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DIPARTIMENTO DI ECONOMIA POLITICA
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SOMMARIO

Urban Unemployment and Gains from Trade under Capital Immobility (Disoccupazione urbana e guadagni dal commercio con immobilità di capitali)
CHI-CHUR CHAO, SAUWALUCK PAKOTIPRAPHA, and EDEN S.H. YU Pag. 385

Rent Seeking and the Byproduct Theory of Labor Movements (Ricerca di rendita e teoria dei movimenti sindacali)
JOHN H. MANGEL, CHARLES D. DELORME, Jr., and DAVID R. KAMERSCHEN » 399

Causality and Lag Structure Between Black Market Foreign Exchange Rates and Consumer Prices. A Case Study of Sudan (Causalità e struttura del ritardo tra il cambio estero al mercato nero e i prezzi al consumo. Il caso del Sudan) ABDEL-MAHMOUD M. ABDEL-RAHMAN » 423

Factor Efficiency in Pakistani Industry: The Influence of Private versus Public Ownership in Affecting Capital and Labor Productivity (Il fattore efficienza nell'industria pakistana: l'influenza della proprietà privata e pubblica sulla produttività del capitale e del lavoro)
ROBERT E. LOONEY » 449

Recensioni (Book-reviews) » 471

Libri ricevuti (Books Received) » 476

Relazioni di bilancio: Credito Fondiario e Industriale, Centrobanca, Credito Italiano » 478

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URBAN UNEMPLOYMENT AND GAINS FROM TRADE UNDER CAPITAL IMMOBILITY

by
CHI-CHUR CHAO *, SAUWALUCK PAKOTIPRAPHA **, and EDEN S.H. YU ***

I. *Introduction*

Since the pioneering work on urban unemployment by Harris and Todaro (1970), economists have explored the normative as well as the positive aspects of a dual economy characterized by an urban minimum wage. Bhagwati and Srinivasan (1974) and Basu (1984) suggest that the first best equilibrium for the dual economy can be achieved through a uniform wage subsidy or reductions of the urban minimum wage [1]. Feldman (1989) shows that urban unemployment may rise even when first best instruments are used [2].

Aside from explaining the first-best tools and related issues, another strand of the literature focuses on the second-best policy implications for the dual economy [3]. Due to a fixed urban wage, the return on urban capital has to bear all the adjusting to arrive at an equilibrium position in a two-factor,

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[1] BHAGWATI (1971) has shown in general that welfare is a monotonic increasing function of first best policy when a single distortion (minimum wage) is present.

[2] Also see CORDEN (1974) and CORDEN and FINDLAY (1975).

[3] See, for example, KHAN (1980, 1982), NEARY (1981), DAS (1982), BATRA and NAQVI (1987), BELADI (1988), FELDMAN and GANG (1990), CHAO and YU (1993) and HAZARI and SGRO (1991).

dual economy. A rise in the goods prices of urban sectors, for example, would be completely reflected in a higher return on urban capital, thereby attracting rural capital to move into urban sectors when capital is intersectorally mobile. The movement of capital leads to a fall in the marginal product of labor in rural sectors, which induces a rural to urban migration and thus causes a rise in the urban unemployment ratio (see Batra and Naqvi, 1987). On the contrary, when capital is sector-specific, capital would not move despite the existence of intersectorally rental differentials [4]. Hence, higher capital returns in urban sectors must be a result of expansions of urban production and the output expansion necessitates increased use of labor leading to a fall in the urban unemployment ratio (see Chao and Yu, 1990).

This paper will show that second-best policies can result in opposite movements of the urban unemployment ratio. Depending on the degree of intersectoral capital mobility, the policies can yield totally contrasting welfare impacts. Following Batra and Naqvi (1987), we consider three types of import substitution policies, i.e., tariffs, production tax-cum-subsidy to manufacturing and wage-tax-cum subsidy to manufacturing. Since it is quantitative restrictions rather than price controls which are effective constraints on imports in most developing countries (Bhagwati and Krueger, 1973), we will examine two additional import substitution policies, i.e., import quotas and voluntary export restraints (VERs), which were not considered at all by Batra and Naqvi (1987). As a secondary contribution, we will derive the relationship between the underemployment transformation frontier and the price line for the immobile capital Harris-Todaro economy. Contrary to Batra and Naqvi (1987), the price line is steeper than the slope of the transformation frontier at production equilibrium. This result is crucial for determining the urban unemployment rate as well as the ensuing welfare analysis.

The layout of the paper is as follows. Section II sets out the model and its assumptions. Section III derives the transformation curve under urban unemployment and capital immobility. Section IV analyzes the welfare effects of various import substitution and export promotion policies. Section V presents main conclusions.

II. *The Model*

The immobile capital Harris-Todaro model can be described as fol-

[4] The weakness of capital markets in developing countries may cause sluggish movements of capital between sectors.

lows. The economy consists of two sectors: rural (A or a) and urban (M or m). The output X_i ($i = a, m$) is produced by using two inputs, capital (K) and labor (L), and a linearly homogenous technology. Capital is sector specific and fully utilized due to flexibility in the real rental rates. Labor is mobile and is fully employed only in the rural sector as the rural real wage (w_a) is flexible, but the urban wage rate (w_m) is rigid causing urban unemployment.

The model can be represented by the following structural equations [5].

$$X_a = A(K_a, L_a) = L_a f_a(k_a) \tag{1}$$

$$X_m = M(K_m, L_m) = L_m f_m(k_m) \tag{2}$$

$$r_a = A_K = f'_a \tag{3}$$

$$r_m = pM_K = pf'_m \tag{4}$$

$$w_a = A_L = f_a - k_a f'_a \tag{5}$$

$$w_m = pM_L = p(f_m - k_m f'_m) \tag{6}$$

$$(1 + \lambda) w_a = w_m \tag{7}$$

$$L_a k_a = K_a \tag{8}$$

$$L_m k_m = K_m \tag{9}$$

$$L_a + (1 + \lambda) L_m = L \tag{10}$$

Eqs. (1) and (2) denote, respectively, the production functions for rural and urban sectors. Note that $k_i = K_i/L_i$, $i = a, m$. From profit maximization conditions, the factor rewards are determined by marginal productivity pricing as stated by (3)-(6), where p, w_i and r_i are the relative price of X_m, the wage rate and capital rental in sector i, respectively. Eq. (7) is the Harris-Todaro labor market equilibrium condition where λ is the ratio of the urban unemployed to the employed (L_u/L_m) [6]. Let K_i and L be the fixed endowments of (sector-specific) capital and labor; eqs. (8)-(10) describe the allocations of capital and labor.

---

[5] For ease of comparison, the notations of BATRA and NAQVI (1987) are retained in this paper.

[6] The urban unemployment *rate* is $L_u/(L_m + L_u) = \lambda/(1 + \lambda)$, which is a strictly monotone function with respect to λ.

III. *Underemployment Transformation Curve*

To analyze the welfare effects of various commercial policies, it is essential to develop at the outset the equilibrium relationship between the marginal rate of transformation and the domestic price ratio. By differentiating (1), (2) and (10) and using (5), (6) and (7), we obtain a relation between X_a and X_m in the presence of urban unemployment:

$$dX_a/dX_m = -p\,(1 + b) \tag{11}$$

where

$$b = [1/(1 + \lambda)]\, M_L\, L_M\, (d\lambda/dX_m) \tag{12}$$

Although (11) here appears identical to the corresponding equation in Batra and Naqvi (1987), the interpretation of the relationship between the slope of the underemployment transformation frontier and the domestic price ratio here is radically different from that in Batra and Naqvi (1987). They have shown that $d\lambda/dX_m > 0$ and, hence, $b > 0$; that is, the price line cuts the family of the transformation curves from below at production equilibrium. We will, however, show that here $d\lambda/dX_m < 0$ and, hence, $-1 < b < 0$, suggesting that at equilibrium the price line intersects the transformation frontiers from above [7].

The three key equations in this model are (6), (7) and (10). The equations can be rewritten to accommodate the policy variables of wage subsidies s_i $(i = m, a)$, as follows:

$$p\,(f_m - k_m f'_m) = (1 - s_m)\, w_m \tag{6'}$$

$$(1 - s_m)\,(1 + \lambda)\,(f_a - k_a f'_a) = (1 - s_a)\, p\,(f_m - k_m f'_m) \tag{7'}$$

$$K_a/k_a + (1 + \lambda)\,(K_m/k_m) = L \tag{10'}$$

Note that the above three equations contain three variables, k_a, k_m and λ and six parameters, p, s_a, s_m, w_m, K_a and L. Solving these three equations, we obtain

$$\partial k_a/\partial p > 0, \quad \partial k_a/\partial s_m > 0, \quad \partial k_a/\partial s_a < 0 \tag{13}$$

$$\partial k_m/\partial p < 0, \quad \partial k_m/\partial s_m < 0, \quad \partial k_m/\partial s_a = 0 \tag{14}$$

---

[7] Bhagwati and Srinivasan (1974, Figure 3) have shown graphically that the price line is steeper than the slope of the transformation frontier.

$$\partial\lambda/\partial p < 0, \quad \partial\lambda/\partial s_m < 0, \quad \partial\lambda/\partial s_a < 0 \tag{15}$$

To obtain the price-output responses, we differentiate (1) and (2), and then use (13) and (14) to yield

$$\partial X_a/\partial p < 0 \tag{16}$$

$$\partial X_m/\partial p > 0 \tag{17}$$

which indicates that the price-output responses are normal in the immobile capital Harris-Todaro model.

Taking the ratio of (16) and (17), we obtain the sign of the slope of the underemployment transformation frontier

$$\partial X_a/\partial X_m < 0 \tag{18}$$

Thus, the family of underemployment transformation frontiers remains negatively sloped, as in the mobile capital Harris-Todaro economy. However, the curvature of the transformation frontier with capital immobility will be steeper than that of the transformation frontier derived by Batra and Naqvi (1987) at any given ray from the origin.

In view of (11) and (18), we have $\partial X_a/\partial X_m = -p(1 + b) < 0$, which implies that $b > -1$. From (12), we know that the sign of b is solely determined by that of $d\lambda/dX_m$, which is $(d\lambda/dp)/(dX_m/dp)$. Since $\partial\lambda/\partial p < 0$ and $dX_m/dp > 0$ by (15) and (17), it is clear that $d\lambda/dX_m < 0$. It follows immediately that $b < 0$. Thus, the distortion parameter b is defined on $[-1, 0]$ in the present model.

Note that Batra and Naqvi (1987) have shown that $\partial\lambda/\partial p > 0$ in the mobile capital Harris-Todaro model. Here $\partial\lambda/\partial p$ is negative indicating that an increase in the relative price of M reduces the urban unemployment ratio. The economic intuition behind this result is as follows. An increase in p results in an expansion in the manufacturing output and more labor employment in the presence of fixed supply of urban capital. Consequently, the urban unemployment ratio falls.

With $b < 0$, we are now ready to show that under capital immobility export promotion policies are inferior to import substitution policies, a task to be dealt with in the next section.

IV. *Free Trade, Restricted Trade and Augmented Trade*

We will analyze the welfare effects of three types of import substitu-

tion policies: tariffs, import quotas and voluntary export restraints, and three types of export promotion policies: export subsidy, production tax-cum-subsidy to agriculture and wage subsidy to agriculture. These instruments constitute the sets of second or third best policies for an economy with unemployment caused by a urban minimum wage. The economy under study wishes to maximize its social welfare, $U = U(D_a, D_m)$, subject to its budget constraint:

$$D_a + pD_m = I \tag{19}$$

where p is the domestic price of X_m expressed in X_a, D_i is the consumption of the ith good, $i = a, m$, and I is the total income. A change in social welfare is

$$(1/U_a)\, dU \equiv dY = dD_a + pdD_m \tag{20}$$

where $U_a = \partial U/\partial D_a$

(A) *Import Substitution Policies*

We state first the conclusions followed by brief proofs [8].

Proposition 1: In the immobile capital Harris-Todaro economy, an introduction of import substitution policies enhances welfare if free trade exists initially. If trade is initially restricted by any kind of import substitution policies, more restricted trade may be better than less restricted trade.

(i) *Tariffs.* – As usual, we assume that all tariff revenue are costlessly distributed to the household sector, so that its total income (I) is now written as $I = X_a + pX_m + tp^*I_m$, where $I_m = D_m - X_m$ is the import volume of the manufacturing good and t is the rate of tariff.

To obtain the welfare effect of tariffs, we differentiate (19) and then use (11) and (20) to yield

$$dY/dt = tp^* (dI_m/dp)(dp/dt) - w_a L_m (\partial\lambda/\partial p)(dp/dt) \tag{21}$$

Note that $dI_m/dp < 0$, $\partial\lambda/\partial p < 0$ and $dp/dt = p^* > 0$. The first term on the right-hand side indicates the volume-of-trade effect, and the second term captures the employment effect. Both effects are generated by tariffs via changes in the domestic price ratio.

A careful examination of (21) reveals the following:

[8] Our results appear implicit in CORDEN's (1974, pp. 146-148) analysis, in which he notes that policy-induced increases in urban unemployment may dominate the gains from increased urban employment.

1. If initially $t = 0$, i.e., free trade, $dY/dt > 0$. Thus an introduction of tariff enhances welfare for this small economy.

2. As the tariff rises, welfare increases.

3. The welfare gain reaches its maximum when $dY/dt = 0$, showing that an optimal tariff (t^o) exists:

$$t^o = w_a L_m (\partial\lambda/\partial p)/p^* (dI_m/dp) \tag{22}$$

4. A further rise in the tariff will cause welfare to decline, $dY/dt < 0$, if the first term, $tp^* (dI/dt)$, dominates the second term, $-w_a L_m (d\lambda/dt)$ [9].

Thus, we conclude that a tariff may be better than free trade and a higher tariff may be superior to a lower tariff. The intuition behind this result is that in the immobile capital Harris-Todaro model, the tariff generates a welfare gain through the reduction in the urban unemployment ratio. This gain can offset the usual consumption and production losses associated with tariffs. Consequently, a small increase in tariff enhances welfare, and the welfare effect can be reversed for a large increase in tariff.

(ii) *Import Quotas.* – Assume that all quota rents are costlessly returned to the household sector, so that the total income is determined in the same way as in the earlier case of tariffs. Let the import be fixed at the given quota level, Q. The total income now is given by $I = X_a + pX_m + (p - p^*) Q$.

Differentiating (19), and then using (11) and (20) yields the welfare effect of quotas:

$$dY/dQ = (p - p^*) - w_a L_m (\partial\lambda/\partial p) (dp/dQ) \tag{23}$$

where the first term is the volume-of-trade effect and the second term is the price-induced employment effect.

In order to ascertain dY/dQ, we need to determine dp/dQ. Here dp/dQ can be obtained through the equilibrium condition of the manufactured good as

$$Q = D_m (p, Y) - X_m \tag{24}$$

where Y denotes welfare in terms of good 1 (real income). Differentiating (24) yields

[9] Utilizing $\lambda = L_u/L_m$, (21) can be written as $dY/dt = tp^* (dI_m/dp) (dp/dt) + w_a \lambda (\partial L_m/\partial p) (dp/dt) - w_a (\partial L_u/\partial p) (dp/dt)$. As pointed out by the referee, alhtough $\partial\lambda/\partial p$ is negative, $\partial L_u/\partial p$ may be positive (see the Appendix for a proof). This may explain why welfare is first rising and then falling as the policy instrument is progressively tightened.

$$dQ = -(e + s)(Q/p)\,dp + (m/p)\,dY \tag{25}$$

where $e = -(p/Q)(\partial D_m/\partial p)$ is the consumption substitution for a given real income and $m = p(\partial D_m/\partial Y)$ denotes the marginal propensity to consume the importable good. Note that $e > 0$ and $0 < m < 1$. Substituting (23) into (25), we obtain

$$dp/dQ = -[p - m(p - p^*)]/Q(e + s\alpha) < 0 \tag{26}$$

where $\alpha = 1 - m(1 - \beta)$ and $\beta = 1 + b$. Recall that $-1 < b < 0$. Hence, $\alpha > 0$. Note also that $p - m(p - p^*) = (1 - m)p + mp^* > 0$. It should be clear that $dp/dQ < 0$. A tightening of import quotas ($dQ < 0$) results in a higher relative price of the manufacturing good. This result appears consistent with that obtainable from the competitive, full employment framework.

Given $dp/dQ < 0$ and $d\lambda/dp < 0$, (23) reveals the following: if initially $p = p^*$, i.e., free trade exists, $dY/dQ < 0$. An introduction of a quota set below the level of imports under free trade ($dQ < 0$) necessarily results in a *higher* welfare. The welfare gain from quota reaches its maximum when $dY/dQ = 0$, implying the existence of an optimal quota, which can be solved implicitly from (23) as [10]

$$(p - p^*)/p^* = w_a L_m (\partial\lambda/\partial p)(dp/dQ)/p^* \tag{27}$$

(iii) *Voluntary Export Restraints.* – Finally, we consider another type of quantitative control, i.e., voluntary export restraints (VERs). The key difference between quotas and VERs is that the revenues from quotas are retained by the home country, whereas the VER rents accrue to foreign residents. The total income under VERs is now given by $I = X_a + pX_m$.

Similarly, by differentiating (19), we obtain the change in welfare due to VERs as

$$dY/dQ^* = -Q^*(dp/dQ^*) - w_a L_m (\partial\lambda/\partial p)(dp/dQ^*) \tag{28}$$

where Q^* is a VER. When the revenue from VERs accrues to the foreign country, changes in VERs generate the terms-of-trade effect as shown in the first term of the RHS of (28) and the price-induced employment effect in the second term.

The terms-of-trade or the price effect, dp/dQ^*, can be obtained from (24). Differentiating (24) and substituting (28) into (24), we obtain

[10] $(p - p^*)/p^*$ is the *implicit* tariff rate for the corresponding optimal quota. See CORDEN (1971, p. 213), WOODLAND (1982, Ch. 11) and CHAO, HWANG and YU (1993) for discussions.

$$dp/dQ^* = -p/Q^* (e + s\alpha + m) < 0 \tag{29}$$

Thus, an increase in VERs ($dQ^* < 0$), similar to the case of quotas, leads to an increase in the relative price of the manufactured good. Because $dp/dQ^* < 0$, the optimal VER is given by $-w_a L_m (\partial\lambda/\partial p)$.

It is notable that the two kinds of quantitative controls have welfare impacts similar to those of tariffs. If the level of quotas or VERs is set equal to the imports under tariff ($Q = Q^* = I_m$), the domestic price under optimum tariff in (22) is identical to that in (27) under optimal quota, implying tariff is equivalent to quota for an economy with urban unemployment.

However, the rankings between VERs and quotas are a bit complicated. By comparing (29) to (26), we have

$$dp/dQ|_Q \gtrless dp/dQ|_V \text{ as } p - p^* \gtrless p/(e + s\alpha + m) \tag{30}$$

where the subscript Q or V refers to the case of quotas or VERs. Note that $(p - p^*)$ is the volume-of-trade effect under quotas, and $p/(e + s\alpha + m)$ is equal to $-Q^* (dp/dQ)|_V$ in (29), denoting the terms-of-trade effect under VERs. The condition in (30) shows that quotas raise the domestic price of the imports by more (less) than do VERs for small (large) departures from free trade.

We now turn to compare the welfare effects of quotas and VERs. By using (28) and (23), we obtain the following result [11]

$$dY/dQ|_Q \gtrless dY/dQ|_V \text{ as } (p - p^*) \gtrless p/(e + s\alpha + m) \tag{31}$$

Hence, starting from free trade, $p = p^*$, an introduction of quotas or VERs raises welfare ($dY/dQ < 0$) and the increase in welfare due to quotas is larger than that of VERs; so quotas are superior to VERs. However, for a large deviation from free trade, a tightening of quotas lowers welfare ($dY/dQ > 0$) if the detrimental volume-of-trade effect outweighs the favorable effect. Moreover, if $(p - p^*) > p/(e + s\alpha + m)$, the reduction in welfare is larger in the case of quotas than VERs; so quotas are inferior to quotas. The above results can be summarized as:

Proposition 2: In the immobile capital Harris-Todaro economy, when the level of quotas or VERs is set equal to the imports under tariff, then (i) tariffs and quotas are equivalent; (ii) quotas are superior (inferior) to VERs for a small (large) deviation from free trade.

[11] $dY/dQ|_Q - dY/dQ|_V = [(p - p^*) + Q (dp/dQ)|_V] - w_a L_m (\partial\lambda/\partial p) [dp/dQ|_Q - dp/dQ|_V]$, where $Q (dp/dQ)|_V = -p/Q (e + s\alpha + m)$ by (29).

An analysis of two additional import substitution policies, production subsidy and wage subsidy to manufacturing, will be presented in the Appendix. In all cases, we find that the import substitution policy can be better than free trade and more price or quantitative restrictions can be superior to less price or quantitative restrictions.

(B) *Export Promotion Policies*

It is relatively straightforward to deduce the welfare effects of export promotion policies in the immobile capital Harris-Todaro model. Following Batra and Naqvi (1987), we consider three kinds of export promotion policies, i.e., export subsidy, production tax-cum-subsidy and wage subsidy to agriculture. The conclusions are as follows:

Proposition 3: In the immobile capital Harris-Todaro economy, an introduction of export subsidy or production subsidy to agriculture necessarily reduces welfare. An increase in these subsidy rates further reduces welfare. In contrast, the use of wage subsidy in agriculture is superior to free trade.

The equations instrumental for our analysis can be derived as follows:

(i) Export subsidy (e)

$$dY/de = \{1/(1 + e)\}\{ep^2 (dI_m/dp) + pw_a L_m (d\lambda/dp)\} \tag{32}$$

(ii) Production tax-cum-subsidy to agriculture (e_a)

$$dY/de_a = -\{1/(1 + e_a)\}\{e_a p_s^2 (dX_m/dp_s) - w_a L_m p_s (d\lambda/dp_s)\} \tag{33}$$

(iii) Wage subsidy to agriculture (s_a)

$$dY/ds_a = -w_a \{s_a (dL_a/ds_a) + L_m (d\lambda/ds_a)\} \tag{34}$$

where e is the rate of export subsidy so that $p(1 + e) = p^*$, e_a the production subsidy to agriculture so that $p_s(1 + e_a) = p^*$ and s_a the wage subsidy to agriculture. Note that while the equations are similar to those in Batra and Naqvi (1987), the interpretations of the welfare effects are radically the opposite.

It is notable that both the export subsidy and production tax-cum-subsidy to agriculture policies generate basically the same welfare effects. If free trade exists initially, i.e., $e = e_a = 0$, both $dY/de < 0$ and $dY/de_a < 0$ because $d\lambda/dp < 0$, $dX_m/dp_s > 0$ and $d\lambda/dp_s < 0$. Thus, both export subsidy and production tax-cum-subsidy to agriculture are inferior to free trade, contrary to Batra and Naqvi (1987). If e (e_a) exists initially, the

dY/de (dY/de_a) is unambiguously negative, showing that more subsidy to promote export is inferior to less subsidy.

It is interesting to note that among all the policies under study, the wage subsidy to agriculture is the only policy which yields a similar welfare effect as that deduced by Batra and Naqvi (1987).

