	26980	25018	25236
Import-competing Industries				
8. Tobacco	20556	23433	19824	20556
9. Textiles	17293	15890	18296	17123
10. Footwear, other wearing apparel, and made-up textile goods	16638	18665	18515	18313
11. Iron, metalware, and machine industries	23014	23858	23906	23326
12. Electrical machinery etc.	24294	26090	26995	26034
13. Transport equipment and repairing	23453	21923	22647	24516
14. Miscellaneous manufacturing	21053	24793	23595	22366
Export Industries				
15. Basic metal industries	24508	19928	23870	23288
16. Paper and paper products	21628	20970	17534	17459
17. Chemicals and products of chemicals, petroleum, and coal	24473	22747	23625	23099

The optimal allocation of labour and capital, and optimal return to these factors of production seem, however, to be quite sensitive to cyclical fluctuations in the wage/capital income ratios. This is especially true for capital. Therefore, one has to be very careful in drawing any conclusions about what should be done in order to make the allocation of labour and capital between industries more technically efficient.

Table 7

Computed, Observed and Optimal Return on Capital in 1965. The Factor Income in the Chemicals etc. Industry is Maximized for the Highest Alternative of the Elasticity of Substitution between Labour and Capital viz. 1.25. 1955, and 1965 Wage/Capital Income Ratios, Respectively. Return on Capital per One N.kr. of the Value of the Capital Equipment

Industry	1955 Wage/Capital Income Ratios		1961 Wage/Capital Income Ratios		1965 Wage/Capital Income Ratios	
	Computed	Optimal	Computed	Optimal	Observed	Optimal
Sheltered Industries						
1. Food	.152	.127	.104	.096	.107	.101
2. Beverages	.268	.212	.159	.133	.108	.114
3. Wood and cork products, furniture, and fixtures	.074	.109	.080	.095	.118	.108
4. Printing, publishing, and allied industries	.121	.106	.216	.115	.205	.118
5. Leather and rubber products	.088	.113	.088	.098	.119	.111
6. Non-metallic mineral products	.071	.112	.107	.108	.119	.118
7. Construction	.276	.158	.120	.122	.149	.133
Import-competing Industries						
8. Tobacco	.169	.137	.091	.097	.000	.108
9. Textiles	.064	.093	.104	.090	.088	.090
10. Footwear, other wearing apparel, and made-up textile goods	.173	.109	.149	.091	.150	.097
11. Iron, metalware, and machine industries	.156	.140	.134	.117	.129	.123
12. Electrical machinery etc.	.178	.153	.168	.132	.161	.137
13. Transport equipment and repairing	.077	.128	.089	.111	.151	.129
14. Miscellaneous manufacturing	.207	.145	.160	.115	.143	.118
Export Industries						
15. Basic metal industries	.081	.117	.113	.117	.116	.123
16. Paper and paper products	.119	.123	.026	.086	.023	.092
17. Chemicals and products of chemicals, petroleum and coal	.124	.133	.111	.116	.114	.122

V. CONCLUSIONS

The theory of distortions in the factor market originated as a result of a discussion of what might be an optimal policy, especially for a less developed country, in an economy with wage differentials in the labour market. One of the conclusions of this discussion was that an economy with genuine distortions in the factor market can only achieve full Pareto optimality by means of appropriate taxes and/or subsidies on factor use.

This analysis implicitly assumed that the government is in complete control of the distribution of income. If this is not true Anand and Joshi have shown that: (a) it may not be possible to offset market distortions fully even if it were desirable to do so since government revenue may be insufficient for the purpose; and (b) it may not be desirable to offset market distortions fully even if it were possible to do so, since this may imply reduction in government revenue available for income distribution policy. Thus, departures from a technically efficient allocation of resources may be called for as part of a rational response by governments to the limitations they face in carrying out a desirable redistribution policy.

Although considerable attention has been given to the theoretical aspects of distortions in the factor market, few empirical studies have been made. One such study is by the present author using data for Norway. The main conclusions of this study is that it would not be much to gain in terms of increased production from a technically efficient reallocation of labour and capital between industries. Also, the technically efficient allocation of labour and capital is quite sensitive to alternative magnitudes of certain parameters in the production function, especially to the wage/capital income ratios which may vary over time due to e.g. business cycles. Therefore, one has to be very careful in deciding what is in fact a technically efficient allocation of labour and capital between industries and also in deciding what should be done to make this allocation more technically efficient. Moreover, at least in the case of Norway, the analysis made by Anand and Joshi may not be of great practical importance. However, one can not exclude the possibility that their analysis may be of importance for some less developed countries.