From (34), we have $dY/ds_a > 0$ if $s_a = 0$ initially, indicating that wage subsidy to agriculture is superior to free trade. However, if s_a is present initially, dY/ds_a may display any sign, because $d\lambda/ds_a < 0$, as shown in (15) and $dL_a/ds_a > 0$ (see Batra and Naqvi, 1987, eq. (A10)).

V. *Concluding Remarks*

This paper explores the welfare effects of several second-best policies in an economy with urban unemployment. The main results obtained can be summarized as follows: In the immobile capital Harris-Todaro economy, (i) restricted trade is superior to free trade; (ii) more restricted trade can be superior to less restricted trade; and (iii) free trade in most instances is superior to augmented trade.

The welfare implications of various commercial policies are clear; for economies suffering from sticky urban wage and urban unemployment, barring the feasibility of the first-best policies, i.e., uniform wage subsidy, import-substitutioin policies should be chosen over export-promotion policies by developing countries characterized by imperfect capital markets with a low degree of capital mobility. In fact, in the 1970s, South Korea and Taiwan adopted import-substitution policies which proved quite successful in setting the stage for rapid economic growth in 1980s. Batra and Naqvi (1987) prescription of the use of export-promotion policies appears workable for quasi-developed countries where capital is fairly mobile between sectors. If the degree of capital mobility is dependent upon the time horizon, then import substitution dominates export promotion during the early stage of development. Argument for infant-industry protection is strengthened as infancy may be attributed to lack of sufficient capital due to capital immobility in a typical underdeveloped economy. Increasing capital mobility constitutes the structural change that facilitates the transition from import substitution to export promotion [12]. It is perceivable that between the two

[12] As pointed out by the referee, the desirability of import restrictions may also come from informational asymmetries at the firm level (see MAYER, 1984 and GROSSMAN and HORN, 1988).

polar cases of capital immobility and capital mobility, both policies may have some merits. In fact, casual observation supports that most developing countries adopt a mixture of import substitution and export promotion policies with varying proportions during various stages of development.

APPENDIX

Totally differentiating (6′), (7′) and (10′), and assuming $s_a = s_m = 0$ initially and noting that $dL = dK_m = 0$, we obtain

$$\begin{bmatrix} 0 & pk_m f''_m & 0 \\ -(1+\lambda)\, k_a f''_a & pk_m f''_m & A_L \\ -K_a/k_a^2 & -(1+\lambda)\, K_m/k_m^2 & K_m/k_m \end{bmatrix} \begin{bmatrix} dk_a \\ dk_m \\ d\lambda \end{bmatrix} = \begin{bmatrix} M_L\, dp + w_m\, ds_m \\ M_L\, dp + w_m\,(ds_m - ds_a) \\ 0 \end{bmatrix}$$

The determinant of the coefficient matrix is given by

$$D = pk_m f''_m [-A_L K_a/k_a^2 + (1+\lambda)\, k_a f''_a K_m/k_m] > 0$$

because $f''_i < 0$ $(i = a, m)$ under diminishing marginal productivity.

Solving for dk_a, dk_m and $d\lambda$, we obtain

$$dk_a = (1/D)\{(1+\lambda)\, A_L\,(K_m k_m^2)\,(M_L\, dp + w_m\, ds_m) + pw_m f''_m\,(K_m/k_m)\, ds_a\}$$

$$dk_m = (M_L\, dp + w_m\, ds_m)/(pk_m f''_m)$$

$$d\lambda = (1/D)\{(1+\lambda)^2\, k_a f''_a (K_m/k_m^2)\,(M_L\, dp + w_m\, ds_m) + pw_m\, k_m f''_m\,(K_a/k_a^2)\, ds_a\}$$

Differentiating (1), and using $\partial k_a/\partial p$ and $\partial L_a/\partial p = -(L_a/k_a)\,(\partial k_a/\partial p)$ yields

$$\partial X_a/\partial p = -(w_a/k_a)\,[(1/D)\, L_a\,(1+\lambda)\, A_L\,(K_m/k_m^2)\, M_L] < 0$$

Similarly, differentiating (2) and using $\partial k_m/\partial p$ and $\partial L_m/\partial p = -(L_m/k_m)\,(\partial k_m/\partial p)$ yields

$$\partial X_m/\partial p = -L_M M_L^2/pk_m^2 f''_m > 0$$

Next, differentiating $\lambda = L_u/L_m$ yields

$$\partial L_u/\partial p = \lambda\,(\partial L_m/\partial p) + L_m\,(\partial\lambda/\partial p)$$

$$= (M_L/D)\{\lambda A_L\,(L_m/k_m)\,(K_a/k_a^2) + (1+\lambda)\, L_m\, k_a f''_a\,(K_m/k_m^2)\} \gtrless 0$$

We succintly present the analysis on welfare effects of production subsidy and wage subsidy to manufacturing:

A. Production subsidy to manufacturing (e_m)

$$dY/de_m = -p^*\, e_m\,(dX_m/de_m) - w_a\, L_m\,(d\lambda/de_m)$$

B. Wage subsidy to manufacturing (s_m)

$dY/ds_m = w_a\{s_m(dL_a/ds_m) - (1-s_m)L_m(d\lambda/ds_m)$.

Although the two equations appear similar to the corresponding equations derived for the mobile capital Harris-Todaro model by Batra and Naqvi (1987), the interpretations between the two sets of equations are dramatically different. Note that while $dX_m/de_m > 0$ and $dL_a/ds_m | < 0$ (see Batra-Naqvi); unlike Batra and Naqvi, here $d\lambda/de_m < 0$ and $d\lambda/ds_m < 0$. Thus, if there is free trade initially ($e_m = 0$ initially), $dY/de_m > 0$; restricted trade in the form of a small production subsidy to M is superior to free trade. In the presence of an initial e_m, $dY/de_m \gtrless 0$, implying the existence of an optimal e_m.

Similarly, if $s_m = 0$ initially, $dY/ds_m > 0$. Thus, an introduction of a wage subsidy to M raises welfare, and welfare is maximized when $dY/ds_m = 0$.

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DISOCCUPAZIONE URBANA E GUADAGNI DAL COMMERCIO CON IMMOBILITÀ DI CAPITALI

Questo articolo mostra che in un'economia con immobilità di capitali del tipo Harris-Todaro le varie politiche di sostituzione delle importazioni sono migliori di quelle di promozione delle esportazioni. In particolare, il commercio con ristrizioni è migliore del commercio libero, il commercio con più ristrizioni può essere migliore del commercio con meno restrizioni e il commercio libero nella maggior parte dei casi è migliore del commercio stimolato. Vengono qui esaminati gli effetti sociali di restrizioni quantitative, per es. contingenti e restrizioni volontarie alle esportazioni, oltre che di vari strumenti tradizionali di prezzo.

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RENT SEEKING AND THE BYPRODUCT THEORY OF LABOR MOVEMENTS

by
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I. INTRODUCTION

This paper presents a byproduct theory of labor movements that is applicable to any economy. However, we provide empirical evidence from the U.S. economy. Our theory shows, using a rent-seeking model of union behavior and a standard collective bargaining model of wage determination, how resources are expended in excess of those traditionally believed. Real resources spent to capture monopoly rents, such as union organizers pushing for collective bargaining agreements with management and established unions lobbying for passage of various favorable labor laws and minimum wages, create no societal value. Tullock (1971), in his analysis of the emergence of revolutionary movements (and the subsequent review of such revolutionary activity by historians), emphasizes that some intellectuals paint a romantic, distorted picture of such events, particularly when the events lead to a public good. The same is true of economists who provide various theories of the organized labor movement. See, for example, Atherton (1973); Commons (1919); Dunlop (1958); Freeman and Medoff (1984); Marx (1906-1909); Perlman (1949); Ross (1956); Webb and Webb (1894, 1897). They fail to point out the self-interest aspect of the labor organizer and worker. We demonstrate in this paper that Tullock's byproduct theory is applicable to unions and their organizers. We maintain

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The authors are indebted to Gordon Tullock for suggesting, at an Allied Social Science Conference, the central point that underlies our reconsideration of the labor movement and David B. Robinson for his incisive comments.

that union leaders are self-interested rent seekers just as are the revolutionary leaders. They carry out unionization in the hope of private gain and produce such public goods as they do incidentally. Our primary objective is to show how Tullock's model can be used to explain how unions develop and how collective bargaining leads to a greater expenditure of resources than depicted by standard models. Since the byproduct theory of the labor movement involves "rent seeking" by labor leaders and their unions, we need to discuss briefly this concept.

Rent is the return to owners of resources above their opportunity costs. Rent seeking involves expanding resources to capture these returns in excess of opportunity costs. Rent-seeking activity includes the investment of time, money, energy, and any effort to capture rents.

Rents are created and sought under numerous circumstances. They are created naturally through the price system as well as artificially through government action. Rents are sought legally and/or illegally. When they are created naturally, shifts in the demand and supply functions result in excess profits or losses. Government regulation and action can result in excess returns in some sectors of the economy and excess profit to some individuals. Rents are created by granting monopoly powers to individuals or companies. This paper evaluates the nature, significance, and cost of rent seeking in labor movements.

Section II discusses the concept of rent-seeking costs. Section III reviews the byproduct theory of the labor movement in general. Section IV provides evidence of rent-seeking conduct in the U.S. labor movement. Section V discusses rent seeking within the collective bargaining process. Section VI discusses declining union U.S. membership. Section VII provides a summary and conclusions.

II. Concept of rent seeking and avoidance [1]

Government restriction on economic activity is common in most economies. The degree of controls and interventions differs widely among countries. Rent seeking involves the competition to capture rents created by governmental restriction, controls, and policy interventions.

More precisely, rent seeking means spending resources to establish, acquire, or maintain a government-granted monopoly or government-granted

[1] The review in this section draws heavily on DeLorme, Kamerschen and Redman (1992), and especially on Ampofo-Tuffuor, DeLorme and Kamerschen (1991).

monopoly power (Tullock, 1967; Krueger, 1974; Posner, 1975; Buchanan, 1980a, b, c; Tollison, 1982; Brooks and Heijdra, 1989; and other numerous works cited in our References). The concept of rent seeking in political economies was popularized by Krueger (1974), who estimated the welfare cost of quantitative restrictions on imports for India and Turkey. Earlier, Tullock (1967) pointed out the underestimation of the welfare costs from tariffs, theft, and the activities of monopolies with the Harberger triangle. An excellent pedagogical explanation and treatment of rent seeking is found in Tollison (1982), who illustrates the emerging theory of rent seeking and analyzes competitive and non-competitive models. Second-best considerations in the theory of rent seeking were pioneered by Bhagwati and Srinivasan (1980). The growth effect of distortions on small countries without substantial influence on trade is analyzed by Bhagwati (1968). Bhagwati (1982a, b) also extended Krueger's rent-seeking activities to include directly unproductive activity triggered by price distortions.

While most of the rent-seeking literature focuses on efforts to secure an existing privileged position, the concept also includes efforts to create a privileged position. There are several societal problems with rent seeking or directly unproductive profit-seeking activities in a partial equilibrium framework (Bhagwati, 1982a, b). There is a loss of consumer and producer surplus arising from monopolization. Also, all resources spent in the pursuit of artificially contrived economic rents – transfers from consumers to producers – result in a loss to society because they create no additional social product. Rent-avoidance expenditures decrease the rent to be captured and thus discourage rent seeking. They also represent a social waste of resources caused by the opportunity to seek an artificially created transfer and may constitute a large portion of the total cost of rent seeking.

Posner (1975) opines rent-seeking activity by a great many equally efficient potential contenders entirely dissipates monopoly power. Young and Magee (1987) demonstrate the conditions under competitive rent seeking where there are "no upper limits to redistributive lobbying" and all of the economy's resources could disappear into "an economic black hole". In Posner's extreme case, all monopoly rents (i.e., the Tullock rectangle) are included in the costs of monopoly along with (deadweight) loss (i.e., the Harberger triangle). However, for the social cost to equal the entire Harberger-Tullock trapezoid, Posner needs two axioms: (1) *dissipation axiom*: the total expenditure to obtain the rent is equal to the amount of the rent, and (2) *social wastefulness axiom*: the expenditure has no socially valuable byproducts (Fudenberg and Tirole, 1987, and Tirole, 1988) [2]. The dissipa-

[2] See TIROLE (1988, pp. 76-78). An additional assumption is the supply of inputs required to

tion axiom may not be satisfied unless there is a zero-profit free-entry situation. The social wastefulness axiom may not be satisfied if a regulated monopoly position is allocated by auction rather than by lobbying activity. Fisher (1985), as well as Fudenberg and Tirole (1987), suggests incomplete dissipation if rent seeking is not competitive, as incumbents may enjoy entry advantages over potential entrants, allowing existing firms to block entry. Even if firms are symmetric or nearly so, including, e.g., static and dynamic contestable natural monopolies, the social wastefulness axiom may not hold, as rents can be dissipated in a socially efficient manner. Pittman (1988) demonstrates that rent seeking is most likely in concentrated industries.

Moreover, because profits from the monopoly accrue over time, uncertainty leads to a significant reduction in rent-seeking activities over that predicted by simple, single-period models (Jadlow, 1985; Tullock, 1985; and Higgins, Shughart, and Tollison, 1985). However, Wenders (1987) argues when rent-defending costs by monopolies to maintain rather than attain monopolies are included, the social losses are increased. The limits to magnitude of rent seeking are generalized by DeLorme and Snow (1990), who show that within a general equilibrium framework, the precise limits to rent-seeking waste depend on the extent to which government subsidizes rent seekers and rent defenders through tax-financed grants, contracts, and favors. Thus, while rent-seeking behaviors waste some of the monopoly profit, exactly what fraction of the monopoly profit should be counted as a welfare loss depends on the situation. Nevertheless, there are likely to be large social losses from rent seeking for government monopolies [3]. Mishan (1981) estimates the losses from "non-productive activities" from seeking special favors or privileges in society at 50 percent of U.S. GNP. Before analyzing rent seeking in collective bargaining between labor and management, we present our byproduct theory of the labor movement.

III. Byproduct theory of the labor movement

Most of the literature on the union movement presents union activity as generating a collective bargaining process and the union organizer as an

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obtain the rent is perfectly elastic so the price cannot be bid up, e.g., rents can't be transferred to civil servants instead of being dissipated.

[3] For instance, DeLorme, Kamerschen and Mbaku (1986) and Mbaku and Paul (1989) demonstrate that resources devoted to rent-seeking activities can be a substantial portion in Cameroon as well as Africa in general. Political instability in Africa is analyzed from a rent-seeking perspective by Mbaku and Paul (1989).

unselfish person whose only interest is the general welfare of the worker. Estey (1981, p. 55) says, "The organizational structure of the labor union is referred to as democratic, because its chief officers are elected either by the general membership of the union or by their delegates at national union conventions, rather than appointed by their predecessors or their fellow officials". The final authority therefore rests in the hands of the members, not the officers, in this case power flows from the bottom of the organizational pyramid to the top. Our byproduct theory of the labor movement is an adaptation of the revolutionary model developed by Tullock (1971). We believe that Tullock's "rent-seeking" model of revolutionary behavior is equally suited to the motives and objectives of organized labor. Our model uses economic theory to challenge the unselfish notion of union activity as presented, for example, by Estey. We view unionization as an uprising of a coalition of workers who attempt to unionize the existing firm and, as a result, implement changes in the firm's work rules. The worker who organizes fellow workers is a rent seeker who pushes or lobbies to have legislation or workers' rules changed in his/her favor. An individual worker's decision to participate in the labor movement is motivated by self-interest and the collective bargaining contract, which we argue is the public good, is only the side effect or byproduct of the labor movement. An important aspect of our byproduct theory is the individual worker's assessment of the probability of union victory since this affects the worker's choice of either remaining neutral or joining a union. Tullock's byproduct theory can be adapted to the labor movement and briefly summarized by the equation $G_r \approx R_i \cdot L_v - P_i(1 - L_v) - L_w \cdot I_R + E$, where G_r is the net gain (or loss) to the worker from union participation rather than remaining neutral; R_i is the private reward to the worker for his/her participation such as opportunity to eventually become a union organizer or as side payments received if the union is successful; L_v is the likelihood of union victory assuming worker is neutral; P_i is the movement's private penalty imposed on the worker for participation in the labor movement if the union activity fails in organizing the firm; L_w is the likelihood of worker injury through participation in unionization where injury could occur through strike activity; I_r is injury suffered in unionization; E is psychic income or entertainment value from participation. While the probability is small that any individual worker will have a significant effect on the outcome of the overall struggle between management and labor, the role played by the union organizer and his/her staff is much more important in seeking "rents". Once the right to bargain collectively has become law, then the public-good aspect of this

contract drops out of the calculus. What is left is the push for further rent-seeking legislation.

The bottom line of this analysis is that individual workers tend to ignore the public-good aspects of labor union movements when deciding to participate (on either side) or to remain neutral. The most important variables are the rewards or punishments assessed by the respective sides. The entertainment variable (E) is probably not very important, at least given that rewards or punishment are significant since people are unlikely to incur a large degree of risk for fun. That discounted values of reward and punishment (rather than the generation of public goods) are the key variables in determining worker participation is not commonly recognized.

While the probability is small that any individual worker will have a significant effect on the outcome of the struggle, the role played by the union organizer is much more important. But even for the union organizers the public-good aspect drops out of their calculus, at least once the right to bargain collectively has become law.

IV. Evidence of rent seeking in the U.S. organized labor movement

Previous Empirical Evidence. – There are a number of empirical studies that support our view of rent seeking in the labor movement. For example, Hamermesh (1975) and Smith (1977) have investigated whether public employee unions, because of the absence of profit-motive in the public sector, the political vulnerability of elected officials, and the inelasticity of demand for public services, are more powerful than private sector unions. Rent seeking in the public sector consists of letter-writing campaigns, television advertising, and marches on city hall or the state capitol to create support for the union's objective. The public union can point out through its lobbying efforts that inconvenience and disruption can occur when public services are cut off when strikes occur. The findings of Hamermesh and Smith suggest that rent-seeking efforts by the public sector generate union wage effects that are not much larger than in the private sector unions. Bellante and Long (1981) have gone further than Hamermesh and Smith in empirically measuring the rents to public sector unions. Their empirical work suggests that even if one adjusts the public/private wage ratios for fringe benefits and employment stability, significant rents exist, on average, at all levels of government. But, they point out that even if competitive rent seeking equalized average rates of return between the private and public sector, it would merely disguise rather than solve the problem of over-

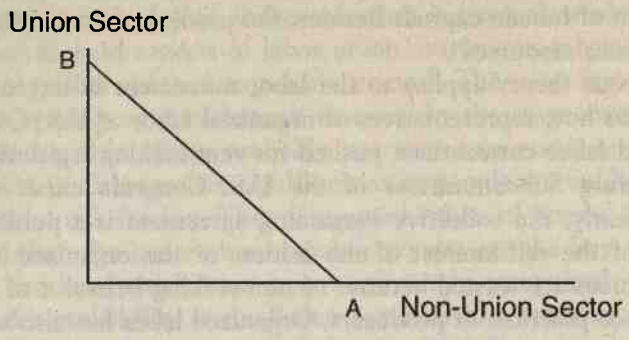
payment in the private sector. Bellante and Long (1981, p. 11) conclude, "Indeed, competitive rent-seeking worsens the problem by leading to a misallocation of human capital. Besides, the process of competition for rent itself consumes resources".

While our theory applies to the labor movement in any country, this section shows how representatives of organized labor at U.S. Congressional hearings and labor conventions pushed for rent-seeking legislation (see the hearings before Subcommittees of the U.S. Congress cited in our References). Clearly, the collective bargaining agreement is a public good and byproduct of the self-interest of the leaders of the organized-labor movement. Resources are wasted because of rent-seeking behavior of unions and rent-avoidance practices of producers. Organized labor has also sought rents through the passage of U.S. minimum wage legislation, as we show in a later section.

A Rent-Seeking Model of Union Behavior. – The recent literature on rent-seeking behavior stems from economists' reconsideration of the traditional assumption of costless transfer payments as well as costs implicit in restricting production and exchange. The labor movement is an excellent example of how resources are transferred (via successful rent-seeking activities) away from the non-union toward the organized sector. As Hirsch and Addison (1986, p. 274) point out, "... Unions are rent-seeking agencies that attempt to redistribute income in their favor at the expense of other groups in society". Such transfer may occur as a result of a labor organizer's attempt to persuade the existing open shop (i.e., unorganized plant) to vote in favor of formal union recognition that results in monopoly representation of a subset of the labor pool through a collective bargaining agreement. A simple example of such a transfer toward the union from the non-union (including management) sector is shown by the conventional zero-sum game, given identical endowments as well as identical utility functions for the participants.

Figure 1 shows two such players. On the vertical axis is the union organizer plus the rank and file. On the horizontal axis is the non-union sector where initial holdings (of both groups considered as a unit) are, for example, $ 100,000. Line segment AB reflects all possible divisions of the original endowment. Given the union movement effects a transfer (say by the threat of continued strikes, boycotts, sabotage, etc.) away from the non-union sector, we end up at point B. Of course, there has been no change in social welfare, but rather merely a transfer payment from one party to another, so that the non-union sector is worse off to the tune of

FIGURE 1
Rent Seeking between the Union and the Non-union Sector



$ 100,000 and the union $ 100,000 better off. The sum of endowments is the same after as before the transaction occurred.

The problem, however, is that such a model ignores any costs borne by the two parties that are bound to occur when such a game takes place. Surely the non-union sector is willing to incur some costs to prevent such an exchange. Given an interest rate of zero, and/or a time period that approaches zero the present value of the initial endowment approaches $ 100,000. Therefore the non-union sector is willing to incur costs of an amount just short of $ 100,000 to avoid such a transfer (see Tollison, 1982).

Organized labor in the U.S. has used the federal, state, and local governments to create artificial transfers of resources (i.e., rent-seeking activities) from the producer and/or consumer toward the union. Organized labor has been involved in lobbying activity via the American Federation of Labor (AFL, founded in 1881) and the Congress of Industrial Organizations (CIO, founded in 1935), as well as the combined AFL-CIO (founded in 1955).

Railway Labor Act (1926). – The first important piece of rent-seeking federal legislation in the U.S. that was lobbied for by the AFL as representative for organized labor was the Railway Labor Act (RLA) of 1926. Largely because of a series of strikes in 1922 and 1923, a joint conference of railroad labor and management met, wrote the Railway Labor Act, and recommended its passage to Congress. This act was significant for many reasons. It was the first federal or state legislative action to guarantee workers the right to organize and bargain collectively without interference from employers. It represents the beginning of formal U.S. labor law. Second-

ly, the RLA represented the first occasion the U.S. Supreme Court upheld the Constitutional right of Congress to extend legal protection to unions (see *Texas and New Orleans Railroad vs. Brotherhood of Railway Clerks*, 281 U.S. 548) and thereby provided a significant precedent for the Court's subsequent ruling on the National Labor Relations Act. Third, the RLA represents the sole federal labor relations law that has not been significantly changed since its initial passage. Finally, the RLA was the first federal legislation written jointly by management and unions.

National Labor Relations Act (1935). – The second most important piece of rent-seeking labor legislation that organized labor lobbied for was the National Labor Relations Act of 1935 (Wagner Act). The enactment of this legislation clearly transferred artificial rent from the non-union to the union sector.

The NLRA included three major features. First, the law extended to individual workers the right to organize and to bargain collectively with employers. Second, it provided a series of guidelines for employer behavior aimed at enhancing the rights extended to workers. Finally, the Wagner Act created the National Labor Relations Board (NLRB) with the responsibility to enforce the law. The NLRB handles only two major types of cases: (1) those involving alleged unfair labor practice violations of the behavioral guidelines; (2) questions about who is going to represent a given group of workers in collective bargaining negotiations.

Since it was understood that employers hated the RLA, the U.S. Congress assumed violations of employee rights would come exclusively from employers. For this reason, the Wagner Act established unfair labor practices describing behavior prohibited by employers.

Taft-Hartley Act (1947). – Passage of the Taft-Hartley Act of 1947 represented the outcome of a decade of continual criticism of the Wagner Act. Although it had support of anti-labor union groups, it could probably not have been passed without favorable public opinion. One major factor influencing public opinion was the behavior of the labor movement itself.

After the numerous strikes in 1945 and 1946, many people condemned the Wagner Act. Within the movement, however, the Taft-Hartley Act was referred to as the "Slave Labor Law". It is a good example of rent-avoidance legislation designed to support management and reduce the rent-seeking ability of organized labor. Appelbaum and Katz (1986a, p. 175) emphasize that groups organize and fight wealth transfers. Such rent-a-

voiding activity must then be added to rent-seeking activity to obtain a true estimate of the total social costs of the rent.

The Taft-Hartley Act requires that the government monitor certain actions of both labor and management. However, abuses in the internal administration of unions continued to be recognized. Since most union monopoly power over members comes from the Wagner and Taft-Hartley Acts, government felt responsible for safeguarding the rights of individual union members. Therefore the conduct of internal union affairs came to be viewed as a federal problem.

Landrum-Griffin Act (1959). – The Labor-Management Reporting and Disclosure Act, more commonly known as the Landrum-Griffin Act, was passed in 1959. This law marked the culmination of the well-publicized hearings of the Senate Select Committee on Improper Activities in the Labor or Management Field (McClellan Committee). These hearings documented that many union officials were coercing workers via violence or the threat of violence, and denying basic rights to union members; that small firms were being victimized through secondary boycotts, extortion, picketing and similar techniques; and that unions in concert with employers were interfering with employee rights through sweetheart contracts and the bribery of union officials by hired consultants. The Landrum-Griffin Act was designed to reduce the rent-seeking ability of organized labor. Therefore, since it benefitted management, it would be considered rent-avoidance or rent-protection legislation.

The AFL-CIO Executive Council labeled the Landrum-Griffin Bill as anti-labor in August 18, 1959, at its meeting at Unity House, Pennsylvania. Its rent-seeking statement was a reaction to rent-avoidance (or rent-protection) legislation.

Again in 1965, the AFL-CIO continued to fight the Landrum-Griffin Act by proposing an amendment to this type of rent-protection or rent-avoidance legislation. It wanted union officials to be bonded through representatives of their own choosing to keep control of worker insurance premiums rather than have management oversee them.

The testimony by organized-labor leaders at various Congressional hearings and organized-labor conventions on the Taft-Hartley Act and Landrum-Griffin Act supports our rent-seeking model of union behavior. The testimony shows how resources are transferred from the management to organized labor and also how management has to spend resources (i.e., rent avoidances) trying to prevent this type of transfer.

V. Rent seeking in collective bargaining

Collective Bargaining (A Public Good). – Previously, we discussed our byproduct theory of the organized labor movement. With the passage of the Railway Labor Act of 1926 and the Wagner Act of 1935, U.S. workers were given the right to organize and bargain collectively through representatives of their own choosing. The reason for considering a collective bargaining agreement a byproduct is that it is a public good that can be brought about by government legislation. The labor leaders who engage in this kind of public goods generating activity do so because they expect private benefits from their actions. These expected private benefits, such as large salaries, big offices in large buildings, fancy cars, expensive clothes, and many other fringe benefits, including power, are assumed to be the real motivations behind the organized-labor leaders' behavior. The public good generating activity, that is, the collective bargaining agreement, is a byproduct of actions directed to the generation of private benefits for the economic agents in the labor movement (see Cao-Garcia, 1983, p. 76).

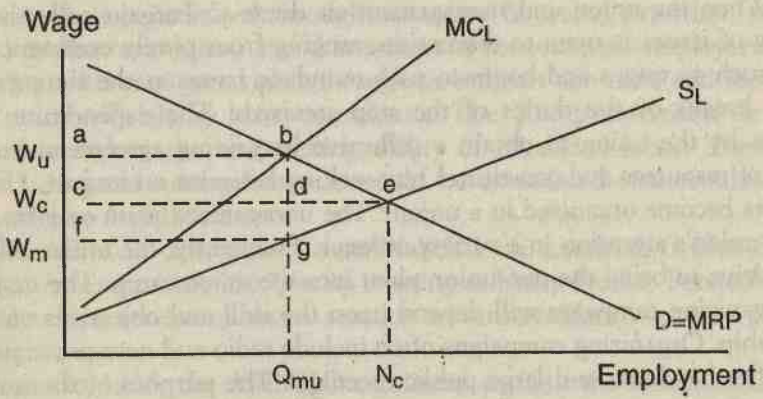
When the union and management sit down to bargain collectively, a variety of issues is open to discussion, ranging from purely economic questions such as wages and hours to such mundane issues as the timing of the coffee breaks or the duties of the stop stewards. The expenditure of resources by the union to obtain a collective bargaining agreement entails a waste of resources and constitutes rent-seeking behavior on its part. How do workers become organized in a union? The unorganized plant may be called to the union's attention in a variety of ways. Frequently, the union will map out a drive to bring the non-union plant into the union camp. The nature of the organizing campaign will depend upon the skill and objectives of union leadership. Organizing campaigns often include radio and newspaper publicity, leaflet handouts and large public meetings. The purpose of the union is to win the representation election conducted by the National Labor Relations Board (NLRB). Once a union is certified by the NLRB as the bargaining agent, the Wagner Act provides that an employer must deal with it.

In the rent-seeking literature on unions, Bronars and Lott (1989, p. 305) focus on rent seeking in existing unions and show rent-seeking prospective members have an incentive to bid up entry costs so that higher union wage gains make union jobs more costly to obtain. These enhanced entry barriers can result from insiders (union members) becoming outsiders (non-union members) during past recessions. Only insiders have bargaining power with employers, as there are recruiting and training costs for outsiders, and because insiders impose costs, such as picket lines, for

outsiders trying to underbid them for jobs. This is another type of rent seeking by the union. One can interpret the Bronars and Lott position as a version of the hysteresis theory. *Hysteresis* is a property for a process such that the history of a variable affects its present behavior (see e.g., Froyen, 1990). For instance, in many European nations the recession of the 1970s and early 1980s caused high cyclical unemployment in the late 1980s. This unemployment trap resulted from current values depending on lagged values or hysteresis.

Behavior of both producers and organized labor entails rent avoidance by management and its corollary, rent seeking by labor. The standard textbook case of a collective bargaining model does not include rent-seeking behavior by management and labor (see Carter, 1959, p. 81). Such an expenditure of resources by both concerned parties in an attempt to gain a favorable wage is much greater than has been traditionally visualized.

FIGURE 2
Rent Seeking in Collective Bargaining



To show this rent seeking, we start with the traditional labor analysis. Given the demand D_L ($= MRP_L$) and supply S_L in Figure 2, the competitive solution results in a wage of W_c and an employment level of N_c. Given monopoly power in the input market (monopsony), the profit-maximizing firm will employ fewer (Q_{mu}) units of labor at a lower wage (W_m) than under competitive conditions, since to hire additional units it must offer a higher wage. The result of such action is the loss to labor of the area *cdegf*. The area generally considered the deadweight efficiency welfare loss triangle is *bge*. The portion of this triangle lost by the firm is the area of the small triangle *bed*, which, however, is more than made up for by the gain to the firm of the area of the rectangle *abgf*.

If the labor movement succeeds in gaining the franchise to engage in a collective bargaining agreement on behalf of labor, bilateral monopoly exists. Under such a condition of bilateral monopoly the highest feasible wage the bargaining agent could hope to obtain is wage W_u where the MC_L is just equal to its MRP_L.

Therefore, the solution to a collective bargaining model under bilateral monopoly lies somewhere between a wage rate of W_u and W_m resulting in a realm of gain (or loss) represented by the area of rectangle *abgf*. The existence of such gain is what results in rent seeking by unions and its corollary, rent avoidance by the firm. Given the union succeeds in negotiating a wage of W_u (possibly by bribing a management negotiator), then the entire rectangle represents a transfer of resources from the firm to the union. If, on the other hand, the firm succeeds in obtaining a wage of W_m (perhaps by bribing a union official) it retains rectangle *abgf*.

Institutionalized collective bargaining guarantees an eventual waste of resources by *each* party of an amount approaching the area of the rectangle as shown in the labor market in Figure 1. The exact limits of rent seeking on the product market side are shown in DeLorme and Snow (1990). If a competitive market exists for pursuing such rents (on both the production and labor input fronts), resources devoted to attaining such rents may be much greater than the value of the rent itself.

This situation is similar to the situation (recognized by Adam Smith) with wages in those employments that promise great gain (such as revolutionary activity, gold mining, athletics, etc.). In such cases people tend to devote far too many resources (given the probability of success) to attempt to gain rents. So it is likely that the existence of an abovenormal return will result in "a black hole" of rent-seeking behavior, whereby each seeker devotes an amount of resources equal to or less than the value of the rent itself. The absence of a coordinating agency means it is possible that resource commitment will approach infinity (see DeLorme and Snow, 1990).

Our analysis of the collective bargaining model and the contract (i.e., public good) is perhaps more tenuous, but may still hold even where the rent has not yet been created (e.g., lobbying for passage of the U.S. Railway Labor Act of 1926). Once the existence of a rent is recognized, and such recognition is not held by only one person, it is no longer necessary that a specific person claim it, or set in motion the circumstances that eventually result in rents, for others stand ready to do so. Therefore, the public-good aspect will again drop out of the individual's calculation whether or not to pursue a career within the labor movement.

The reason historians are preoccupied with the public-good aspects of

labor unions may be explained just as Tullock explained historians' view of the public-good byproducts of revolutionaires. Historians in both cases are neither penalized nor benefitted directly by the results of activities undertaken in the past. Therefore, they focus on what does concern them, which is whatever public goods have been generated. They may be benefitted by past union activity in satisfying their egalitarian instincts, and they may be harmed by the increased prices they pay for goods and services. But they are definitely not compensated or rewarded by the system of rewards and punishment established for participants in the struggle for unionization.

Just as people who participate in labor movements disregard the public-good aspects of unionization because of the small probability of influencing the outcome, historians (as well as other interested observers) disregard the personal, private payoff from participation. More directly, each person is primarily interested in that portion of an occurrence that is of maximum importance to him or her.

Misleading or false information is also likely to be emphasized because the primary source of information about the early union movement is the involved union entrepreneur. It is unlikely such people would describe their motives as self-interested.

The Economic Sanctions of Collective Bargaining. – When a collective bargaining contract cannot be agreed upon by both parties, union and management, resources are wasted because of the rent-seeking behavior of the union and the rent-avoidance practices of management. The management threat of economic sanctions may be implicitly or explicitly used to induce one's opponent to come to terms over the contract. The primary economic sanction available to the two parties is the discontinuance of work. If the union takes the initiative of stopping work, there is a strike. If management takes the initiative, there is a lockout. The effect is the same: the union members suffer a loss of income and the employer loses production and revenue. The actual "social cost" of strikes is to deprive the public of goods and services.

The second economic sanction the union can use in its rent-seeking activity is the boycott. A boycott is an attempt to place economic pressure on a firm by discouraging consumer purchases of its product. The union asks consumers to do what it cannot accomplish, i.e., place sufficient pressure on the struck firm to accede to union demands. Almost all unions and the AFL-CIO maintain a "We DO NOT Patronize" or similar list containing the names of firms involved in a dispute and suggesting that union members should not purchase their products. This type of activity is rent seeking and

another important example of waste of resources brought about by union activity.

Picketing, another rent-seeking weapon of the union in its economic sanctions, is defined as patrolling an area near a firm directly or indirectly involved in a labor dispute to call attention to the dispute. Picketing may be an important weapon of the unions. But it is a waste of economic resources as far as the opportunity cost of the work force is concerned and once again results from the rent-seeking activities of the union.

Rent Seeking by Organized Labor for Protective Legislation for Worker Welfare. – As the industrialization of the United States has progressed, the organized-labor movement has lobbied for public policy measures to reduce uncertainties that confront workers. Among the most prominent concerns have been the issues of minimum wages and maximum hours.

Minimum Wages and Maximum Hours. Organized labor has sought rents by lobbying for minimum wage legislation. The idea of a minimum wage was developed in Europe by the famous papal encyclical of Pope Leo XIII in 1891, entitled *Rerum Novarum* ("new matters") and in the "living-wage" concept espoused in Sidney and Beatrice Webb's work (1897). The supporters of the U.S. minimum wage argued employers would pay wages to the weakest workers in society, thereby pushing them to starvation levels. On the other hand, opponents of the minimum wage held that it would be disastrous to interfere with many wages that are otherwise determined by the market forces of supply and demand. Also, they felt that any employee had a constitutional right to sell his or her services for whatever wage he or she could obtain in the market.

The first U.S. federal effort to enact a minimum wage came in 1931 with the passage of the Davis-Bacon Act. It applied only to workers in the construction industry, and it set the prevailing wage in a local labor market at the minimum wage to be paid on all federally supported construction projects. The principle was that the lowest bidder on federal contracts should not be the one who paid the lowest wage. This Act shows rent-seeking behavior by the organized-labor movement because it did not want firms in the same industry to compete on the basis of wage rates. Organized labor wanted to narrow the wage between the skilled and unskilled and thereby provide jobs for the more skilled workers by pricing the less skilled workers out of the labor market. Kau and Rubin (1978, p. 339) have shown empirically that minimum wages are passed at the behest of high-wage workers.

In 1963, a bill was proposed to amend the prevailing wage section of

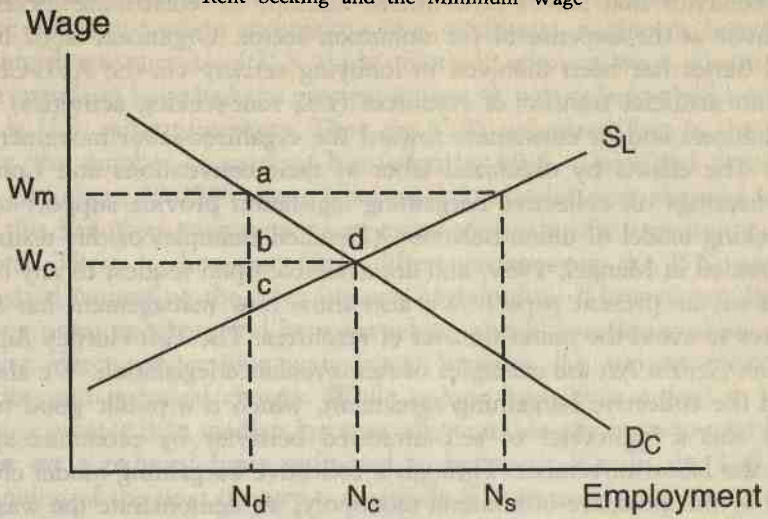
the Davis-Bacon Act by including "fringe benefits" within the scope of the term "wages". Organized labor was represented at the hearing and supported the bill because it wanted to increase the cost of construction by adding "fringe benefits". Its action would further narrow the wage between the skilled and unskilled (organized) worker. In the following year, 1964, there was another hearing to amend the Davis-Bacon Act. Once again organized labor participated in the hearings and continued its rent-seeking objective by pushing for the maintenance of prevailing wages.

Following the Davis-Bacon Act of 1931, the Fair Labor Standards Act (FLSA) was signed into law in June 1938. The original FLSA set the minimum wage for both men and women at 25 cents an hour, with scheduled increases to 40 cents an hour by 1945. The maximum number of hours was set at 44 hours a week, beyond which wages equal to time and a half were required. The hours maximum was scheduled to be reduced to 42 hours in 1939 and 40 hours by 1940. Again, the rent-seeking aspect of the pressure for passage of the minimum wage was clear. Organized labor was seeking to narrow the wage differential between the (organized) skilled and (unorganized) unskilled. It is well-known that union wages are above the minimum wage. Organized labor's efforts to get the Fair Labor Standards Act of 1937 passed was a rent-seeking attempt to price unskilled workers out of the market. There would be an artificial transfer of resources from the unskilled to the (organized) skilled by passage of the Fair Labor Standards Act.

Rent-Seeking Model of the Minimum Wage. A graphical model of rent seeking via minimum wage legislation shows that the losses in resources are partly due to the lobbying activities or organized labor for minimum wages. The following diagram, Figure 3, represents a competitive labor market for homogeneous unskilled labor.

Given the competitive wage of W_c in Figure 3, an effective minimum wage law that raises the legal wage to W_m results in unemployment of $N_s - N_d$ and a loss of employment (disemployment) of $N_c - N_d$. Given that the effective minimum wage is imposed economy-wide regardless of age, sex, race, etc., such legislation will result in a deadweight loss of employees' surplus (ordinarily referred to as consumer's surplus) equal to the area of the triangle *abd* as well as a loss in employee or labor's surplus (ordinarily referred to as producer's surplus) of triangle *bcd* that in turn is offset from the labor side by area of the rectangle $W_m abW_c$. Whether labor as a whole is helped or harmed depends on the relative own or direct price elasticities of the demand for, and supply of, labor. The own price elasticity of the demand for labor, of course, also determines whether the total wage bill

FIGURE 3
Rent Seeking and the Minimum Wage



increases or decreases. The wage gain of the rectangle W_mabW_c, however, is less than is normally shown in the literature on the minimum wage because the organized-labor movement has spent resources to help in the passage of minimum wage legislation.

These effects are in part ameliorated given the existence of another labor market not covered by effective minimum wage legislation. However, the flow of labor from "protected" markets results in depressed wages in "unprotected" markets.

Relaxing the assumption of a homogeneous labor market makes it clear that the segment of the labor market the bill purports to help is precisely that segment that suffers the most harm. The least productive units of labor (therefore low-income units) will suffer a further fall in wages if alternative labor markets are available or, in the worst case where no alternative market is allowed to exist, will have an effective minimum wage of zero.

If those that minimum wage legislation is supposed to help are actually hurt, then who benefits from such laws? Increasing the wage of unskilled labor narrows the differential between unskilled (relatively unproductive) and skilled (relatively productive) labor, and the differential between union and non-union labor. The ability of the firm to substitute a relatively unproductive (but inexpensive) input for a relatively productive (but expensive) input is diminished. This is the means by which the labor movement through its rent-seeking activity has been able to disenfranchise a subset of the labor force, effectively denying entrance to the labor market.

Peroration. – In this section, we have presented a rent-seeking model of union behavior that shows how unions attempt to redistribute income in their favor at the expense of the nonunion sector. Organized labor in the United States has been involved in lobbying activity via the AFL-CIO to create an artificial transfer of resources (i.e., rent-seeking activities) from the producers and/or consumers toward the organized-labor movement (unions). The efforts by organized labor at their conventions and Congressional hearings on collective bargaining legislation provide support to the rent-seeking model of union behavior. (Detailed examples of this testimony are provided in Mangel, 1989, and are available upon request to any of the authors of the present paper). We also show how management has spent resources to avoid the union transfer of resources. The Taft-Hartley Act and Landrum-Griffin Act are examples of rent-avoidance legislation. We also examined the collective bargaining agreement, which is a public good to the worker and a byproduct of self-interested behavior by economic agents within the labor movement. Through a collective bargaining model characterized by the existence of bilateral monopoly, we demonstrate the waste of resources by both parties – unions and management – with the resource loss exceeding the amount previously shown in the existing literature on collective bargaining models. When the collective bargaining contract cannot be agreed upon, resources are wasted because of the rent-seeking behavior of the union through the use of strikes, boycotts and picketing, and rent-avoidance practices such as education on the part of management. Organized labor has also engaged in rent-seeking behavior by lobbying for protective legislation such as the minimum wage. In testimony at Congressional hearings, organized labor has urged policymakers to narrow the wage between the skilled and unskilled and thereby price the less skilled workers out of the labor market. The organized labor movement has spent resources to help obtain minimum wage legislation, and this resource loss constitutes more than just the reduction in the number of employed workers.

VI. Declining U.S. union membership [4]

One thing our model does not explain very well is why private sector union membership as a percentage of the U.S. work force has declined to 16-17% in 1986-87 and then to 12% in 1989-90 from its peak in 1970 of 31%. While increased output market competition, especially from imports,

[4] This section draws heavily on Troy (1990) and Blanchflower and Freeman (1990).

and increased anti-union activity of employers have contributed to this decline, structural shifts changing the occupational mix from production to white-collar, non-union occupations (e.g., architects, engineers, lawyers) and the inordinate success of U.S. trade unions in winning wage advantages for their members have had the greatest impact. A particularly vivid example of this is U.S. railway workers. They are 90% unionized, but in the past 40 years, the number of workers has fallen by 60%. Unionized firms in the U.S. pay about 20-25% above labor market rates for nonunionized workers, and this has given management an extraordinary profit incentive to oppose unions. There is, however, little difference between the U.S. and other industrial nations on the other impacts of unionism: it lowers pay dispersion among union workers and between white- and blue-collar workers and has similar effects on employment, fringe benefits, job tenure, productivity, profits, and technical change. While unions have little appeal to workers earning greater than median incomes, they can remain an important factor – albeit on a reduced basis estimated to be about 8% in the U.S. at the beginning of the next century – especially if they recruit and retain workers who gain from technological change. Unions have always gone after middle and upper, and not the lower, echelons of labor. Despite its shortcomings, the U.S. union movement is the largest and wealthiest in the Free World. However, the U.S. trade union movement has been retracting relative to other industrial democracies. The average proportion of unionized workers increased by 17 percentage points in 17 non-U.S. countries. The proportion of U.S. unionized workers fell to 37 points below that average compared with 17 points below in 1970. U.S. trade union density changed from rough equality with Canada in 1970 to less than half the Canadian rate in 1986-87. If the flight from high wages continues in the U.S., union density will drop below double digits in the early 1990s and be relegated to a few old industrial sectors and to public and nonprofit sectors. Such "ghetto unionism" is what was found in the U.S. prior to the growth in unionism in the 1930s and 1940s.

VII. Summary and conclusions

This paper discusses the concept of rent seeking and presents a byproduct theory of labor movements in any economy based on the work of Tullock (1971). Our analysis focuses on rent seeking in creating a union. Other studies, such as by Bronars and Lott (1989), examine rent seeking in existing unions. We show Tullock's theory is applicable to the union move-

ment and union organizers and support his condemnation of the historians' romantic view of the revolutionary's place in the generation of the public good. Union officials are the same self-interested "rent seekers" as the revolutionary leaders. People organize unions to obtain private gain and produce as a byproduct the public good which is a collective bargaining contract. We use Tullock's byproduct model to explain the role of the labor organizer in the development of unions. It is not commonly recognized that the discounted values of reward and punishment rather than the public good generated are the key variables in determining the worker calculus for participation in the union movement.