The empirical evidence of distortions in the factor market should not mean that a less developed country should pay no attention to distortions in the factor market. Distortions in the factor market may be of importance in some sectors of the economy in any country, although they may not be of importance for the economy as a whole. Also, in the theoretical literature, the type of distortion in the factor market that has been put to the forefront has been that of wage differentials. However, the distortions that may exist in the capital market may be the most important. Thus, in many less developed countries governments and banks discriminate between the traditional and the modern sector, so that the rate of interest facing the traditional sector is much higher than the one facing the modern sector. Not only does this type of discrimination create a technically inefficient allocation of labour and capital between industries, but results also in a distorted distribution of income in favour of the well to do in the modern sector. Thus, if a less developed country is in favour of both a more equal distribution of income and a more technically efficient allocation of labour and capital between industries, it should try hard to get the capital market working more perfect.

REFERENCES

1. Anand, S., and V. Joshi. "Domestic Distortions, Income Distribution and the Theory of Optimum Subsidy". *The Economic Journal.* Vol. 89. June 1979. pp. 336–352.
2. Aukrust, O. "Prim I: A model of the Price and Income Distribution Mechanism of an Open Economy". *Review of Income and Wealth.* Series 16. Number 1. March 1970. pp. 51–79.
3. Bhagwati, J. "The Generalized Theory of Distortions and Welfare". In J. Bhagwati *et al.* (Eds.). *Trade, Balance of Payments, and Growth, Papers in International Economics in Honour of Charles P. Kindleberger.* North-Holland Publishing Company, Amsterdam. 1971.
4. Bhagwati, J. and V.K. Ramaswami. "Domestic Distortions, Tariffs, and the Theory of Optimum Subsidy". *Journal of Political Economy.* Vol. LXXI. No. 1. February 1963. pp. 44–50. Reprinted in R.E. Caves and H.G. Johnson (Eds.), AEA. *Readings in International Economics.* Richard D. Irwin, Inc., Homewood, I11., 1968.
5. Bhagwati, J. and T.N. Srinivasan. "Domestic Distortions, Tariffs and the Theory of Optimum Subsidy: Some Further Results". *Journal of Political Economy.* Vol. 77, No. 6. September 1969. pp. 1005–1010.
6. Bhagwati, J. and T.N. Srinivasan. "The Theory of Wage differentials: Production Response and Factor Prize Equalization". *Journal of International Economics.* Vol. 1. February 1971 pp. 19–35.
7. Chacholiades, M. *International Trade Theory and Policy.* Tokyo: McGraw-Hill Kogakusha, Ltd. 1978.
8. Cairnes, J.E. *Some Leading Principles of Political Economy.* Macmillan and Company, Ltd., London. 1874.
9. Corden, W.M. "Tariffs, Subsidies and the Terms of Trade". *Economica* (N.S.). Vol. 24. August 1957. pp. 235–242.
10. Corden, W.M. *Trade Policy and Economic Welfare.* Oxford University Press, London. 1974.
11. Dougherty, C. and M. Selowsky "Measuring the Effects of the Misallocation of Labour". *The Review of Economics and Statistics.* Vol. LV. August. 1973. pp. 386–390.
12. Eckaus, R.S. "The Factor-Proportions Problem in Underdeveloped Areas". *American Economic Review.* Vol. 45. September 1955. pp. 539–565. Reprinted in A.N. Agarwala and S.P. Singh (Eds.). *The Economics of Underdevelopment.* Oxford University Press, London, 1958.
13. Fishlow, A. and P.A David. "Optimal Resource Allocation in an Imperfect Market Setting". *Journal of Political Economy.* Vol. LXIX. No. 6. December 1961. pp. 529–546.

14. Flϕystad, G. "Allocation Problems in an Distorted Economy". (Bergen, The Norwegian School of Economics and Business Administration, 1972, revised 1974 and 1976) (Mimeo.).
15. Flϕystad, G. "Distortions in the Factor Market: An Empirical Investigation". *The Review of Economics and Statistics.* Vol. LVII. May 1975. pp. 200–213.
16. Flϕystad, G. "Factor Price Equalization in Theory and Practice – A Study of Mainly Norwegian Data". *Weltwirtschaftliches Archiv.* Band 109, Heft 4. 1973. pp. 554–578.
17. Haberler, G. *The Pure Theory of International Trade.* William Hodge and Company, London. 1936.
18. Haberler, G. "Some Problems in the Pure Theory of International Trade". *Economic Journal.* Vol. LX. No. 238. June 1950. pp. 223–240. Reprinted in R.E. Caves and H.G. Johnson (Eds.), AEA *Readings in International Economics.* Richard D. Irwin, Inc., Homewood, I11, 1968.
19. Haberler, G. *A Survey of International Trade Theory.* Princeton University Special Papers in International Economics. No. 1. International Finance Section, Department of Economics, Princeton University, Princeton, N.J. 1961.
20. Hagen, E.E. "An Economic Justification of Protectionism". *Quarterly Journal of Economics.* Vol. 72. November 1958. pp. 496–514.
21. Hagen, E.E. "Reply". *Quarterly Journal of Economics.* Vol. 75. February 1961. pp. 145–151.
22. Harberger, A.C. "Using the Resources at Hand more Effectively". *American Economic Review.* Vol. XLIX. May 1959. pp. 134–146.
23. Herberg, H. and M.C. Kemp. "Factor Market Distortions, the Shape of the Locus of Competitive Outputs, and the Relation Between Product Prices and Equilibrium Outputs". In J. Bhagwati *et al.* (Eds.). *Trade, Balance of Payments and Growth, Papers in International Economics in Honour of Charles P. Kindleberger.* North Holland Publishing Company, Amsterdam. 1971.
24. Herberg, H. and S.P. Magee. "Factor Market Distortions, the Reversal of Relative Factor Intensities, and the Relation Between Product Prices and Equilbrium Outputs". *Economic Record.* Vol. 47. December 1971. pp. 518–530.
25. Johnson, H.G. "Factor Market Distortions and the Shape of the Transformation Curve". *Econometrica.* Vol. 34, No. 3. July 1966. pp. 686–698.
26. Johnson, H.G. "Optimal Trade Intervention in the Presence of Domestic Distortions". *In* R.E. Baldwin *et al.* (Eds.). *Trade, Growth and the Balance of Payments.* Rand-McNally and Company, Chicago, I11. 1965.