Historically, economists have viewed the organized-labor movement either as what unions attempt to maximize (wages, working conditions, job security, etc.) or as the result of unionization (the generation of public goods and/or public bads). Our paper outlines a rent-seeking model of union behavior that incorporates union attempts to redistribute income in its favor at the expense of the non-union sector.

As empirical evidence on rent-seeking behavior, we cite the findings of Hamermesh, Smith, and Bellante and Long. These studies have empirically measured the rents to public sector unions as compared to private sector unions. We also show how unions in the U.S. are engaged in lobbying activities via the AFL-CIO in an attempt to effect the transfer of resources from producers and consumers toward themselves. The testimony by organized labor within U.S. Congressional hearings and at labor conventions shows clearly the efforts to do this (see our References). We also hypothesize that U.S. management has expended resources in "rent avoidance" to avert the transfer of resources. The Taft-Hartley and Landrum-Griffin Acts are cases in point.

We have also examined the institution known as a collective bargaining agreement. Such agreements represent a public good for employed workers that are byproducts of self-interested behavior of economic agents within the labor movement. In a collective bargaining model characterized by the existence of a bilateral monopoly, we show a resultant waste of resources on both sides of the market, labor and management, with the loss of resources exceeding the amount previously suggested in the literature. This waste occurs because of strikes, boycotts and picketing on the union side, and rent avoidance such as education and security expenses on the part of management.

Organized labor has also engaged in rent-seeking behavior through lobbying activities in an attempt to legislate such protective measures as minimum wage laws. The testimony of organized-labor leaders at U.S.

Congressional hearings shows that unions attempt to narrow the wage differential between skilled and unskilled labor and thereby price the relatively unskilled out of the market. Such legislation results in social losses beyond the obvious reduction in employment.

While our model does explain a good deal of otherwise puzzling behavior, it does not explain completely why U.S. union membership has been declining.

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RICERCA DI RENDITA' E TEORIA DEI MOVIMENTI SINDACALI

Questo articolo presenta una teoria dei movimenti sindacali basata sul lavoro di Tullock. L'analisi si concentra sulla ricerca di rendita nella creazione di un sindacato anziché sulla condotta dei sindacati esistenti. Si organizzano sindacati allo scopo di ottenere dei guadagni privati e produrre come conseguenza quel bene pubblico che è un contratto collettivo di lavoro. L'evidenza empirica sulla ricerca di rendita comprende studi che hanno effettivamente misurato le rendite dei sindacati. Questo articolo dimostra perché e come i sindacati negli Stati Uniti si siano impegnati in attività lobbistiche per cercare che venissero trasferite risorse dai produttori e consumatori verso loro stessi.

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CAUSALITY AND LAG STRUCTURE BETWEEN BLACK MARKET FOREIGN EXCHANGE RATES AND CONSUMER PRICES

A Case Study of Sudan

by
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Introduction

The relationship between exchange rates and prices is usually considered at the macroeconomic level by reference to their interactions and dynamic responses to various monetary and fiscal stimuli. The analysis usually proceeds along purchasing power parity (PPP) lines applied either to fixed exchange rate or flexible exchange rate regimes. In its strongest form PPP says that a fixed rate determines the price level, whereas under a flexible rate, the domestic price level determines the exchange rate [1].

Not much analysis has been recorded for the third type of exchange rate regimes; that is exchange-control regimes. This type is the commonest in Less Developed Countries (LDC) with its usual accompaniment of a black market in currencies. A parallel exchange rate is then determined in the black market and is believed to have a relationship with consumer prices. But theory remains ambiguous about the exact nature of the relationships involved, the explicit leads or lags connecting the two variables and on the possibilities of feedbacks. Empirically, there is not much work been done on the subject where econometric evidence relates only to works on PPP as applied to fixed or flexible rates [2].

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[1] See KRUEGER (1983) for example.

[2] Indeed, we were able to cite only one study of rates-prices relationship in the case of exchange control regimes – that of MARWAH (1988). But, alas, Marwah makes the *a priori* assumption that prices are exogenously determined and the exchange rate adjusts *pari passu*

But in the spectrum of exchange control regimes the issue of whether exchange rates cause prices or prices cause exchange rates becomes important in its own right and for PPP functional specifications purposes. Also, in extended PPP-type relations such as inflation functions which try to account for imported inflation via a 'pass-through' in exchange rates, the question of whether the appropriate exchange rate variable is an endogenous or exogenous variable has a direct bearing on the specification of the required function and has to be settled before embarking upon estimation. However, a general answer cannot be obtained since controls vary greatly from one country to another and hence specific answers relating to each country could only be provided and it becomes important to test the assumption of causal priority on individual case merit.

In this paper we investigate the empirical relationship between foreign exchange rates and prices under a currency control regime. The currency control regime is that of Sudan where black markets in currencies sprung and prevailed. We argue that the appropriate rates variable to use is the black market foreign exchange rate since its behaviour is largely similar to a flexible exchange rate. The 'absolute' price variable used is the consumer price index (CPI). We rely on Causality-Exogeneity (CE) tests and the Transfer Function (TF) methods to investigate the direction of causality between black market foreign exchange rates and consumer prices and on TF and cointegration techniques to further generate the dynamic nature of the relationship.

Thus, Section 1 of the paper considers the possible relationships between black market rates and consumer prices. Section 2 includes an account of the Sudanese black market for foreign exchange and some of its main characteristics, whereas Section 3 considers some issues pertaining to data and methodology. Section 4 discusses the causality issue along the above mentioned lines and inferences relating to the problem are drawn. A final section then concludes the study.

1. *Black Markets, Exchange Rates and Consumer Prices*

As noted above studies on the relationships between exchange rates

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with relative prices. For empirical studies on the validity of PPP, see KRUGMAN (1978), HAKKIO (1984) and DAVUTYAN and PIPPENGER (1985) *inter alia*. On the relevance of PPP using cointegration techniques, see BAILLIE and SELOVER (1987), EDISON (1987), EDISON and KLOVLAND (1987), CORBAE and OULIARIS (1988), ENDERS (1988), CANARELLA et al. (1990) and ARDENI and LUBIAN (1991) *inter alia*.

and prices do not adequately deal with the repercussions of the existence of control regimes and black markets in foreign exchange on consumer prices. Instead, work evolved separately on the economics of black markets in foreign exchange with no consideration of effects on prices [3].

But in as far as the relationship between exchange rates and prices is concerned, we note first that in the presence of black markets the appropriate rates measure to use is the black market exchange rate. As regards the relationship between black market rates and nominal consumer prices, it may be reasonable to conjecture that black market foreign exchange rates tend to affect prices positively when imports are financed through black market acquisitions of needed exchange. Increases in the prices of foreign exchange 'pass-through' [4] onto the prices of officially imported and/or smuggled goods since prices would then cover costs, black market premiums and risks plus profit margins. The foreign component of domestic costs also rises with the purchases of capital and foreign material inputs, again via black market acquisitions of needed foreign exchange. Eventually also, prices for nontradables tend to rise because of rising foreign inputs and rising labour costs and because of excess demand. The general level of consumer prices then responds since prices are a weighted average of the prices of tradables and nontradables. This despite the fact that at first the domestic price of nontradables may be declining relative to tradables. Domestic tradables will be less competitive if higher production costs are passed on in prices and less profitable if prices are maintained resulting in a policy dilemma.

Considering the opposite relationship, it may be argued that consumer prices may also affect black market foreign exchange rates. This 'positive' effect could work its way through by triggering pressures in the form of adjustments to the transactive, precautionary and speculative demands for foreign currency [5] in response to changes in prices. An increase in prices would fuel expectations about future inflations and hence results in a major flight from domestic currency holdings onto foreign currency in order to avoid paying the 'inflation tax'. Expectations may also lead to changes in money wages through the real wage resistance effect with workers trying to maintain the purchasing power of their wages which would feedback into

[3] For works on the economics of black markets see SHEIKH (1976), BLEJER (1978), DORNBUSCH *et al.* (1983), NOWAK (1984), GLEN (1988) and FISHELSON (1988) *inter alia*.

[4] On the literature of the 'Pass-through', see, for example, DOHNER (1984) and KIM (1990).

[5] In line with the currency-substitution literature, the same motives that operate for holding domestic currency also apply to holdings of foreign currency. See, for example, MILES (1979), BRILLEMBOURG and SCHADLER (1979), GIRTON and ROPER (1981) *inter alia*.

higher labour costs and prices hence giving rise to another associated wage-price spiral alongside the main exchange rates-price spiral. Both spirals may combine to produce considerable volatility in prices where black market foreign exchange rates and price expectations lead to actual movements that are 'fully' validated by domestic wages and prices. The rates-price spirals could continue with obvious feedbacks of past black market rates determining current and future prices and past consumer prices determining current and future black market rates.

Overall, black market foreign exchange rates tend to adjust swiftly but prices are sluggish and sticky and adjust only gradually because of the dampening effect of the domestic component of nontradables. Lack of information and small 'menu' costs can also generate enough wage and price stickiness to give changes in black market foreign exchange rates an added impetus. The evolution over time of prices following an innovation in the black market rate raises the spectre of a pseudo-J-curve [6] behaviour where it is possible that consumer prices respond only with time lags to changes in the exchange rate. One reason for the pseudo-J-curve effect is that by the time an exchange rate change occurs, goods already received, in transit or under contract have been purchased and priced according to the old rate and the completion of those transactions dominates the short term changes in prices. The pseudo-J-curve can then describe the movement over time of prices. Prices – or/and their rate of change – may – relatively – deteriorate at first as goods denominated in domestic currency in old contracts earn less than new imports.

2. *The Black Market for Foreign Exchange in Sudan*

In Sudan and since the late seventies there existed a dual exchange rate regime characterized by one – or a number of – official rate(s) and a parallel [7] black market rate. The black market has sprung in response to the imposition of quantitative trade and exchange controls dictated by authorities. The government mostly retained a pegged exchange rate, banned capital outflows and rationed foreign exchange among demanders for current account transactions. Over time, the parallel market became very significant and even – at times – dominant. The authorities had minimal

[6] On the literature on the J-curve, see, for example, KOCH and ROSENWEIG (1990).

[7] We prefer to reserve the term 'parallel' for the black market despite common usage of it to refer to markets with official multi-tier regimes.

reserves and a large, increasing foreign debt. Dwindling legal export proceeds and some current account transactions in the form of transfers from Sudanese working abroad (SWA) were the principal sources of foreign exchange. The SWA transactions mostly flowed into the black market because of the premium and the black market gained in significance with increased dealings in parallel monies.

The black market exchange rate was largely determined by market forces of supply and demand where appropriate margins were preserved [8]. But, because there were risks, the black market exchange rate tended to differ from its equilibrium rate as risk operated to affect demand in the black market.

Over the period of this study, the currency market swung between periods of legal and illegal statures – legal when banks and money changers were authorized to trade in currency from August 1981 to March 1983 and from January 1984 to February 1985 and illegal when the dealers were not allowed to trade in foreign exchange and participants prohibited from holding foreign exchange. During periods of illegality the black market was not 'entirely' clandestine in operations but remained conspicuously public and, it would appear, officially tolerated at times [9].

The major currency traded in the black market was the U.S. Dollar. The net rate of additions to the stock of black market foreign currencies was a function of the premium. It was also a function of quantitative and qualitative incentive schemes designed by the authorities at various periods to lure participants into the official market, the degree of risk associated with the black market transactions and on returns on foreign bonds *e.g.* rates of interest in the Gulf area where most of the SWA work, returns on various investment schemes, the Eurodollar interest rates etc... On the supply side SWA provided a continuous flow of remittances to the black market but the precise volume of transactions, being of clandestine nature, is unknown. The remittances were mainly in U.S. Dollars and the Saudi Arabian Riyal. The Saudi Riyal has a limited flexibility in terms of the U.S. Dollar, hovering around a fixed value of 3.75 per Dollar. Cross-rates of exchange were closely aligned through arbitrage for other currencies beside the Dollar and Riyal *e.g.* Gulf Dinar, Sterling etc... Thus, the remittances which provide the major flow component of supply to the black market

[8] These margins include higher premiums and prices charged for the Dollar for bulk transactions or for transfers effected abroad since there are no conversion restrictions to be faced by importers or smugglers and where many of the imported goods originate.

[9] Indeed, sometimes people were explicitly or implicitly directed to the black market by authorities unable to finance their requirements.

could be conveniently thought of in terms of Dollars. Other sources of supply were from exporters who underinvoiced exports in response to the premium they obtained in the black market.

As regards the demand for foreign currency in Sudan we note that the transactive component of demand included financing of imports through nill-value or self-finance schemes, illegal economic activities, smuggling [10], travel abroad for tourism and medical treatment, Pilgrimage (Hajj and Omra), transfers to private students abroad plus an 'inventory' of foreign currencies held to finance such recurrent expenditures as Duty Free market purchases by households and Khartoum International Exhibition (KIE) [11] purchases by businessmen. The above components of transactive demand require finances through Dollar acquisitions and in turn give rise to substantial Dollar outflows.

Considerations related to other components of stock demand for currencies also created some excessive precautionary and speculative demands for the Dollar in the Sudanese black market. As part of asset substitution within a diversified portfolio, households held part of their wealth in foreign currencies – amongst other things – in a period of unprecedented inflations. The Sudanese pound was considered unsafe, constantly eroding in value whereas alternative foreign money balances proved to be viable safe alternatives. Foreign money balances also provided a reasonable return upon resale.

Consequently, a "Dollarization' effect ensued with a noted flight from the domestic currency onto foreign currency holdings. This effect increased substantially with formed inflation expectations and gained momentum with the occurrence of possible policy shocks and economic and/or political regime shifts such as devaluations and increased political risks associated with changes of administration or general instability.

3. *Statistical Considerations, Data and Methodology*

In the relationships between black market Dollar rates and consumer prices, the direction of causation and the choice of the lag structure and length becomes of paramount interest. However, there is no *a priori* theoreti-

[10] Currency convertibility restrictions force agents to resort to smuggling in order to obtain foreign exchange earnings and/or obtain foreign goods which are then remitted and/or smuggled back through black markets in currency and goods in order to obtain high return differentials.

[11] This was held in January each year and provides a major revenue for traders and businessmen to purchase foreign goods with hard currency.

cal information on the appropriate structure and lengths to use. One way of identifying the response mechanisms is through the use of CE tests and the bivariate Box-Jenkins analysis which enables causal effects between the two variables to be picked up and ascertained. A time structure for the relationship as a whole could then be derived by use of a suitable TF.

To apply these methods to our problem, data were obtained on black market Dollar exchange rates in terms of the Sudanese Pound (LSD) measured in a hundred of piasters and on the CPI [12] on a monthly basis from October 1980 up to August 1986 yielding a total of 71 observations. Data on black market Dollar rates were collected by the Bank of Sudan on a daily basis and monthly averages were then constructed. The data describes black market and moneychangers rates for the U.S. Dollar collected during the period and are reasonably accurate. However, data on these rates were not available to us beyond the period of August 1986.

Consumer prices were obtained in monthly values for the CPI from *International Monetary Fund – International Financial Statistics* (IMF-IFS) sources (1986-1988). Data were not available beyond February 1986 and hence quarterly figures were interpolated to obtain the necessary monthly figures.

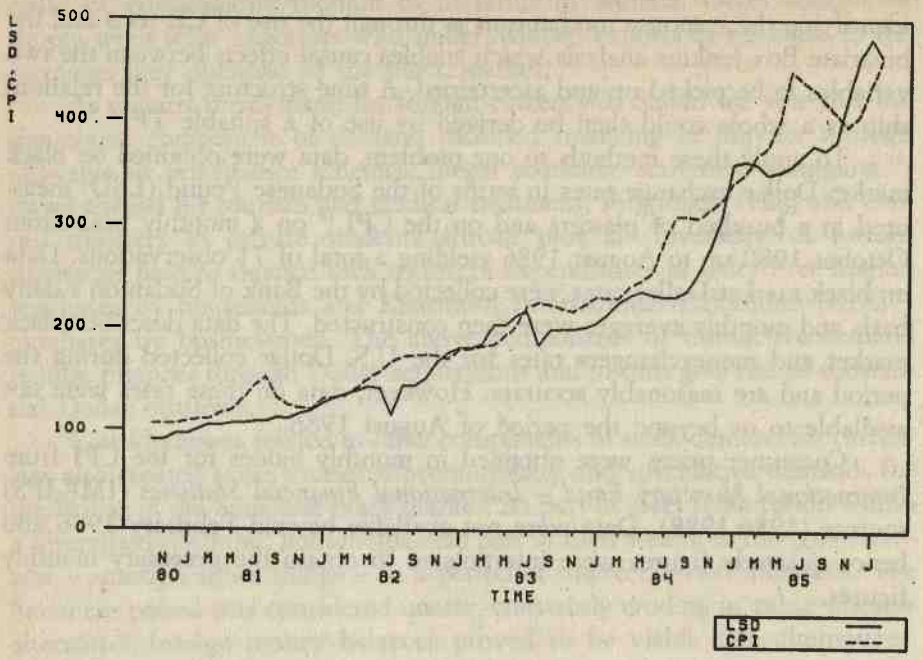
4. *Empirical Results*

To employ the methodologies outlined above, we started by some simple analysis of the individual series. The interpolated portion of the sample was not used in the model identification and estimation stages but was subsequently used in cross-validation to gauge the out of sample forecastability performance of the resultant models. Use of various filters on the primary data set resulted in sample reductions and degrees of freedom losses; hence we decided to use the reliable bulk of the data in the causal models generation and building phases and to retain the interpolated portion for the models validation stages.

The original series are plotted in Fig. 1 below:

[12] Absolute CPI figures were used because our interest parallels that of the absolute version of the PPP hypothesis. Empirically, the CPI is the only price data available for Sudan over the entire sample period. On the theoretical level, an index that gives a heavy weight to traded goods does not provide a fair test of PPP-type relationships. Tradables have greater weight in wholesale prices than in consumer prices and hence we have a theoretical justification for the use of CPI whose basket contains non-tradables.

FIG. 1. Black Market Dollar Rates (LSD) and the Index of Consumer Prices (CPI)



Both LSD_t and CPI_t were driven by strong secular trends with some curvature and an increasing variance through time. The CPI shows some seasonal behaviour, starting to rise more rapidly by May each year before levelling off or declining through September to December. The black market exchange rate is less seasonal however, starting to rise from October to January roughly five months after the rise in the CPI or seven months before the new rise in the CPI starts. Aside from these obvious trends and seasonals, other periodic components proved hard to pick out visually.

To iron out the curvature and to induce some variance stationarity we used the series in their logarithmic forms – Log LSD_t (lsd_t) and Log CPI_t (cpi_t). This transformation was validated on empirical grounds by comparisons to original data where runs on the original series proved inferior to the logarithmic series.

To check for stationarity, each series was tested by a Dickey-Fuller (DF) test and an augmented Dickey-Fuller (ADF) test allowing for a 6th order stochastic process. Results are presented in Table 1 below:

TABLE 1

TESTING FOR I(1) OF THE *lsd*, *cpi* PROCESSES *

VARIABLE	DF	ADF
LEVELS:		
lsd	−2.992	−2.209
cpi	−2.454	−2.505
FIRST DIFFERENCES:		
∇lsd	−8.932	−3.892
∇cpi	−5.271	−4.242

* The form of DF regression used was:

$$\nabla y_t = \alpha_0 + \alpha_1 t + \rho y_{t-1} + \varepsilon_t$$

∇ being the first difference operator, with a null of unit root:

$$H_0 : \rho = 0$$

to be accepted if its *t*-statistic exceeds the tabulated chosen critical value of the test. The form of ADF regression used was:

$$\nabla y_t = \alpha_0 + \alpha_1 t + \rho y_{t-1} + \sum_{i=1}^{6} \beta_i \nabla y_{t-i} + \varepsilon_t$$

with a null of unit root:

$$H_0 : \rho = 0$$

to be accepted if its *t*-statistic exceeds the tabulated chosen critical value of the test. 5% critical values are obtainable from FULLER (1976).

The results fail to reject the hypothesis that the processes are I (1), *i.e.* lsd_t and cpi_t contain a unit root [13]. In addition, the coefficient of time was significantly different from zero indicating the presence of a strong trend that should be removed. On the other hand stationarity of first differences – the rate of growth of lsd_t and inflation – cannot be rejected at the 5% level. Further corroboration of these results is obtained by examining the autocorrelation function (ACF) of the respective series which reflected slow decay in an indication of strong trends in both series whereas inspection of the differenced series and their ACF and partial ACF (PACF)

[13] Nonstationarity in exchange rates and prices has been noted by MEESE and SINGLETON (1982), ENDERS (1988) and MARK (1990) *inter alia*.

clearly indicates the effectiveness of trend removal in attaining stationarity.

Somewhat surprisingly, the ACF of the ∇lsd_t series did not reflect the presence of seasonal components. An attempt to apply seasonal differences resulted in the appearance of seasonal spikes in the ACF and PACF of the deseasonalized series. On the other hand, the ACF of the ∇cpi_t did show patterns of seasonal spikes at 12 months spans. Whenceupon, the latter series was seasonally filtered as $\nabla^{12} \nabla cpi_t - \nabla^{12}$ being the seasonal difference operator. Its ACF was obtained and revealed no further seasonal patterns reflecting the adequacy of the applied seasonal filter.

The absence of the seasonal factors in the black market rates series may seem surprising at first. In certain periods there is a high rate of inflow into the black market that gives rise to a seasonal accumulation of Dollars and hence should lead to a seasonal decline in prices. But because this seasonal movement is perfectly anticipated it may result in a smooth devolution of price instead of the expected sharp decline. Another reason why we failed to detect seasonality in rates may be due to the fact that seasonality in inflows was always matched by a synchronized seasonality in outflows in the shape of increased demand for the black market Dollars during the same period of increased inflows – thus neutralizing the seasonal effect on rates. Inflows tend to increase during SWA holidays in summer and, to a lesser degree, in mid-term new year. But during these same time periods outflows in the shape of Hajj and Omra transfers – occurring in summer during the period of study – and acquisitions to finance purchases from KIE in January, tended to match and balance the inflows. Thus simultaneous shifts in inflows and outflows may have helped to cancel out price changes due to seasonal factors.

4.1. *The causality test procedures.* – Examination of the nature of this dynamic relationship was then undertaken. This was done firstly by application of CE tests; namely the Granger (1969) test and the Sims (1972) test.

The results in each bivariate relationship are computed by estimating a system of two equations with Seemingly Unrelated Regression (SUR) techniques [14]. The tests were conducted for lag lengths 6, 9 and 12 and the results remained largely robust to the choice of the lag length but at the risk of some pretest bias we chose to report those for the lags of order 6 since they tally most closely with those obtained via the Cross Correlation Function (CCF) testing procedure in the next subsection.

[14] Ordinary Least Squares (OLS) results were also obtained and they showed a pattern largely similar to that of SUR.

TABLE 2

CAUSALITY-TEST RESULTS *

TEST	H_1 $lsd_t \rightarrow cpi_t$	H_2 $cpi_t \rightarrow lsd_t$
GRANGER	12.964 (.044)	12.500 (.052)
SIMS	23.214 (.002)	9.732 (.204)

* Causality was verified for the time period dictated by the computations of the cross correlation function (CCF) in the next subsection. Time trends and seasonal dummy variables were also included in each of the bivariate relationships.

Under H_1 and H_2 each test statistics is asymptotically distributed as $\chi^2_{(\cdot)}$ with appropriate degrees of freedom. Approximate marginal significance levels are given in parentheses.

The Granger and Sims tests suggest that at 5% the lsd_t leads to subsequent movements in cpi_t but that cpi_t does not lead to lsd_t.

4.2. *The transfer function approach.* – This procedure starts by prewhitening both series of cpi_t and lsd_t by building univariate seasonal Autoregressive Integrated Moving Average (ARIMA) models for each and obtaining the residuals εcpi_t and εlsd_t from the respective models. This model identification stage entailed some extensive experimentation. The initial models chosen after comparisons with theoretical configurations of ACFs and PACFs of various ARIMA processes were altered, perturbed and improved upon by subsequent analysis. Two univariate ARIMA models were chosen as the adequate filters. Results for the two models were:

1. The Black Market Dollar Rate:

$$(1 - \underset{(.146)}{.260}L - \underset{(.111)}{.374}L^{13} - \underset{(.116)}{.242}L^{25}) \nabla lsd_t = \underset{(.010)}{.002} + \varepsilon lsd_t \qquad (1)$$

$$R^2 = .288, \qquad \hat{\sigma} = .045 \qquad Q_{15} = 23.852 \qquad P = .068$$

2. The Consumer Price Index:

$$(1 + \underset{(.155)}{.462}L^{12}) \nabla^{12} \nabla cpi_t = \underset{(.036)}{.002} + (1 - \underset{(.172)}{.440}L^{6}) \varepsilon cpi_t \qquad (2)$$

$$R^2 = .248, \qquad \tilde{\sigma} = .035, \qquad Q_{16} = 14.231, \qquad P = .582$$

where terms in parentheses beneath the parameter estimates are standard errors, $\hat{\sigma}$ and $\tilde{\sigma}$ are Least Squares (LS) and Maximum Likelihood (ML) estimates of respective equation standard errors and Q is the Ljung-Box *portmanteau* χ^2 test whereas P is its approximate marginal significance level. Correlation matrices for the coefficients, ACFs and PACFs for the residual series and different filter perturbations were also employed to check for the adequacy of the deployed filters. Results on these are not reported here but they indicate overall models acceptances. We also note in passing the description of the behaviour of both the rates and prices series in terms of ARIMA filters entirely different from the random walks hypothesized normally for these variables.

The CCF for the residuals from the two univariate models was then obtained in accordance with the TF model building methodology under the contention that any causation should be revealed in significant cross-correlations where significant values for the sample cross correlations are those correlations greater in absolute value than $2/\sqrt{n}$ where n is the length of the residual series used in calculating the cross-correlations. As evidenced by Table (A.1) in the appendix, significant correlations were found to exist between εlsd_t and εcpi_t at lead 5 with:

$$\text{Corr}\,(\varepsilon lsd_t, \varepsilon cpi_{t+5}) = 0.0525$$

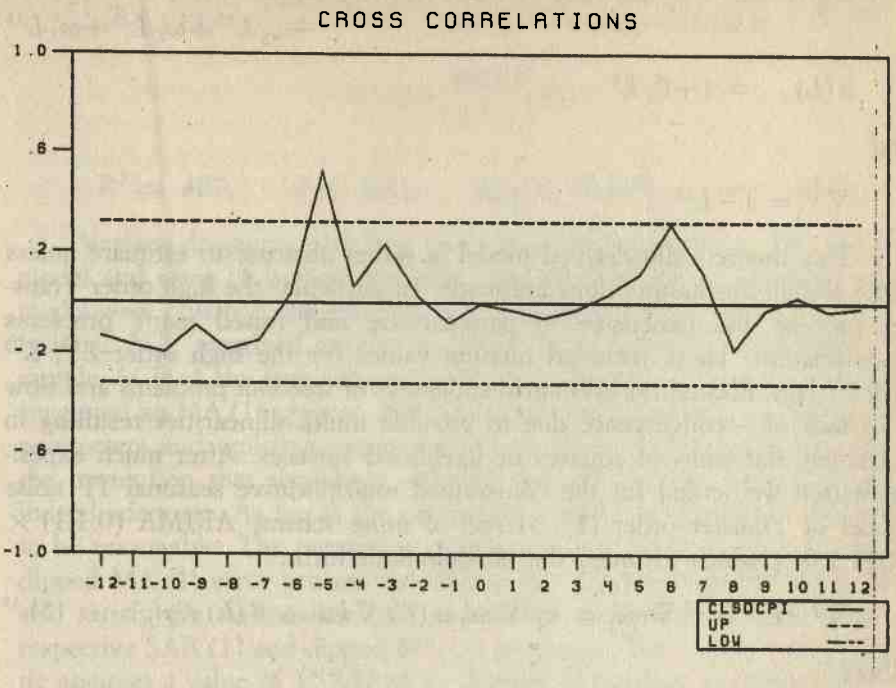
implying a significant major departure from independent behaviour.

In Fig. 2 the cross correlogram is seen to cross the upper significant bound at lead 5. This means that black market Dollar rates affect prices with a lag of five months.

No evidence was obtained on a significant inverse relation with εcpi affecting εlsd since cross correlations between the two, although substantial in magnitude at lag 6, proved statistically nonsignificant and did not cross the 95% bounds. This is consistent to a remarkable degree with results obtained via the CE procedures above and in particular to those obtained by the Granger test.

Checking for systematic patterns then the CCF may suggest that following an increase in ∇lsd_t, $\nabla^{12}\nabla cpi_t$ initially increases over six months before decreasing a small amount each of the following six months – *i.e.* for $k < 0$, LSD leads the CPI in the following way: lags 2 through 6 months are all positive and peak at monthly lag $k = 5$ while lags 7 through 12 are all negative. But, on a more formal basis, we performed the Koch-Yang (1986) tests of independence and the corresponding results listed in Table (A.1) of the appendix suggest no significant long-run patterns in

FIG. 2. The Cross Correlogram of εlsd_t and εcpi_t.



successive distributed lag coefficients since apart from the first few values of i, the independence hypothesis is not rejected.

Based on these results, a degenerate unidirectional bivariate causal effect with no feedbacks was determined where black market Dollar rates affect prices after a lag of 5 months. A resultant dynamic error shock model of the form:

$$\varepsilon cpi_t = \omega_5' L^5 \, \varepsilon lsd_t + \eta cpi_t \tag{3}$$

where ηcpi_t should be white noise.

To construct the models relating to the original series we transformed the dynamic shock model (3) into structural form by substitution of the ARIMA filters (1) and (2) into it. After some algebraic manipulations and rearrangements we obtained the multiplicative seasonal TF-noise form:

$$\nabla^{12}(L) \quad \nabla^{12} \nabla cpi_t = k_3 + \omega_5' L^5 \, \omega(L) \, \nabla lsd_t + \theta(L) \, \varepsilon cpi_t \tag{4}$$

where the rational lag and noise polynomials, after some multiplication are:

$$\nabla^{12}(L) = 1 - \nabla_1 L^{12}$$

$$\omega(L) = 1+\omega_1 L+\omega_2 L^6+\omega_3 L^7+\omega_4 L^{13}+ +_{w5} L^{19}+\omega_6 L^{25}+\omega_7 L^{31}$$

$$\theta(L) = 1+\theta_1 L^6$$

and

$$\nabla^{12} = 1-L^{12}$$

This theoretically derived model is rather abstruse to estimate unless some simplifying assumptions are made. In particular the high order Transfer process was expensive to parameterize and raised many problems in estimation. These included missing values for the high order L^{19}, L^{25} and L^{31} lags, ill-conditioned matrices, degrees of freedom problems and slow – or lack of – convergence due to possible multicollinearities resulting in extremely flat sums of squares or likelihood surfaces. After much experimentation we settled for the constrained multiplicative seasonal TF noise model of Transfer order (1,0,5) and of noise scheme ARIMA (0,1,1) $\times$ $\times$ $(1,1,0)_{12}$ which assumed the parsimonious form:

$$\nabla^{12}(L)\ \nabla^{12}\nabla cpi_t = k_4 + \omega_5'\omega(L)\ \nabla lsd_t + \theta(L)\,\varepsilon cpi_t \qquad (5)\ [15]$$

where

$$\nabla^{12}(L) = 1-\nabla_1 L^{12}$$

$$\omega(L) = (\omega_0+\omega_1 L^8)L^5 = \omega_0 L^5+\omega_1 L^{13}$$

$$\theta(L) = 1+\theta_1 L^6$$

ML methods were employed in the estimation of the above model (5). The estimated relation was

[15] The difference and seasonal operators applied to the variables on both sides of the TF are different from each other. Box and Jenkins (1976) recommended filtering both series symmetrically with the univariate ARIMA model that reduces the input of each relationship to white noise. But, as noted by Abraham (1985) and Harvey (1990), in principle, different operators may be employed to ensure joint stationarity of the series. Empirically, we note the evidence on the seasonality of cpi_t and the nonseasonality of lsd_t presented in Section 4. Also, the appearance of L^8 in the TF coupled with a variable lag of order L^5 leading to a total of length 13 again suggests the presence of a first difference mechanism juxtaposed on the Transfer part, *i.e.* a convolution of a difference and a seasonal transfer effects. Hence, we did not feel the urgency for applying symmetric seasonal filters for both series.

$$(1 + \underset{(.172)}{.710L^{12}})\,\nabla^{12}\nabla cpi_t = -\underset{(.004)}{.005} + (\underset{(.080)}{.174L^{5}} + \underset{(.085)}{.161L^{13}})\,\nabla lsd_t$$

$$+ (1 - \underset{(.175)}{.400L^{6}})\,\varepsilon' cpi_t \qquad (6)$$

$$R^2 = .407, \qquad \tilde{\sigma} = .033, \qquad Q_{16} = 15.837, \qquad P = .464.$$

Various diagnostic checking procedures were directed at the estimated model and some of its perturbations. Sample ACFs of the residuals of the model were obtained and subsequently compared to their 95% bounds. The residual ACF remained within the white noise bounds. Furthermore, the sample ACF of the first difference of the residuals for the model strongly suggested an MA (1) process. Excessive reparameterizations, *i.e.* fitting extra parameters and omitting parameters to check for overspecification, led to the contention that the above selected form (5) of the derived model is indeed adequate. As far as the estimation results are concerned, they seem to be reasonable. The parameter estimates of the SAR (1) process and the dipped MA (1) error process are statistically significant at 5% level. They also satisfy the stationarity and invertibility conditions required from the respective SAR (1) and dipped MA (1) processes. The *portmanteau* Q statistic assumes a value of 15.837 at 16 degrees of freedom as compared to the theoretical 26.30% at 5% level – thus reflecting model adequacy.

As for the TF components, the major significant impact occurs with consumer prices responding to initial changes in the black market Dollar rates which occurred five months before. A lesser significant interim response is also detected operating over a time span of thirteen months. These could be considered as confirmations of the pseudo J-curve behaviour but negation of the absolute PPP-type in proportion form by the presence of lags extending over a year.

Observing the Sudanese black market, it may seem at first glance that the five months time lag is rather longer than expected. For, following a Dollar innovation, available commodities are usually immediately withdrawn from the market and switched to alternative venues of black markets for goods where they are usually traded at much higher prices. The market then absorbs the initial rates-prices shock and goods begin to resurface again but at the much higher prices prevailing in the black market. The black market prices are thus partially validated within a short period of time. Arrival of importables at the higher Dollar prices would then result in total validation of prices to their new high levels – *i.e.* the pseudo-J curve behaviour.

Another force tending to lengthen the Transfer lag works through the impact of formed price expectations on wage adjustments through negotiations processes which usually take some time. Wages are sticky in the short run and hence delayed cost changes would stagger the response of price increases. The final outcome of these forces could be a compromise between the swift black market Dollar rates-consumer prices spiral effect and the sluggish expectations-wages-prices spiral effect, hence explaining the five months lag.

In the final analysis, the TF model was used for cross-validation forecasts where 6 period ahead forecasts were generated and presented in Table (A.3) together with their summary statistics. The results point to acceptable forecasts despite some indications of bias and consistent overestimation as evidenced by convergent values of ME, MAE and RMSE and by the decomposition statistics. The model did consistently better compared to a 'naive' forecasting model as judged by the Theil U statistic which assumed a value of .017 for the entire period.

4.3. *Cointegration and the error correction representation.* – Questions as to whether PPP and/or PPP-type relations are interpretable as short run or long run equilibrium conditions or as identities are spurring recent works on cointegration [16]. Hence, in this subsection we resume the application of the cointegration approach started at the beginning of Section 4.

To test for cointegration of the series, we obtained the OLS regression of the long run relationship:

$$cpi = \underset{(3.329)}{.458} + \underset{(36.649)}{.929}\, lsd \qquad (7)$$

$$R^2 = 0.953, \quad CRDW = .533, \quad DF = -3.084, \quad ADF = -3.218,$$

where numerals in parenthesis are t-values. The cointegrating regression Durbin-Watson (CRDW) statistics exceeds the theoretical 5% bounds provided by Sargan and Bhargava (1983) of 0.436 [17]. Also, the DF and ADF tests for cointegration exceed their respective theoretical values obtained from tables in Dickey and Fuller (1981) and Dickey and Fuller (1979) for $n = 50$, respectively. Based on these comparisons, the null hypothesis of nonstationary residuals ($\hat{e}_t$) is rejected. The variables are there-

[16] See footnote 3.

[17] This was obtained from a quadratic interpolation in n^{-1} as suggested by SARGAN and BHARGAVA (1983).

fore cointegrated. The result of the test indicates that a long-run exchange rate-price elasticity is $\hat{p} = 0.929$.

The cointegrating technique of Johansen and Juselius (1990) was also used to further investigate the long-run properties holding between the two variables. The technique is superior to the above used regression based diagnostics of CRDW, DF and ADF as it captures the underlying properties of the data more fully as well as provides estimates of the long-run cointegrating vectors. Results obtained using a Vector Autoregression (VAR) of order 6 on levels are reported in Table 3 below:

TABLE 3

JOHANSEN COINTEGRATION *

H_0	LR	5% Value
$r < 1$	0.212	3.84
$r = 0$	16.604	12.52

* r is the number of cointegrating vectors. LR is the sequential likelihood ratio trace test statistics. Critical values are from OSTERWALD-LENUM (1992, table 0).

The results demonstrate that for levels at 5% level the null of zero cointegrating vectors is rejected while that of at most one is not. The cointegrating regression normalized on *cpi* is now:

$$cpi = 0.948\ lsd$$

which is largely similar in magnitude to the value obtained in (7).

Following results obtained by Engle and Granger (1987) and noting that the application of the causality testing procedures enables us to specify a particular direction to regress variables in the cointegrating regression [18], the short-run dynamic specification of the price-black market exchange rate equation is an error-correction model (ECM) converging in the long run to the relationship (7) above. A possible form for the short-run black market exchange rate prices equation selected from close alternatives is [19]:

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[18] ENGLE and GRANGER (1987) show that for y_t and x_t being two cointegrated variables using either y or x as the dependent variable should within a bivariate context, yield identical estimates of the constant of cointegration.

[19] Other forms tried for the ECM contained seasonal dummies and more lags. Some of these forms were acceptable but tests on the dummies indicated nonsignificance where the lagged dependent variable may have subsumed some of the seasonal effects and we chose to report the above form (8) here.

$$\nabla cpi_t = \underset{(1.360)}{.009} + \underset{(.456)}{.040}\,\nabla lsd_t + \underset{(.373)}{.033}\,\nabla lsd_{t-4}$$

$$+ \underset{(1.822)}{.157}\,\nabla lsd_{t-5} + \underset{(3.412)}{.406}\,\nabla cpi_{t-1} - \underset{(-3.360)}{.169}\,\hat{e}_{t-1} \qquad (8)$$

$$R^2 = 0.341 \qquad \tilde{\sigma} = .037 \qquad LM_1 = .063 \qquad LM_{12} = 5.915$$

where the *LM*s are the Lagrange multiplier statistics for serial correlation at orders 1 and 12 respectively. Statistically, the ECM is acceptable with a reasonable R^2, keeping in mind the fact that the regressand is in first difference form. The *LM*s are both less than their theoretical χ^2 counterparts hence we do not reject the null of zero autocorrelation. The EC term is equal to -0.169 while that obtained from the above Johansen procedure is -0.206.

The cointegrated ECM model was subjected to the same forecastability tests performed on the TF model where 6 period forecasts were generated and presented in Table (A.4). Based on the estimation and forecast results we note that the performance of the ECM model was superior to that of the TF. The bias is substantially reduced and the overall statistics for the whole period are acceptable. The estimated coefficients reflect more clearly a J-curve pattern with a "tilt to the right" in the response of prices to the black market rates in a more pronounced way as compared to that of the TF. The ∇lsd_{t-5} term is significant at level .07. The error correction term $\hat{e}_{t-1}$ is significant at level .05 indicating the existence of market forces that operate to restore long-run equilibrium after possible short run shocks. On other counts, the two models retain a largely similar structure and thus similar inferences could be drawn from each.

Overall, the results on the TF and the ECM suggest that the presence of the black market in currency had a positive impact on the inflation rate where the effect worked its way through the black market exchange rate. The black market rate operated as a transmission mechanism for the effect of tradables on domestic prices. Restrictive policy measures resulted in further depreciations of the black market rate and in turn generated rapid inflation leading to the policy dilemma noted in Section 1.

The resultant lags also confirm the skepticism that PPP must hold in either absolute or relative form, without qualification for the time dimension and we suggest that in testing PPP in the case of an exchange control regime an explicit account must be taken of determining the lag structure in the process connecting rates to prices.

Conclusion

In this paper we raised the issue of exogeneity of rates in control regimes. The main concern was to detect for causality between black market foreign exchange rates and consumer prices and to ascertain the lag structure and length connecting the two variables. A special case of the Sudanese black market for currency was considered. Methods of causality testing, cointegration and multivariate time series TF modelling were used to signal causality, indicate feedback if present and suggest the appropriate specification of lag structures and lengths to use.

Data were obtained on monthly basis for black market Dollar rates and the CPI over the period October 1980 to February 1986. Causality was established to be mostly unidirectional with black market Dollar rates affecting consumer prices but with no statistically significant feedback in the opposite direction. The effect was lagged with the first major impact occurring on consumer prices after a period of five months following initial shocks in the black market Dollar rate. Other weaker effects tended to spread through lengthier periods of time.

Perhaps the single most important result of the paper is the explicit impact the black market on currencies has on domestic prices in Sudan. The results also present a first step to establishing *a priori* the variables to use and the adequate form to specify if PPP tests on PPP-type relationships, like inflation functions, are to be estimated in Sudan. Indeed, on a more general level, an important outcome of the analysis concerns the appropriate specification of models used to test for PPP and PPP-type relationships in exchange control regimes with their accompaniment of black markets in currencies. The present study suggests that rather than relying on specifications developed mostly for the fixed or flexible rates cases, one should check firstly for causality between rates and prices before selecting the appropriate specification to test for PPP or to estimate for PPP-type relationships.

Other additional case-specific results collected during the empirical analysis concern the nonstationarity of the black market rates and prices series, the behaviour of the black market rates and prices which were describable by filters different from random walks, seasonality in prices but not in rates and the operation of J-curve patterns and pass-through effects on prices.

TABLE A.1

CROSS CORRELATIONS FUNCTION BETWEEN εlsd and εcpi

LAG *	CROSS CORRELATIONS
−12	−.132
−11	−.168
−10	−.195
− 9	−.090
− 8	−.183
− 7	−.148
− 6	.040
− 5	525
− 4	.067
− 3	.233
− 2	.030
− 1	−.078
0	−.001
1	−.025
2	−.056
3	−.024
4	.037
5	.115
6	.315
7	.121
8	−.184
9	−.024
10	.025
11	−.030
12	−.015

* Negative lags are leads. The standard errors $n^{-\frac{1}{2}}$ for the coefficients are 0.124.

TABLE A.2

KOCH-YANG INDEPENDENCE TEST *

	$M = 6$		$M = 9$		$M = 12$	
i	v_i	KY_i	v_i	KY_i	v_i	KY_i
0	13.000	19.116 (.120)	19.000	23.724 (.207)	25.000	25.706 (.423)
1	8.229	17.866 (.022)	12.226	20.636 (.056)	16.225	23.695 (.096)
2	5.528	15.226 (.009)	8.363	16.600 (.035)	11.202	19.027 (.061)
3	4.000	12.234 (.016)	6.169	12.726 (.048)	8.345	14.678 (.066)
4	3.045	9.578 (.023)	4.787	9.614 (.047)	6.543	11.144 (.084)
5	2.405	6.942 (.031)	3.847	6.775 (.079)	5.314	7.834 (.166)
6			3.172	4.333 (.228)	4.426	5.158 (.271)
7			1.610	1.530 (.216)	3.757	3.195 (.363)
8			2.280	1.927 (.382)	3.236	2.230 (.526)
9					2.822	1.901 (.387)
10					2.487	1.798 (.407)
11					2.213	1.898 (.387)

* KY_i are sets of KOCH-YANG (1986) test statistics $\left\{\left(\frac{1}{\beta}\right) r_i^*, (i = 0, 1, 2, ..., M-1)\right\}$ associated with the CCF of table 3. Each KY_i is asymptotically distributed as $\chi^2_{v_i}$ under the null that lsd_t and cpi_t are unrelated. For $i = 0$, the statistics degenerates onto HAUGH (1976) measure.

Figures in parentheses are marginal significance levels. v_i are the fractional degrees of freedom of the approximate χ^2 distribution in each row that is used to test the independence hypothesis.

TABLE A.3

FORECASTS AND SUMMARY STATISTICS *
THE TF MODEL

PERIOD	ACTUAL	FORECAST	ME	MAE	RMSE	THEIL U
86:3	469.833	467.578	− 3.708	4.869	5.703	.454
86:4	479.067	484.718	− 0.596	9.596	11.130	.446
86:5	488.300	501.540	−15.879	15.879	16.762	.451
86:6	503.469	524.656	−21.173	21.173	21.499	.438
86:7	518.633	542.110	−23.990	23.990	23.995	.393
86:8	533.800	556.048	−22.248	22.248	22.248	.304
WHOLE PERIOD:			−13.925	14.677	16.869	.017

CORR = .992
THEIL'S DECOMPOSITION:
BIAS = .681
VAR = .278
COV = .041

* ME is Mean Error, MAE is Mean Absolute Error, RMSE is Root Mean Square Error. CORR denotes correlation between actual and forecasted. Theil's inequality U coefficient is equal to 0 for a perfect forecast and to 1 for the worst possible forecast obtainable from a 'naive' model. Theil's decomposition optimal values are bias = 0, var = 0 and cov = 1, in which case the forecast error is due to unsystematic deviations only.