27. Jones, R.W. "Distortions in Factor Markets and the General Equilibrium Model of Production". *Journal of Political Economy.* Vol. 79. May-June 1971. pp. 437–459.
28. Lefeber, L. "Trade and Minimum Wage Rates". *In* J. Bhagwati, *et al.* (Eds.). *Trade, Balance of Payments and Growth, Papers in International Economics in Honor of Charles P. Kindleberger.* North-Holland Publishing Company, Amsterdam. 1971.
29. Lewis, W.A. "Economic Development with Unlimited Supplies of Labour". *Manchester School of Economic and Social Studies.* Vol. 22. May 1954. pp. 139–191. Reprinted in A.N. Agarwala and S.P. Singh (Eds.). *The Economics of Underdevelopment.* Oxford University Press, London. 1958.
30. Magee, S.P. "Factor Market Distortions, Production, Distribution, and the Pure Theory of International Trade". *Quarterly Journal of Economics.* Vol. 75. November 1971. pp. 623–643.
31. Magee, S.P. "Factor Market Distortions, Production, and Trade: A survey". *Oxford Economic Papers* (N.S.). Vol. 25. March 1973. pp. 1–43.
32. Magee, S.P. *International Trade and Distortions in Factor Markets.* Marcel Dekker, Inc., New York. 1976.
33. Manoilesco, M. *The Theory of Protection and International Trade.* P.S. King and Son, Ltd., London. 1931.
34. Meade, J.E. *The Theory of International Economic Policy.* Vol. II: *Trade and Welfare.* Oxford University Press, London. 1955.
35. Myint, H. "Infant Industry Arguments for Assistance to Industries in the Setting of Dynamic Trade Theory". *In* R. Harrod (Ed.). *International Trade Theory in a Developing World.* St. Martin's Press, Inc., New York. 1963.
36. Myrdal, G. *An International Economy.* Harper and Row, Publishers, New York. 1956.
37. Naqvi, Syed Nawab Haider. "Protection and Economic Development". *Kyklos.* Vol. XXII – *Fasc.* I. 1969. pp. 124–154.
38. Norway. Central Bureau of Statistics. *National Accounts 1950–1965.* Oslo 1968.
39. Norway. Central Bureau of Statistics. *Wage Statistics 1965.* Olso 1967.
40. Ohlin, B. *Interregional and International Trade.* Harvard University Press. Cambridge, Mass. 1933.
41. Ohlin, B. "Protection and Non-Competing Groups". *Weltwirtschaftliches Archiv.* Vol. 33 (Heft 1). 1931. pp. 30–45.
42. Prebish, R. "Commercial Policy in Underdeveloped Countries". *American Economic Review, Proceedings.* Vol. 49. May 1959. pp. 251–273.
43. Ramaswami, V.K. and T.N. Srinivasan. "Optimal Subsidies and Taxes When Some Factors are Traded". *Journal of Political Economy.* Vol. 76, No. 4. July-August. 1968. pp. 569–582.

44. Samuelson, P.A. "The gains from international trade once again". *Economic Journal.* Vol. 72. 1962. pp. 820–829.
45. Samuelson, P.A. "International factor price equalization once again". *Economic Journal.* Vol. 59. June 1949. pp. 181–197.
46. Samuelson, P.A. "Social indifference curves". *Quarterly Journal of Economics.* Vol. 70. 1956. pp. 1–22.
47. Viner, J. *Studies in the Theory of International Trade.* Augustus M. Kelly, Publishers, New York. 1965.
48. Viner, J. "The Theory of Protection and International Trade: A Review". *Journal of Political Economy.* Vol. 40. February 1932. pp. 121–125.