TABLE A.4

FORECASTS AND SUMMARY STATISTICS *
THE COINTEGRATION-EC MODEL

PERIOD	ACTUAL	FORECAST	ME	MAE	RMSE	THEIL U
86:3	469.833	473.021	4.202	6.646	7.914	.630
86:4	479.067	485.701	9.660	14.320	17.561	.703
86:5	488.300	498.321	14.524	19.534	24.661	.663
86:6	503.469	505.517	18.706	20.073	25.262	.515
86:7	518.633	505.307	24.641	24.641	27.115	.444
86:8	533.800	503.183	30.617	30.617	30.617	.418
WHOLE PERIOD:			3.675	10.973	14.570	.015

CORR = .826
THEIL'S DECOMPOSITION:
BIAS = .064
VAR = .498
COV = .439

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CAUSALITÀ E STRUTTURA DEL RITARDO TRA IL CAMBIO ESTERO AL MERCATO NERO E I PREZZI AL CONSUMO. IL CASO DEL SUDAN

Questo articolo considera la relazione dinamica tra i tassi di cambio estero al mercato nero e i prezzi al consumo nel caso del Sudan. Per identificare l'esistenza e la natura della reazione reciproca di ogni variabile vengono usati test Box-Jenkins, di priorità causale e di cointegrazione. I test indicano una struttura di causalità per lo piú unidirezionale secondo cui i tassi di cambio estero al mercato nero influenzano i prezzi al consumo, ma i prezzi al consumo non influenzano i tassi del mercato nero. Sulla base di questo, una funzione di trasferimento bivariata degenere (TF) e un meccanismo di correzione dell'errore (ECM) sono stati identificati, stimati e controllati diagnosticamente. L'effetto iniziale principale dei tassi sui prezzi si verifica dopo un intervallo di cinque mesi, ma successivi effetti possono diffondersi durante periodi di tempo piú lunghi.

Modern Wars. Pronouncing. (1981. 1)

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FACTOR EFFICIENCY IN PAKISTANI INDUSTRY: THE INFLUENCE OF PRIVATE VERSUS PUBLIC OWNERSHIP IN AFFECTING CAPITAL AND LABOR PRODUCTIVITY

by
ROBERT E. LOONEY *

Introduction

Pakistan's recent fascination with privatization stems from two sources: external and internal. External influences are largely associated with the increased role of the International Monetary Fund in the country's policy making decision process. Internal pressures for privatization are from three main sources.

First concerns the fiscal situation. Government deficits have been a growing problem in recent years and the conventional wisdom has been that in large part these deficits have stemmed from losses accrued by public enterprises. As a result, the perception has developed that a privatization program may go some way to relieving fiscal pressure.

The second source of internal pressure concerns ideology with respect to the role of the state. The emphasis of economic thinking in the late 1980s was on issues such as government failure and the power of the market. In such an ideological environment, the inclination of advisers is to roll back the power of the state and privatization is seen by some as the tool to achieve that objective. This view also gains some support from elements in the current theological debate about what an Islamic economic system should look like. The third source of pressure comes from the business community who sense the opportunity of making a financial killing on the transaction.

In general, however, most economists reject both total public sector domination of production and complete *laissez-faire*. The critical issue is not

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one of privatization or public ownership *per se*, but, particularly in the case of manufacturing, where to draw the demarcation line between the two. What should best be left to the public sector and what to privatize.

While the issues surrounding the areas to privatize will ultimately be determined by political considerations, there are nevertheless some general economic considerations that policy makers ought to consider as they proceed in restructuring the economy. In particular are private firms in Pakistani industry more efficient than their counterparts in the public sector and if so in what regard? Are efficiency differences between state and private firms likely to be large or modest? Do efficiency differences between state and private firms hold across a wide number of industries or are they confined to several segments of manufacturing? Are the observed efficiency differentials confined to better utilization of capital or labor or both? What role do factors such as firm size and regional location play in affecting the productivity of capital and labor?

Privatization and Efficiency

Increased reliance on market forces in developing countries has become the conventional wisdom in development economics. The reasons behind this are varied and include: [1]

1. An intellectual belief, particularly held by economists in the superior attributes of markets versus government central planning regimes and government (public) ownership.
2. The observed inefficiency of state-owned enterprises in developing countries.
3. The success of the NICs, especially those of Asia (Taiwan, Hong Kong, Singapore and Korea) which are perceived to have relied more on market forces than other developing countries.
4. The growth performance of Japan since World War II, where again the perception is one of market reliance.
5. A spill-over effect of conservative political tide which has swept many developed countries in the 1980s, the extreme example of which is Thatcherism in the U.K.; which has been marked by both an intellectual/ideological belief in the superiority of the market system and a commitment to reduce the size of the government deficit/debt. Both of these in turn giving rise to a strong privatization move.

Lesser [2] notes that what has probably been of greatest influence in the

[1] LESSER (1991, p. 160).
[2] *Ibid.*

swing of the advocacy of private markets is the combination of the relative failure of some thirty years of development efforts to significantly increase the standard of living in developing countries, or to close the income gap between developing and developed countries, and the predominant role which governments in most developing countries have played in the development process. In simple terms, government planning is perceived not to have worked, and the advocacy of markets emerges as the alternative [3].

For some, the identification of the alternative (versus perceived failure of government per se) is an ideological premise based on a dual belief that first, efficiency is, or should be, the paramount goal of an economy and second, that markets are the best available means of achieving efficiency. For others the market alternative is seen as a pragmatic option, a means of correcting the perceived failure of government planning systems and state-owned enterprises [4].

As noted above our concern here is largely one of assessing efficiency differences between public and private firms in Pakistan. However, to consider efficiency systematically it is necessary to make a distinction between two types of efficiency – productive and allocative. Productive efficiency is straight forward and refers to the type of efficiency which most lay persons would recognize when they use the term "efficiency". It means producing an output in the least cost possible way, and is secured when the firm is producing the output at minimum average cost. Allocative efficiency is more difficult to grasp. It looks at the output of a company or plant in relation to the output from all the other companies or plants in the economy and asks if the output is too much or too little given a society's preferences. The question is whether the plant is getting too many or too few of the scarce resources in the economy given what society wants. In general allocative efficiency is secured by ever changing competitive prices. Increased competition will (other things being equal) lead to improved allocative efficiency.

Allocative and productive efficiency can often pull in opposite directions. For example, it was often said in the UK that the nationalized industries provided allocative efficiency because the government could impose competitive prices, but that this was at the expense of productive efficiency since there were no obvious mechanisms in the public sector to force lower costs [5].

With regard to productive efficiency, some argue that simply the act of

[3] See for example: BERG (1987).

[4] VERNON-WORTZEL and WORTZEL (1989).

[5] STEVENS (1989, p. 64).

moving the enterprise from the public to the private sector would improve productive efficiency. This assumes that public enterprises are chronically and universally inefficient. There are some theoretical grounds supporting this view associated with economic theories of agencies [6] and public choice [7]. There are no empirical grounds to assume either sector is automatically superior to the other. Superior performance is essentially determined by the environment in which the enterprise operates and the act of privatization alone cannot be assumed to lead to productive efficiency.

Gains to allocative efficiency. [8] – How well markets function will determine privatization's impact on allocative efficiency. Public enterprises operating in competitive markets should be privatized since there is no first or second best rationale for public intervention of any sort. In these cases gains in efficiency will be minor, since the public enterprises will have already been exposed to a competitive environment. These public enterprises will typically be found in the service or manufacturing sectors in areas where there are no scale economies and where the market can support several firms [9].

It would appear that the potential for important efficiency gains is to be found in imperfect markets or in potentially competitive markets where public ownership is the result of unwarranted intervention. In either case however, gains in allocative efficiency from privatization are unclear. In competitive markets, public ownership is sometimes associated with inefficient intervention: a statutory public monopoly established in a market that should support several firms; a public enterprise granted protection from competition; or perhaps public ownership subsidized to support state distributional objectives. In such cases greater efficiency gains can be expected from regulatory reform than from privatization itself, even though in practice the two often come together [10].

The likely gains in imperfect markets are similarly modest. As Hemming and Mansoor argue, "allocative efficiency is a function of market structure rather than ownership" [11]. In the absence of other reforms that affect the pattern of relative prices in the economy and increase competition, the privatized enterprise still faces the same prices as the public enterprise before it. Privatization by itself will not change the nature of the market in

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[6] See for example VICKERS and YARROW (1988).

[7] See for example PEACOCK (1979).

[8] The following is based largely on VAN DE WALLE (1989, pp. 604-605).

[9] VAN DE WALLE (1989, p. 604).

[10] VAN DE WALLE (1989, pp. 604-605).

[11] HEMMING and MANSOOR (1988, p. 13).

which the firm operates, and the environment which shapes its pricing decisions. A public monopoly makes way for a private monopoly, for example, but monopoly pricing will remain in effect.

Gains to Productive Efficiency. – With some important exceptions the gains in allocative efficiency from divestiture are likely to be modest. The case for privatization then rests with the gains in productive efficiency that it will bring about within the firm. Privatization advocates argued that public enterprises are more likely to exhibit greater internal inefficiencies than private firms for several reasons:

1. Public enterprises tend to misuse production inputs because they are protected from competition and thus allow considerable slack or "X-Inefficiencies" [12] to develop in their production processes. Public enterprises in many countries have easy access to capital, often at subsidized levels, and thus can be expected to undervalue capital in their investment decisions. Subsequent to privatization an enterprise would compete with other firms for access to capital, and use it more efficiently.
2. The property rights school argues that managerial incentives to maximize profits and minimize costs are undermined by public ownership and regulations [13]; public managers are given numerous and inconsistent objectives by government overseers. Unwieldy bureaucratic controls and the absence of shareholders with a direct interest in profits lessening the pressure on managers to maximize company performance.

Previous Estimates of Public Sector Efficiency

How important are these inefficiencies in production? Certainly in Pakistan's case there are few estimates. While X-inefficiencies are assumed to be important in some cases, it is not clear in what proportion they result specifically from public ownership, rather than from protection from competition more generally. In addition because public enterprises are saddled with noncommercial functions, criteria for performance are more ambiguous and difficult to monitor effectively. Also in Pakistan's case, public enterprises have been burdened with employment creation or overt redistributive functions. In such situations it is difficult to distinguish technology-induced inefficiencies from those brought on by government social welfare objectives.

[12] LEIBENSTEIN (1966).

[13] See for example: DEMSETZ (1968) and FURUBOTN and PEJOVICH (1972).

With these considerations in mind it is interesting to look at the previous empirical work on public/private efficiency and profitability rates. These studies have provided mixed pictures. In one of the first studies of this type Sarmad [14] selected four ratios from a choice of seventeen performance indicators (on the basis of their predictive power). This methodology enabled him to select, in particular, the profitability ratios most appropriate for performance evaluation in the prevailing market conditions. Of his findings several stand out [15]:

1. Nine poorly performing enterprises were identified whose current state was the result of the aggravation of a declining trend in profitability which was already present in the earlier years of 1977-78-1981-82 period.
2. A comparison of the operational conditions of poorly performing enterprises with those of the well performing ones showed that the former, labor intensities were much higher and factor utilization relatively unproductive. However, despite continuous deficits, the low-performing enterprises were not allowed to go into liquidation.
3. The regression results regarding the determinants of enterprise profitability were just as expected. Enterprise size was found to be negatively related to the profit rate while for the group of smaller enterprises the relation was positive, suggesting a certain critical level beyond which enterprise size exerts a negative influence on the profit rate.
4. The growth rate of the asset variable is significant and positively related to profit rate, which is explained by the increase in capacity utilization of nearly all public enterprises during the years from 1977-78 to 1981-82. The negative relation of leverage to the profit rate is explained by the greater risk associated with a higher equity-asset ratio.

Sarmad concluded [16] that the lower profit rate in big enterprises could result from two causes. First such enterprises tend to have a large share of the total supply of the product and because of less competition have little incentive to improve efficiency. Secondly, given the limited size of the domestic market, capacity utilization in large enterprises is low, particularly during the earlier years of operation. Sarmad notes that while the inverse relationship between enterprise size and rate of profit is true in general, the incidence of slackness is mostly in the small asset sized group.

As noted above, owing to multiple objectives, i.e., commercial and non-commercial, assessment of asset utilization in public enterprises is a

[14] SARMAD (1984).
[15] SARMAD (1984, p. 153).
[16] SARMAD (1984, p. 153).

complex task. The most important element which influences the performance of these firms is government control on prices of their inputs and outputs. Barring a few manufacturing enterprises prices of almost all of the public enterprises in Pakistan are directly or indirectly controlled by the government which in turn influence their sales as well as profits [17].

Despite the presumption that public enterprises in Pakistan lack profitability because of price controls, a recent report by the Auditor General [18] shows that in 1987-88 the return on government investment works out to 8 percent. The GSC report demonstrates that in 1988-89, 154 public enterprises' return on net shareholder equity works out to 10.4 percent. In addition, enterprises paid total taxes of Rs 25.8 billion which is 26.7 percent of total consolidated taxes received by the government. During the same years these enterprises generated a saving of Rs 24.8 billion against an investment of Rs 26.8 billion, leaving a gap of only Rs 2 billion i.e., 7.7 percent.

However, the analysis of the financial performance also shows a significant number of negative trends [19].

1. Since inflation in Pakistan is approximately 9 percent and the interest rate around 15 percent enterprises generating less than this return on assets can be considered giving negative return on assets employed. There were only six enterprises which in 1988-89 gave a return above 15 percent and ten enterprises which gave returns above 10 percent.
2. Out of 154 GSC enterprises, at least 51 units with about 12 percent assets incurred losses. In the manufacturing sector alone 5 units with about Rs 2 billion assets were closed down; and
3. In 1988-89 out of 356 companies listed at the Karachi Stock Exchange 44 belonged to the public sector. These companies with 56 percent share in assets contributed 454 percent of the sales and generated only 38 percent net profit. Similarly their share in corporate tax was 37 percent and the dividends at 35 percent.

As Mehdi [20] notes, the above findings may simply demonstrate the effects of the negative element of public ownership rather than inefficiency of management. This however, is consistent with the notion that in general public sector firms have higher cost structures. A primary conclusion of a survey of public enterprises world wide is that they have not performed up

[17] Mehdi (1991).
[18] Auditor General of Pakistan (1989).
[19] Mehdi (1991, pp. 896-897).
[20] Mehdi (1991, p. 896).

to the expectations of their creators and founders [21]. In Pakistan also such conclusions have strengthened the case for economic reforms in which privatization plays a major role.

Along these lines, LaPorte and Ahmed [22] note their starting assumptions concerning state ownership, the role of public enterprises in the economy of Pakistan, and the performance of these organizations: [23]

1. state ownership is unavoidable
2. public enterprises play a major role in the economy of Pakistan
3. the commercial performance of public enterprises is poor
4. if government continues to use public enterprises, improvements in management and performance must be pursued; and
5. alternatives to "government" by public enterprise should be pursued.

are essentially correct.

Qualifying the third point, they note that while their results suggested that the public enterprise sector as a whole was not the savings generating sector as envisaged by its advocates, nor were many public enterprises profit makers; not all lost money and some not only generated savings, but made profits for the government. They found that public enterprises whose management systems were quite archaic or that had just begun to adopt business-type systems, generated savings and made profits despite being over staffed. They do caution however that these enterprises were in economic sectors where they enjoyed a monopoly status, and had very high demands for their goods or services. In this regard, it should be noted that the principle examples they cite where this occurrence was common was not in manufacturing but the Water and Power Development Authority (WAPDA) and Telegraph and Telephone.

In a much more detailed study, Shaikh examined the operational performance of Pakistan's vegetable ghee industry during the ten year period 1970-80 [24]. Here the particular focus was on the trend in performance and relative efficiency under the two ownership periods: [25]

1. In terms of the growth rate of public profitability in constant prices the period of study could be divided into three phases, each coinciding with a different

[21] Nells (1990).
[22] LaPorte and Ahmed (1989).
[23] LaPorte and Ahmed (1989, pp. 146-147).
[24] Shaikh (1985).
[25] Shaikh (1985).

external control structure: high rate of growth from a very low base under private ownership, stagnation under the provisional governments and impressive growth from a relatively high base under the Ghee Corporation.
2. In terms of average level of public profitability in constant prices, the performance of the period under public ownership was significantly better than the performance in the period under private ownership.

Shaikh qualifies his findings by suggesting [26] that managerial performance under private ownership was probably better than indicated by these results for several reasons. First there was uncertainty in the supply of inputs during some years of the private period. Secondly, deliberate underreporting of operational performance occurred for purposes of tax evasion. Third, it can be argued that some of the increased production was a passive response to shifting demand. How the private sector would have responded in the absence of nationalization is something that cannot be tested.

In spite of these qualifications, the results can be used to argue [27] against the inevitability of lower efficiency under public ownership. The results also suggest the fact that it is not ownership *per se* but rather the nature of the technology, prevalent institutional arrangements and specific policies adopted by the government which affect performance. This fact is dramatically brought out by the contrast in the performances during the two phases of public ownership. Both the level and the rate of growth in public profitability in constant prices are significantly higher for the period under the Ghee Corporation than for the period under the provincial governments.

In their study of privatization Naqvi and Kemal [28] concluded that most of the *a priori* arguments in favor of privatization – e.g., that it improves allocative or productive efficiency by promoting greater competition, that it helps to raise more money for the government to help solve its budgetary deficit problems and that it lays the foundation of the so-called people's capitalism – are not convincing in Pakistan's context.

In particular, their analysis suggests that: [29]

1. Privatization may yield modest, if any gains in allocative or productive efficiency because the (private) market structures are basically oligopolistic.
2. The public sector's profitability is due not to the higher level of protection that it enjoys (indeed, the effective protection rates are lower for them) nor due to

[26] SHAIKH (1985, p. 716).
[27] SHAIKH (1985, p. 716).
[28] NAQVI and KEMAL (1991).
[29] NAQVI and KEMAL (1991, p. 131).

any restrictions placed on the entry of new firms, but to its better performance and superior productive efficiency.
3. The charge of the inherent inefficiency of the public industrial enterprises is based neither on good theory nor solid empirical evidence.
4. The country's stock exchanges are too thin and the small potential takers of the stocks of the diversified public enterprises are basically risk averters.

From this they concluded [30] that changing the locus of ownership of industries is by itself neither a necessary nor a sufficient condition for an efficient operation of specific industrial enterprises. Their evidence shows that both the private and public sector firms have operated efficiently as well as inefficiently, depending on the type of industry to which they belong. Their results also suggest very strongly that in Pakistan, there is nothing inherently good or bad about the public sector; or even about the private sector for that matter. Specifically they cite data showing that the thirty nine units out of the sixty public enterprises units for which data is available have had capacity utilization rates exceeding 75 percent. This piece of information also confirms the fact that public sector enterprises do not necessarily act as monopolists (or oligopolists) restricting output and raising prices.

Indeed Naqvi and Kemal's data show that in terms of production, the performance of the public sector corporations has been commendable [31]:

1. That public industrial companies have not necessarily been inefficient is quite clear from the indicators such as pre-tax profits on new equity and the growth rates of output. Over the 9 years period from 1978-79 to 1987-88 the production increased at a rate of 8.9 percent which is no lower than the average growth rate of the large manufacturing sector as a whole over the period.
2. Furthermore the average rate of return on equity of 10.0 percent (in 1987-88) has been no less than the average rate of interest on domestic borrowing. Indeed it has been significantly higher than the average inflation rate of around 6 percent (in 1988-89).

Naqvi and Kemal [32] also note that the experience of the public industrial enterprises shows marked variations both across industrial units within an industry and across different industries. These differences may have been caused by differences in the scale of production, the quality of management, and the environment in which they operate. The favorable impact of change

[30] Naqvi and Kemal (1991, p. 131).
[31] Naqvi and Kemal (1991, pp. 131-132).
[32] Naqvi and Kemal (1991, p. 132).

in management on the efficiency of operations can probably be best explained with reference to the Pakistan National Fibers (producing polyester fiber) which made a loss up to 1984-85, but with a change in management in 1985 it has turned into a profitable unit since 1985-86. The success of management is even more significant because over the 1986-90 period, there has been a substantial reduction in the protection given to the polyester industry.

Finally, Naqvi and Kemal [33] observe that privatization leads to a higher level of efficiency only to the extent that it enhances competition; but this does not always happen, because the presence of a large number of firms in almost all the industries where public enterprises operate offers scope for (monopolistic) competition. The only exception to this rule is Pakistan Steel, which enjoys a monopoly in most of the products it sells; though in certain other products it faces competition both from the private sector and from the imported products. Moreover, the average effective rate of protection in the public sector industries is significantly less than the average for the industrial sector. All of these considerations point to the conclusion that where industrial inefficiency is the problem, steps should be taken to improve the situation regardless of the locus of ownership. The divestiture of public enterprises, mainly on ideological grounds to secure dubious economic gains or to satisfy the sensibilities of donors and creditors, is certainly not an optimal policy.

In summing up the previous work on public enterprise performance in Pakistan, it is clear that a number of issues remain unresolved. In part the difficulty involved in deriving some general conclusions are associated with the common practice of lumping all public enterprises together. Clearly the performance of public enterprises in manufacturing is somewhat different than experienced by similar firms in utilities or other sectors of the economy.

A related issue is that conclusions concerning the performance of public enterprises often hinges on the (somewhat arbitrary) selection of a measurement of profitability or efficiency. Profits, capital utilization, labor efficiency and the like all give somewhat different pictures of efficiency. Finally different studies have examined firms at different points in time. Obviously the economic environment in the 1970s was different enough from that in the 1980s to have produced a significant effect on firm efficiency.

In the analysis that follows we hope to overcome these problems through focusing exclusively on production efficiency.

[33] NAQVI and KEMAL (1991, p. 132).

Methodology

The data is composed of the industrial statistics provided in the annual *Census of Manufacturing Industries* [34]. The raw data by industry consists of:

1. Number of Reporting Establishments;
2. Value of fixed assets at the end of the year;
3. Changes in stocks;
4. Average daily persons engaged;
5. Average daily Employment including contract labor-number;
6. Average daily Employment including contract labor-cost;
7. Industrial cost during the year;
8. Value of production during the year; and
9. Value added during the year.

Each of these variables is identified by region: (a) Total Country, (b) Punjab, (c) Sindh, (d) NWFP and (e) Baluchistan and by ownership pattern: (a) individual ownership, (b) partnership, (c) private limited company, (d) public limited company, (e) co-operative society, (f) federal ownership, (g) corporation by act of National/Provisional assembly, (h) provincial government establishment, (i) and local body government establishment. Individual ownership, partnership and private limited company were aggregate to obtain total private firms. The remaining firms were classified as public sector entities.

The industrial groups are:

Food Beverages and Tobacco
Food Manufacturing
Beverage Industry
Tobacco Manufacturing

Textile, Apparel & Leather
Manufacture of Textiles
Wearing Apparel
Leather and Leather Products
Foot Wear except rubber or plastic
Ginning and bailing of fibers

Wood, Wood Products and Furniture
Wood, wood and Cork products
Furniture and fixtures, not metal

[34] Federal Bureau of Statistics (1976 through 1986-87).

Paper, Printing and Publishing
Paper and Paper Products
Printing and Publishing

Chemicals, Rubber and Plastics
Drugs and Pharmaceutical Products
Industrial Chemicals
Other Chemical Products
Petroleum Refining
Products of Petroleum Refining
Products of Petroleum and Coal
Rubber Products
Plastics

Non-Metallic Mineral Products
Pottery, China and Earthenware
Glass and Glass Products
Other non-Metallic Products

Basic Metal Industries
Iron and Steel
Non-Ferrous Metal Basic Industries

Metal Products, Machinery, Equipment
Fabricated Metal Products
Non-Electrical Machinery
Electrical Machinery and Supplies
Transport Equipment
Scientific and Measuring Instruments
Photographic and Optical Goods

Handicrafts, Sports and Others
Handicrafts
Sports and Athletic Goods
Other Manufacturing

The basic model was estimated in a two step manner:

1. The first step involved estimating [35] two separate factor productivity relation-

[35] Ordinary least squares estimates were performed. See *SPSS/PC + Base System User's Guide, version 5.0* (Chicago: SPSS Inc., 1992) for a description of the computational method. Data from: Government of Pakistan, Federal Bureau of Statistics, Statistics Division, *Census of Manufacturing Industries* annual editions, 1975-76 to 1986-87.

ships. The first, the contribution of capital (the productivity of capital) to overall value added, and the second the contribution of labor (the productivity of labor).
2. On the assumption the predicted values for each of these equations represent the average productivity of capital (and labor), an additional step assessed the factors responsible for deviations from this norm. Specifically, what factors contributed to firms attaining output levels higher (and lower) than that normally associated with a certain quantity of capital (and labor)?
3. Operationally, 2 above involved regressing separately two sets of variables on the residuals from the capital/value added and labor/value added equations: the first set of variables consisted of other factor inputs (raw materials and labor for the capital equation and raw materials and capital for the labor equation), together with the size of the firm.
4. The size of firms (defined in terms of capital per firm in the capital productivity equations and in terms of labor per firm for the labor productivity equations) was included to control for the fact that public sector firms are, on average, larger than their private counterparts, i.e. we wanted to eliminate the spurious correlation between ownership and the size of the firm.
5. The second set of variables consisted of a series of structural parameters: the effect of regional location, a time/policy dimension and finally, whether the firm was private or public. Here the attempt was to determine the effect of ownership on factor productivity after controlling for as many other factors as possible.

Results

Before examining the findings in detail, several qualifications are in order:

1. In addition to the usual limitations of the data, several conceptual problems should be noted. The dependent variable is value added. It is likely that market imperfections will bias the results although the general direction of this bias is not apparent. On the one hand public firms are more likely to face less competition than their private counterparts (and thus have an inflated value added). On the other hand many of these public enterprises have their prices controlled (and thus have a deflated value added).
2. The product mixes in the same industry will vary from private to public firms, thus the dependent variable (value added) may not be directly comparable for both types of firms.
3. The labor term is average daily employment per firm. The skill levels may vary systematically between public and private firms.

With these limitations in mind, the analysis produced a number of interesting patterns (summarized in Table 1):

1. For manufacturing as a whole (Table 1), variations in capital account for slightly over 75 percent of the variation in value added (equation 1). The same is also true for labor looked at individually.
2. Labor, materials and size were all statistically significant in accounting for deviations in value added from that predicted by the stock of capital. It should be noted that the size variable was negative, suggesting that larger firms may not be as efficient as their smaller counterparts in effectively utilizing plant and capacity.
3. While the regional variable was insignificant – locations in regions of descending level of development: Punjab = 1; Sindh = 2; NWFP = 3 and Baluchistan =4 do not appear to systematically affect the productivity of capital – there was a distinct time trend. Breaking the period under consideration into four sub periods 1976-78, the Bhutto years; 1979-81 the early Zia years = 2; 1982-84 consolidation under Zia = 3; and 1985-87 = the transition towards civilian rule = 4, it was found this variable had a negative sign (indicating falling productivity associated with time).
4. Finally the ownership variable was positive and statistically significant. Since this variable assumed values of 1 for private and 2 for public firms, it appears that public ownership is associated with a more productive capital stock than that controlled by the private sector.

Before we can conclude that public ownership appears to generate more value added per unit of capital than do comparable amounts under private ownership it should be noted that the overall improvement in the explanation of the capital residual term (Table 2, equation 1) was relatively minor. Even including the regional, and time variables – the adjusted $r2$ term increased from 0.238 to 0.253. On the other hand this result (Table 2 equation 3) does suggest that for manufacturing as a whole there are no gross inefficiencies in capital usage associated with public ownership per se.

A somewhat similar picture emerges from the analysis of labor productivity (Table 2 equations 4, 5 and 6):

1. Again, other factor inputs (materials and capital) together with size were statistically significant in accounting for differences in productivity. However, capital was significant at only the 90 percent level. As with capital, regional location does not appear to affect the productivity of labor.
2. On the other hand, time was no longer a significant factor affecting productivity. More importantly the negative sign on the ownership term suggests that labor is more effectively utilized by private firms.

Again it should be noted that the structural variables – region, time and ownership – provided only a marginal improvement in the overall explanation of differences in labor productivity.

TABLE 1

SUMMARY OF EMPIRICAL FINDINGS ON THE PRODUCTIVITY OF CAPITAL AND LABOR IN PAKISTANI MANUFACTURING

Industry	Factor Inputs			Size	Structural		
	Capital	Labor	Materials		Region	Time	Public/Pr
Total Manufacturing							
Capital		+++	+++	−−−	ins	−−−	+++
Labor	+++		+++	−−−	ins	ins	−−−
Food							
Capital		+++		−−−	−−−	ins	−−−
Labor	ins		ins		−−−	+++	ins
Textiles							
Capital		+++	+++	−−−	−−	−−−	ins
Labor	++		+++	−−−	−−−	ins	−−
Wood Products							
Capital		ins	++	−−	++	−−	ins
Labor	ins		+++	−−−	+++	ins	ins
Paper/Publish							
Capital		+++	ins	−−−	+	ins	ins
Labor	ins		+++	−−−	ins	ins	−−
Chemicals							
Capital		+++	+++	−−−	ins	ins	+
Labor	+		+++	−−−	ins	ins	ins
Non-Metallic Minerals							
Capital		ins	+++	−−−	−−−	−	++
Labor	+		+++	−−−	ins	ins	−
Basic Metals							
Capital		ins	+++	ins	++	ins	++
Labor	ins		+++	ins	+++	ins	−−
Metal Products/ Machinery							
Capital		ins	+++	−−−	+++	−−	++
Labor	ins		+++	−−−	+++	ins	ins
Handicrafts/ Sports/Other Manufacturing							
Capital		++	ins	ins	ins	−−	ins
Labor	+++		ins	−−−	ins	ins	ins

SOURCE: Compiled from Tables 2-11. NOTES: + = positive coefficient (+ significant at 90% level of confidence, ++ = 95%, +++ = 99%). − = negative coefficient (− significant at 90% level of confidence, −− = 95%, −−− = 99%).

TABLE 2

PAKISTAN: FACTORS AFFECTING RESOURCE PRODUCTIVITY: TOTAL MANUFACTURING INDUSTRIES

Productivity of Capital (K)

(1) $VA = 1.25 + 0.89\,K$
(9.20) (56.46)*** r^2(adj) = 0.754; df = 1036; F = 3187.27***

Analysis of Residuals (RE = Actual-Predicted), Labor (L), Materials (MT), Size (SC)

(2) $RE = -2.81 + 0.33\,L + 0.25\,MT - 0.56\,SC$
(−16.05) (7.83)*** (9.11)*** (−13.89)***
[0.43] [0.49] [−0.68]
r^2(adj) = 0.238; df = 1034; F = 109.07***

Region (RG), Time Period (TP), Ownership-Public/Private (PS)

(3) $RE = -2.49 + 0.25\,L + 0.27\,MT - 0.57\,SC - 0.05\,RG - 0.19\,TP + 0.20\,PS$
(5.70)*** (9.69)*** (−12.64)*** (−1.53) (−3.68)*** (2.26)**
[0.36] [0.48] [−0.69] [−0.04] [−0.10] [0.11]
r^2(adj) = 0.253; df = 1031; F = 59.47***

Productivity of Labor (L)

(4) $VA = 2.96 + 1.27\,L$
(29.44) (60.01)*** r^2(adj) = 0.776; df = 1036; F = 3601.02***

Analysis of Residuals (RE = Actual-Predicted), Capital (K), Materials (MT), Size (SL)

(5) $RE = -2.74 + 0.05\,K + 0.41\,MT - 0.63\,SL$
(−17.62) (1.90)* (14.34)*** (−17.61)***
[0.11] [0.76] [−0.65]
r^2(adj) = 0.256; df = 1034; F = 119.92***

Region (RG), Time Period (TP), Ownership-Public/Private (PS)

(6) $RE = -2.93 + 0.06\,K + 0.42\,MT - 0.56\,SL - 0.04\,RG + 0.07\,TP - 0.25\,PS$
(2.07)** (14.60)*** (−11.32)*** (1.34) (1.35) (−3.40)***
[0.13] [0.78] [−0.58] [0.04] [0.04] [−0.14]
r^2(adj) = 0.266; df = 1031; F = 63.56***

NOTES: Ordinary least squares estimates. r^2(adj) = adjusted coefficient of determination; F = F Statistic; df = degrees of freedom; ( ) = t statistic with: *** significant at the 99% level; ** significant at the 95% level; * significant at the 90% level. [ ] = standardized coefficients; VA = value added; K = value of fixed assets; L = Average daily employment; MT = cost of materials. VA, K, L and MT are in natural logarithms and on a per firm basis. RG = regional dummy variable with Punjab = 1, Sind = 2, NWFP = 3 and Baluchistan = 4. PS = ownership dummy with private firms = 1 and public firms = 2. There are two size variables. SC is defined in terms of the firm's capital stock with value less than 5 million Rs = 1; 5 million to 10 million = 2, 10 million to 50 million = 3 and greater than 50 million = 4; SL is defined in terms of the workforce per firm with less than 25 workers = 1; 25 to 100 = 2; 100-500 = 3 and greater than 500 = 4. Time period (TP) reflects the evolving political/economic environment toward less state intervention with 1976-78 = 1; 1979-81 = 2; 1982-84 = 3; and 1985-87 = 4.

To determine the generality of these patterns, similar regressions were performed on the value added of other major industrial groupings. While space does not permit a detailed accounting of each main division of manufacturing, several findings are of particular interest. For the food industry (Table 3):

1. By itself variations in capital accounted for about 50 per cent of the observed differences in value added (Equation 1, Table 3). In contrast, labor accounted for over 86 percent in the differences in value added between firms (Table 3, Equation 4).
2. In contrast to manufacturing as a whole, regional location appears to play an important role in affecting the productivity of capital (Equation 3, Table 3). Here the negative sign indicates that plants located in the less developed regions – NWFP and Baluchistan utilize capital less efficiently than their counterparts in the more developed parts of the country – Punjab and Sind.
3. While there appears to be no productivity effects associated with time, the ownership variable is negative (Table 3, Equation 3), suggesting that capital is used relatively ineffectively by public firms.
4. As noted, labor is much more important than capital in accounting for differences in value added between firms in the food industry. Furthermore, capital and materials appear to be insignificant in accounting for differences in value added across firms (Equation 5, Table 2).
5. Although labor productivity differences across firms can not be explained by the relative use of supporting resources (capital and materials) several structural variables do play a role. In particular, firms in the more developed regions have labor productivity levels above their counterparts in the more backward areas of the country. In addition, there appears to be a general increase in labor productivity with time.
6. Finally, although public firms in the food industry appear to use capital less efficiently than their private sector counterparts, they are not at a disadvantage with regard to the utilization of labor (Table 3, Equation 6).

For the remaining industries, several general patterns emerge:

1. Industrial inputs-materials, fuel and the like are consistently quite significant in affecting the productivity of labor and capital.
2. Regional location appears to be a bit more important in determining the productivity of capital rather than labor, although there are several exceptions to this rule. The main pattern here is one whereby if regional location affects the productivity of one factor it generally also does so for the other.
3. There does not appear to be a regional pattern with regard to the common definition of industries into light (food, textiles, wood, paper and handicrafts) and heavy (chemicals, non-metallic minerals, basic metals and metal products). Locat-

TABLE 3

PAKISTAN: FACTORS AFFECTING RESOURCE PRODUCTIVITY: THE FOOD INDUSTRY

Productivity of Capital (K)

(1) $VA = -0.42 + 1.15\,K$
$(-0.46)\quad (11.99)^{***}$ r^2 (adj) = 0.499; $df = 142$; $F = 143.73^{***}$

Analysis of Residuals (RE = Actual-Predicted), Labor (L), Size (SC)

(2) $RE = -3.87 + 1.25\,L - 1.11\,SC$
$(11.02)^{***}\ (-7.81)^{***}$
$[1.15]\quad [-0.82]$
r^2 (adj) = 0.463; $df = 141$; $F = 62.59^{***}$

Region (RG), Time Period (TP), Ownership-Public/Private (PS)

(3) $RE = -3.53 + 0.41\,L - 1.06\,SC - 0.29\,RG + 0.24\,TP - 0.56\,PS$
$(10.81)^{***}\ (-7.00)^{***}\ (-3.13)^{***}\quad (1.43)\quad (-2.85)^{***}$
$[1.30]\quad [-0.78]\quad [-0.19]\quad [0.90]\quad [-0.22]$
r^2 (adj) = 0.503; $df = 138$; $F = 29.98^{***}$

Productivity of Labor (L)

(4) $VA = 2.92 + 1.42\,L$
$(11.53)\quad (29.91)^{***}$ r^2 (adj) = 0.863; $df = 142$; $F = 894.57^{***}$

Analysis of Residuals (RE = Actual-Predicted), Capital (K), Materials (MT)

(5) $RE = 1.07 - 0.03\,K - 0.07\,MT$
$(1.90)\ (-0.37)\quad (-0.80)$
$[-0.05]\quad [-0.11]$
r^2 (adj) = 0.012; $df = 141$; $F = 1.87$

Region (RG), Time Period (TP), Ownership-Public/Private (PS)

(6) $RE = 1.52 - 0.13\,K - 0.06\,MT - 0.22\,RG + 0.37\,TP + 0.26\,PS$
$(-1.45)\quad (-0.58)\quad (-3.31)^{***}\quad (3.30)^{***}\quad (1.19)$
$[-0.21]\quad [-0.09]\quad [-0.26]\quad [0.27]\quad [0.16]$
r^2 (adj) = 0.128; $df = 138$; $F = 5.21^{***}$

NOTES: same as Table 2.

ing in the poorer regions tends to reduce the productivity of capital in food, textiles, and non-metallic minerals, but increases it in wood products, paper, basic metals and metal products industries.

4. In general, capital became less productive over time. That is for those industries where time had a statistically significant effect on the productivity of capital it was

always in a negative direction. Labor productivity in food was the only case where output per unit of a factor increased systematically with the passage of time. For all other industries, labor productivity does not appear to have varied systematically with time.

5. As noted for industries as a whole, public firms appear to utilize capital more effectively than their private counterparts. However, this is offset a bit in several cases by the fact that these firms use labor less efficiently. It should be noted that this relationship between state ownership and capital productivity is confined largely to the heavier industries, chemicals, non-metallic minerals, basic metals and metal products industries. As such this result is a bit surprising given the fact that public firms usually use considerably more capital per unit of labor than that associated with private production.

6. Possibly a related pattern involves the inability of heavy industries – non-metallic minerals, basic metals and metal products/machinery – to increase capital productivity per firm though increasing the number of supporting workers per firm. This pattern suggests relatively fixed technical coefficients for these firms, leaving management and organization as the mainly responsible for overall capital productivity.

7. In contrast capital productivity in the lighter industries (with the exception of wood products) is increased considerably with the addition of additional workers.

Conclusions

The analysis undertaken above was largely concerned with those areas where the gains from privatization in Pakistan are likely to produce improvements in productive efficiency (as opposed to allocative efficiency). In general the main findings noted above are consistent with those of Naqvi and Kemal, and suggest that privatization *per se* may not provide the significant increases in output and productivity predicted by advocates of these programs.

If the government continues to move ahead with privatization in manufacturing, its best strategy would seem to be selective privatization in the lighter manufacturing areas such as food and textiles. Although even here the work noted on the vegetable ghee industry suggests that the gains from privatization may be minimal. In any case, the lighter manufacturing industries should be examined carefully before moving on to the heavier industries where there are significant gains in productivity.

The general increases in output that might be expected from increased capital efficiency in the lighter manufacturing areas should also be reinforced if the privatization movement also reduces through further divestiture the overall size of firms. Also the most productive areas to explore for

privatization in the food and textiles industries appear to be in the more underdeveloped regions – NWFP and Baluchistan.

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IL FATTORE EFFICIENZA NELL'INDUSTRIA PAKISTANA: L'INFLUENZA DELLA PROPRIETÀ PRIVATA E PUBBLICA SULLA PRODUTTIVITÀ DEL CAPITALE E DEL LAVORO

Lo scopo di questo articolo è di esaminare le possibili influenze economiche della privatizzazione nel Pakistan. In particolare, stabilire se le imprese private dell'industria pakistana sono piú efficienti delle imprese corrispondenti nel settore pubblico e, in caso affermativo, in che modo. La conclusione è che la privatizzazione in sé può non portare i significativi aumenti di produzione e produttività che i sostenitori di questi programmi asseriscono. Se il governo continua sulla strada della privatizzazione nelle industrie, la miglior strategia sembrerebbe essere una privatizzazione selettiva nei settori industriali leggeri come l'alimentare e il tessile.

RECENSIONI

PIRANI M.: *Il futuro dell'economia visto dai maggiori esperti mondiali.* 1993, Milano, Arnoldo Mondadori Editore, pp. VI-229, L. 30.000.

Il volume è costituito da una serie di interviste ai piú prestigiosi studiosi internazionali di questioni economiche. Il testo è preceduto da un'introduzione di Pirani, in cui vengono spiegate le motivazioni che hanno condotto a una simile indagine e le peculiarità piú significative degli intervistati. Questi ultimi, dopo aver analizzato piú o meno sinteticamente le problematiche legate alle crisi che interessano molti sistemi economici occidentali, cercano di trarre delle conclusioni sul manifestarsi di determinati eventi e, contemporaneamente, effettuano delle previsioni sul futuro assetto dell'economia. In particolare, riveste un notevole interesse la suddivisione degli intervenuti in base alla loro provenienza geografica, poiché offre una interpretazione eterogenea e una testimonianza che permette anche di cogliere dei distinguo nelle varie versioni dottrinali.

Il libro apre la sua trattazione agli economisti americani per poi passare ai giapponesi e agli europei. Le domande poste vertono su un ampio spazio: dal rapporto tra economia e politica, a quello tra economia ed etica, al legame tra economia e ambiente e cosí via. La finalità è di offrire un quadro compiuto e istruttivo sulla realtà economica odierna. È proprio l'abilità di Pirani, nell'adattare i quesiti ai suoi interlocutori, a rendere il libro adatto a un vasto pubblico: dall'esperto in questioni economiche al "semplice" lettore desideroso di indagare la realtà economica, potendo trarne una panoramica esaustiva.

È significativo l'apporto delle diverse correnti ideologiche: le versioni keynesiane, quelle monetariste-liberiste, l'approccio della *supply-side* ..., sullo stesso argomento, cosicché si possono trarre spunti per un'attenta riflessione, giungendo a una personale analisi critica.

Sul "declino" degli Stati Uniti e sulle sue ripercussioni interne ed esterne esprimono dapprima il loro pensiero, se pur con approcci distinti dovuti alla diversa impostazione, i protagonisti statunitensi dell'opera: Dornbusch, Feldstein e Krugman. Essi trattano anche altri argomenti che rappresentano motivo di comparazione: la politica economica di Clinton, i rapporti tra Stati Uniti e Giappone, il Mercato Comune Nordamericano (NAFTA).

In questa disamina, Dornbusch e Krugman auspicano il ritorno all'interventismo keynesiano per risollevare le sorti americane, mentre Feldstein enfatizza il ruolo della moneta nel "pilotare" il sistema economico del suo Paese verso un concreto miglioramento. Il punto in comune è dato dalla certezza che soltanto un veloce incremento degli investimenti farà superare la crisi agli Stati Uniti. Non potendo sottrarsi da un esame sul pregnante ruolo assunto dai nipponici nel campo economico, Dornbusch reputa necessario che l'economia giapponese rimanga soprattutto "confinata" nel mercato reale, per non turbare gli equilibri finanziari statunitensi. Krugman invece, focalizza la propria attenzione sul fatto che tra i due popoli sussistono interdipendenze e vantaggi reciproci, tanto che, come afferma: « se dovessimo ingaggiare una

guerra commerciale con il Giappone, questo ne sarebbe colpito un po' piú di noi, ma ambedue i paesi sopravviverebbero abbastanza bene » (pag. 36). Infine, le ultime domande dell'intervista a Dornbusch e a Krugman cadono su un argomento quanto mai attuale: l'istituzione del Mercato Comune Americano. Il primo Autore ne analizza con estrema chiarezza le luci e le ombre, sia dal punto di vista economico sia sociale e auspica che, entro la fine di questo secolo, « la zona di libero scambio si estenderà a tutto l'emisfero americano » (pag. 15). Anche il secondo studioso è estremamente favorevole a questo accordo in quanto, soprattutto il Messico, deve essere ulteriormente incentivato sulla strada del progresso democratico.

Il testo accoglie poi gli interessanti apporti di Baumol e Solow, che acquistano una valenza specifica dal momento che Baumol si concentra soprattutto sul legame tra etica ed economia, cercando di effettuare un'analisi a livello microeconomico per trarne poi delle conclusioni sul piano macroeconomico; Solow, a sua volta, esamina le tematiche legate alla crescita, proponendo una spiegazione delle cause della susseguente debolezza registrata nel periodo attuale. Egli ritiene che « Uno dei modi per evitare di fermarsi è l'invenzione di nuovi materiali, di nuove tecnologie: la collina che scaliamo potrebbe, allora, a volte scendere e, dopo, risalire » (pag. 68).

Sull'influenza esercitata dall'etica nel campo economico si sofferma pure l'economista giapponese Morishima, il quale rileva il ruolo fondamentale che presenta il confucianesimo nipponico, dal momento che tale religione diviene il motore centrale operativo della nazione. Infatti, « Non è l'economia che condiziona lo spirito, ma al contrario: il dato di fondo è l'etica e non può svilupparsi un'economia incompatibile con essa » (pag. 73). Morishima, dopo aver analizzato criticamente l'economia del suo Paese e aver esaminato le possibili prospettive di quella cinese, è dell'opinione che il miglioramento futuro sia strettamente connesso a una continua innovazione sistematica.

Le interviste approdano successivamente in Germania, con Seitz, Siebert e von Weizsäcker, nelle cui risposte, direttamente o indirettamente, impone sempre la sua presenza un elemento comune: la riunificazione del Paese con la ex Deutsche Demokratische Republik.

Seitz esamina criticamente la realtà dell'industria tedesca e la confronta con quella nipponica, ritenendo che il Giappone sia la prima potenza industriale e finanziaria proprio per il suo metodo produttivo flessibile e per l'alto tasso di risparmio. Dall'esame condotto, l'economista trae spunto per fornire delle "ricette" affinché gli europei possano diventare competitivi sul mercato. Di qui un intervento di sostegno a livello comunitario e governativo, seppure in contrasto con i principi liberisti, vigenti in Germania. In effetti, « dobbiamo convincerci che, nelle condizioni date, l'economia e la società dell'informazione non possono venir create dalla "mano invisibile" del mercato. Non c'è, infatti, una sola forma di economia di mercato, bensí tre: l'economia di mercato capitalistica americana, l'economia sociale di mercato di tipo tedesco, l'economia di mercato rivolta al futuro del Giappone. È evidente che la forma giapponese di economia di mercato è superiore a quella americana, nonché a quella tedesca » (pag. 99).

Di diverso avviso è il presidente dell'Istituto per l'economia mondiale Siebert che imprime alle sue teorie una chiara impronta liberista. Egli crede moltissimo sul futuro comunitario e ritiene che sia cogente stabilire una politica economica rivolta a promuovere ogni singolo settore attraverso la valorizzazione delle doti che presenta l'operare di un sistema concorrenziale. Pertanto, sono indispensabili delle buone informazioni che obiettivamente il settore pubblico non è in grado di possedere. Il compito di ogni singolo Stato e della Comunità Europea consiste nel migliorare e nell'incentivare il sistema imprenditoriale, promuovendo la ricerca. L'Europa per guardare al domani deve possedere una totale apertura industriale e commerciale, evitando l'esclusione dei singoli comparti dal mercato. Trattando della riunificazio-

ne tedesca, Siebert ritiene che il suo successo non può essere immediato e comunque l'andamento dei tassi di crescita è strettamente legato all'evolversi dell'economia medesima. Riveste comunque una priorità fondamentale l'impegno per proseguire sulla strada dell'unificazione europea, al fine di garantire nel nostro continente una certa stabilità economica e sociale. Sui tempi di parificazione tra le due Germanie l'opinione di von Weizsäcker si rivela piú pessimista. Lo studioso nelle sue risposte esegue un'analisi molto approfondita sulla realtà del suo Paese e sulle dense problematiche che comporta la riunificazione sia nel campo reale sia in quello monetario e dunque non tale da essere conseguita in un decennio. Egli, confrontandosi successivamente, su richiesta di Pirani, con Seitz e Dornbusch relativamente alle politiche industriali e commerciali da adottare nei confronti del Giappone e degli Stati Uniti, assume una posizione personale nel ribadire le proprie convinzioni liberoscambiste e sottolinea, parimenti, i vantaggi che esse comportano anche per la sfera europea.

Sul fronte francese gli interventi si soffermano su Albert e Malinvaud. Il primo Autore ritiene la necessità che anche l'Europa si costituisca in un sistema federale e adotti il "modello renano" nell'improntare il proprio sistema economico. Il legame franco germanico è indispensabile per una buona riuscita del Trattato di Maastricht che si esplicherà con l'unione monetaria. Il secondo economista si occupa prevalentemente del problema occupazionale in Francia e in Europa. Malinvaud crede che l'unico modo per porvi rimedio sia la diminuzione del costo del lavoro, soprattutto per i lavoratori meno qualificati. In effetti, solo ristabilendo delle buone condizioni economiche e finanziarie delle imprese si possono conseguire dei miglioramenti nel campo occupazionale. Trattando in generale della Comunità Europea, egli ritiene che « occorrano delle politiche a medio e lungo termine su molte cose: lo sviluppo dei sistemi educativi, la ricerca, il sistema previdenziale » (pag. 147).

Sugli aspetti positivi della completa attuazione del Trattato di Maastricht è di opinione diversa, rispetto alla maggior parte degli economisti presenti nel volume, l'inglese Hahn, che manifesta pienamente il proprio giudizio negativo, focalizzandolo sull'unione monetaria. Al riguardo, sostiene che « va contro quasi tutto quello che sappiamo di economia » (pag. 159), dal momento che in Europa non sussiste un'adeguata mobilità dei fattori della produzione e in particolare dell'elemento lavoro. Ne deriva che fissare i tassi di cambio risulta estremamente arbitrario e pericoloso, cosí « Con l'Unione monetaria, invece delle fluttuazioni del cambio si avranno fluttuazioni nel tasso di disoccupazione » (pag. 160).

Il volume si conclude con la partecipazione di tre principali esponenti dell'economia italiana: Padoa Schioppa, Prodi e Ruffolo, i quali si soffermano su aspetti diversi seppure caratterizzati da un elemento comune: la ricerca di come migliorare l'assetto economico e sociale del nostro Paese. Riteniamo che soprattutto in questa ultima parte, si esplichi il legame, di cui abbiamo accennato, tra economia, politica e ambiente al fine di ricercare, anche sotto questo profilo, come sollevare l'economia italiana. Grande sostenitore degli accordi comunitari è Padoa Schioppa che asserisce: « La comunità come progetto illuministico ha assicurato la pace e la prosperità nella seconda metà del XX secolo » (pag. 172). L'economista affronta anche la proposta in campo monetario dell' "Europa a due velocità", per poi soffermarsi sull'aspetto linguistico, giungendo a sottolineare il ruolo cruciale del plurilinguismo. Il tema di maggiore interesse appare quello legato alla crisi economica dell'Italia, in quanto emerge la difficoltà di inquadrare con certezza se essa rasenta la normale manifestazione del ciclo economico oppure riveli una disfunzione strutturale. Lo studioso sceglie la controffensiva da impartire alla recessione ricorrendo alla diminuzione dei tassi d'interesse e alla crescita dei Paesi in via di sviluppo, al fine di ricollocare le nostre potenziali risorse.

Un approccio alternativo viene seguito da Prodi nell'analizzare la nostra realtà. Egli evidenzia le disparità tra Nord e Sud, soffermandosi a considerare la fuga all'estero delle

imprese italiane, dovuta agli elevati costi da sostenersi per le produzioni semplici. L'economista rileva, nel contempo, la trascuratezza delle strutture scolastiche che non appaiono idonee a formare il "capitale umano". In questo ambito, si riferisce altresí alla ricerca d'innovazione che appare molto trascurata soprattutto a livello aziendale, dove non è prevista una mobilità interna con gravi conseguenze sui possibili risultati. Lo "strumento" competitivo non può essere la svalutazione a risollevare il destino dell'Italia ma « il miglioramento della qualità e della raffinatezza delle nostre attività produttive » (pag. 208). Infine, Ruffolo esamina lo scottante problema dello sviluppo economico alla luce dell'impatto ambientale, sostenendo che le risorse prodotte sono incompatibili con il "potenziale ambientale". Egli crede che la via della crescita si debba trovare nel « definire nuove tecnologie che permettano di aumentare la produttività delle risorse, ma non a scapito dell'ambiente » (pag. 222).

Dall'insieme delle interviste riportate, una interessante e stimolante "carrellata" di diverse opinioni, si evince comunque la difficoltà a individuare una soluzione immediata alle gravi problematiche che affliggono i sistemi economici occidentali. Ma, al riguardo, il volume contiene un'indicazione di fondo da non disperdersi: occorre intensificare l'investimento affinché l'economia dei grandi paesi industrializzati torni a crescere.

MARIA LUISA BERGAMINI

CELLERINO Rita: *Oltre la tassazione ambientale*. Nuovi strumenti per il controllo dell'inquinamento. 1993, Bologna, Il Mulino, pp. 258. L. 30.000.

Il volume in esame segna una nuova tappa nell'economia ambientale e contribuisce a portare questa disciplina a uno stadio evoluto. L'economia ambientale, nata negli anni sessanta in risposta all'emergenza di una serie di problemi ecologici, ha conosciuto un avvio molto promettente. Attraverso le opere di Coase (1960), Dales (1968), Baumol e Oates (1971) ed altri ancora essa si è dotata in brevissimo tempo di un insieme di concetti teorici alquanto validi. Le tesi fondamentali sono in sostanza due: il sussistere di problemi ecologici è principalmente dovuto all'esistenza di esternalità, mentre il modo più efficiente per internalizzare le stesse consiste nell'applicazione di strumenti cosiddetti « economici », in particolare la tassazione ambientale. In fondo, particolarmente la seconda conclusione, non è affatto sorprendente, in quanto facilmente riconducibile al « nucleo » della teoria economica corrente. L'economista neoclassico attribuisce infatti la facoltà di determinare la migliore allocazione possibile delle risorse al mercato, innanzitutto poiché esso consente di valorizzare i vantaggi dello scambio volontario tra individui e in secondo luogo considerando l'impossibilità da parte dell'ente pubblico di conoscere tutte le opportunità e i costi, in questo caso di disinquinamento, dei singoli imprenditori.

Anche le debolezze dell'economia ambientale, emerse dopo un inizio così promettente, sono *precisamente quelle dell'economia neoclassica in generale*, che vede le raccomandazioni politiche derivate dai propri modelli teorici sovente ignorate a livello pratico. La mancata considerazione delle conseguenze distributive o, in altre parole, della possibilità di ottenere un consenso politico, è in gran parte responsabile delle poche applicazioni pratiche, rispetto a quanto la teoria suggerisce e tale risultato è generalizzabile a tutta la teoria economica (Hahn, 1992).

Con il passare del tempo ci si è poi accorti che neppure nelle poche applicazioni pratiche si è stati in grado di raggiungere una soluzione che, almeno approssimativamente, consentisse di ridurre le emissioni al minor costo possibile per la collettività (Atkinson e Tietenberg, 1990). La ragione principale per cui la pratica ha smentito le previsioni della teoria è in fondo sintomatica per buona parte della teoria economica. Il livello d'astrazione dei modelli usati non

permette di includere aspetti cruciali come i costi di transazione nonché considerazioni di carattere istituzionale.

Qualora messa alla prova dei fatti, al cospetto di problemi concreti legati all'applicazione pratica degli strumenti economici, la tanto famosa raccomandazione di una « internalizzazione delle esternalità attraverso l'uso di strumenti economici » aiuta ben poco. Anche questo è sintomatico per la maggior parte degli economisti, visto e considerato che gli incentivi nel mondo universitario spingono lo studioso a sviluppare modelli matematici sofisticati che riescano a stupire i colleghi universitari (Frey, 1992), anziché occuparsi dell'applicazione concreta di modelli più semplici e di dettagli, « essendo disposti a sporcarsi le mani » (Cropper e Oates, 1992).

Rita Cellerino nel suo libro supera queste debolezze occupandosi direttamente dell'applicazione dell'economia ambientale. In successione vengono trattati la vendita dei diritti di inquinamento (capitolo I. e II.), la cauzione (capitolo III.), l'assicurazione ambientale e la responsabilità oggettiva (capitolo IV.) nonché gli incentivi (capitolo V.). Tutti questi strumenti « oltre la tassazione ambientale » (ormai trattati in abbondanza nella letteratura economica) vengono ampiamente analizzati, se ne illustrano il principio di funzionamento, vantaggi e svantaggi nonché le applicazioni effettuate fino ad oggi, con i risultati ottenuti in particolare negli Stati Uniti e in Germania. L'obiettivo di Rita Cellerino è quello di analizzare nel dettaglio ogni singolo strumento, concentrandosi sugli aspetti che ne *condizionano l'efficienza*, in modo da tracciare una gestione complessiva dei differenti tipi di inquinamento secondo la potenzialità di utilizzo di ogni strumento.

Così la regolamentazione diretta attraverso norme e sanzioni serve specialmente qualora fosse necessario applicare un divieto drastico di sostanze che possono causare danni irreversibili all'ambiente o alla salute umana. Per prevenire danni derivati da episodi di inquinamento accidentale gli strumenti più adatti sono l'assicurazione ambientale e l'istituzione della responsabilità oggettiva. Questi strumenti sono conformi al principio inquinatore-pagatore, ma svolgono sopratutto, e con notevole efficacia, una funzione di prevenzione del danno ambientale. Per controllare l'inquinamento « di routine », la tassazione e la vendita dei diritti di inquinamento si equivalgono dal punto di vista dell'efficienza. Dal punto di vista ambientale, invece, i diritti di inquinamento consentono una gestione puntuale dello standard di qualità ambientale. Richiedendo un numero elevato di acquirenti, la vendita dei diritti di inquinamento è particolarmente adatta a problemi dell'inquinamento a lunga distanza. Questo costituisce uno dei motivi principali per cui la vendita dei diritti viene proposta per controllare problemi di inquinamento globale, in particolare i gas serra. L'utilizzo di cauzioni ambientali è invece raccomandabile quando si vogliono operare il recupero e il riciclaggio dei materiali. Benché allo stato attuale la cauzione venga ancora percepita come strumento minore rispetto ad altri, la potenzialità della sua applicazione è notevole. Infine, per periodi transitori, al fine di agevolare l'adozione di misure di controllo dell'inquinamento in settori economicamente deboli, oppure per accelerare l'applicazione delle politiche, lo strumento più adatto è quello degli incentivi.

Scrivendo questo libro Rita Cellerino dimostra la sua conoscenza approfondita dell'economia ambientale. Il volume non solo è attento ai più importanti contributi sul tema apparsi negli ultimi anni, ma include anche un interessante studio sulla possibile vendita di diritti di inquinamento nelle aree di Brescia e Piacenza svolto dell'autore (Cellerino, 1991). Il grande merito del volume in esame rimane però nella disponibilità di Rita Cellerino di « essere disposta a sporcarsi le mani » con questioni legate all'applicazione dell'economia ambientale e all'analisi di problemi di dettaglio. Il libro può essere consigliato a chiunque, economista o meno, sia interessato all'applicazione di strumenti economici ai problemi ambientali.

Olivier Binet

LIBRI RICEVUTI (BOOKS RECEIVED)

AA.VV.: *Rapporto sul Commercio Estero - Sintesi.* 1993, Roma, Istituto Nazionale per il Commercio Estero, pp. 72, s.i.p.

Considerazioni di sintesi. – 1. Il commercio mondiale. – 2. Il commercio estero della comunità europea. – 3. Le tendenze delle politiche commerciali. – 4. I conti con l'estero dell'Italia. – 5. L'orientamento geografico del commercio estero dell'Italia. – 6. La struttura settoriale del commercio estero dell'Italia. – 7. Le esportazioni delle regioni italiane. – 8. Le politiche di sostegno all'internazionalizzazione delle imprese italiane. – Tavole statistiche.

ALLAIS Maurice: *Les fondements comptables de la macro-économique.* 2e éd. 1993, Paris, Presses Universitaires de France, pp. VIII + 96, s.i.p.

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BISHOP Matthew and KAY John (edited by): *European Mergers and Merger Policy.* 1993, Oxford, Oxford University Press, pp. XII + 363, hardback £ 40.00, paperback £ 14.95.

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BRUNO Michael: *Crisis, Stabilization and Economic Reform.* Therapy by Consensus. 1993, Oxford, Clarendon Press, pp. XX + 300, £ 25.00.

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BRUNSSON Nils and OLSEN Johan P.: *The Reforming Organization.* 1993, London and New York, Routledge, pp. VIII + 216, Hb £ 37.50, Pb £ 12.99.

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ZAMAGNI Vera: *Dalla periferia al centro. La seconda rinascita economica dell'Italia 1861-1891.* 1990, Milano, Il Mulino, pp. 536, L. 48.000.

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Si è tenuta a Roma, lunedì 11 aprile, l'Assemblea ordinaria degli Azionisti del Credito Fondiario e Industriale - FONSPA-Spa, che ha approvato il Bilancio chiuso al 31 dicembre 1993.

Nel passato esercizio l'attività dell'Istituto si è inserita in una fase congiunturale caratterizzata da un deterioramento delle condizioni del mercato produttivo, che ha comportato un'attenta selezione delle iniziative da finanziare.

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È stata ulteriormente accentuata la prudenziale politica negli accantonamenti a fronte dei rischi creditizi, che hanno inciso sul conto economico per 185,4 miliardi, contro i 105,8 del 1992.

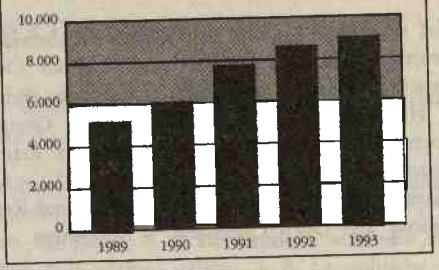
L'utile prima delle imposte è diminuito a 84,5 miliardi, rispetto ai 103,1 miliardi del precedente esercizio.

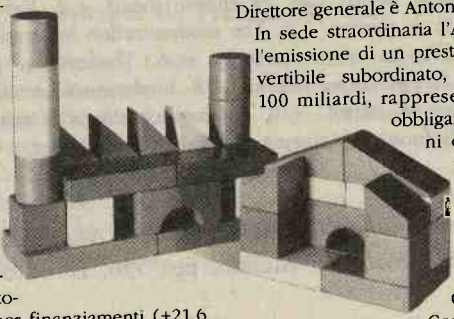
In particolare la differenza è da imputare unicamente ai maggiori accantonamenti al fondo rischi per finanziamenti (+21,6 miliardi) per effetto dell'applicazione dell'aliquota dello 0,5% sul totale dei crediti (0,4% nel 1992), nonché di un'ulteriore quota tassata di 10 miliardi.

L'utile netto è risultato di 32,1 miliardi (46,9 miliardi nel 1992).

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L'Assemblea ha provveduto altresì ad integrare il Consiglio di Amministrazione nominando consiglieri i signori Camillo Ferrari ed Ettore Masoero.

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In sede straordinaria l'Assemblea ha deliberato l'emissione di un prestito obbligazionario convertibile subordinato, dell'importo massimo di 100 miliardi, rappresentato da 25 milioni di obbligazioni convertibili in azioni ordinarie in ragione di un'azione nuova per ogni obbligazione presentata per la conversione. La sottoscrizione del prestito stesso è stata assicurata dalla Banca Commerciale Italiana, dal Credito Italiano e dalla Banca di Roma, per la parte di loro competenza, e il completo collocamento è garantito da un Consorzio costituito dalle medesime tre Banche.

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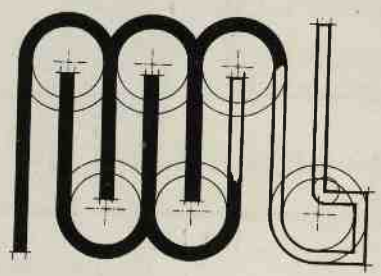
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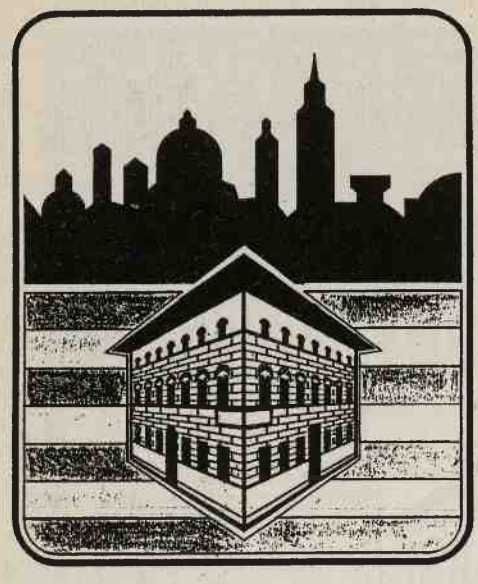
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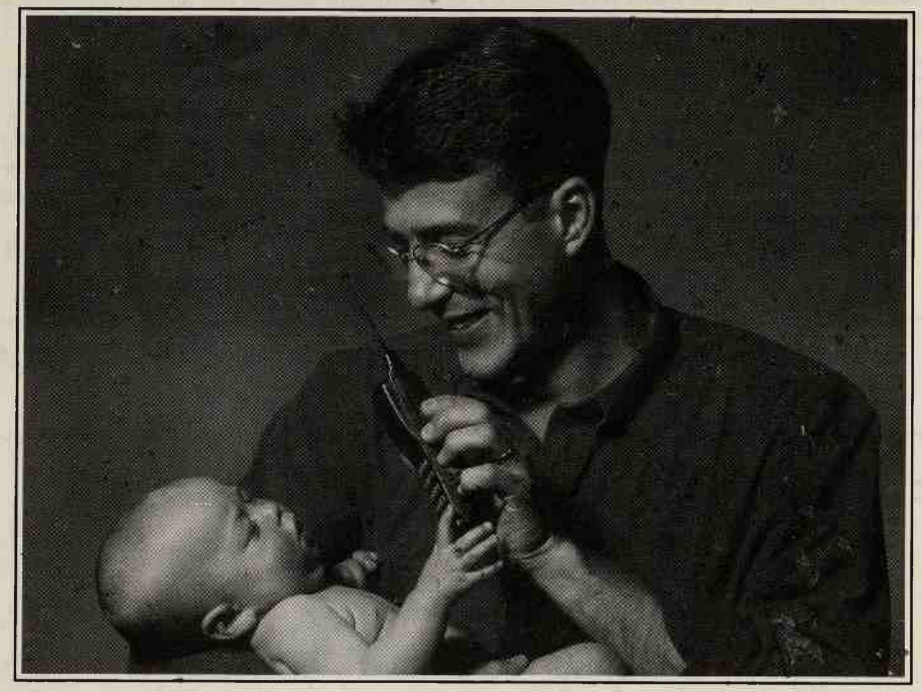
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STET
GRUPPO IRI

Adottatelo nella vostra famiglia.



Oggi con le Tariffe Famiglia il telefonino è di casa.

Avete mai pensato al telefonino per la vostra famiglia? Pensateci ora. Ora che infatti ci sono le Tariffe Famiglia oltre alle Tariffe Affari. Ora che con solo 10.000 lire di canone al mese potete disporre sempre del telefonino e dimenticare le preoccupazioni. E la spesa rimane minima con un uso intelligente del vostro cellulare. Infatti con queste tariffe la convenienza di telefonare nelle fasce serali o durante il week-end è grande: circa un gettone al minuto per qualsiasi distanza nazionale. Ma soprattutto, avete mai pensato di dare il telefonino alle persone che vi stanno più a cuore? Ora ne avete la possibilità, perchè in un colpo solo potete acquistare tutta la serenità e la sicurezza che avete sempre desiderato per voi e per la vostra famiglia. Non pensateci su: correte in uno dei Negozi Affiliati SIP. Scoprirete che anche la nuova gamma di telefonini ha un costo molto familiare. Per informazioni telefonate al 187.

NUOVE TARIFFE FAMIGLIA	
CONTRIBUTO ATTIVAZIONE	L. 200.000*
CANONE MENSILE	L. 10.000*
COSTO DEL TRAFFICO PER MINUTO DI CONVERSAZIONE PER QUALUNQUE DISTANZA NAZIONALE**	
dal lunedi' al venerdi' dalle 7,30 alle 20,30	L. 1.524*
dal lunedi' al venerdi' dalle 20,30 alle 7,30	L. 170*
sabato, domenica e festivi tutto il giorno	L. 170*
* Le tariffe indicate sono al netto dell'IVA 9% e della tassa governativa di L. 10.000 mensili. ** Al netto dello scatto alla risposta (L. 127).	
Le chiamate di emergenza all112-113-115 sono gratuite. La chiamata al 116 (Soccorso Stradale ACI) costa un solo scatto.	

SIP

LE STESSE TARIFFE VENGONO APPLICATE ANCHE A CHI CHIAMA UN UTENTE MOBILE.