

**Direct Vs. Full Costing Controversy under Inflation:
An End of a Familiar Debate ?**

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Present climate in accounting profession—as well as academics—is markedly occupied with the need for accounting reform due to the rampant inflation and its acknowledged distortion effect upon the conventional financial reporting. This paper aims at attempting to provide evidence as to the relative desirability (usefulness) of direct and full costing methods for preparing external financial reports within the historical cost model, under conditions of inflation.

A simulation model of a firm under some assumed internal and environmental conditions was used to generate the necessary data for the experiment. The usefulness criterion adopted in comparing the two methods was the approximation of future cash flow as an accounting objective of financial statements.

Simulation data were analyzed for results. Given the conditions postulated in the models it was concluded that certain accounting conventions result in better approximation of future cash flow than others—a difference which is lessened at high inflation rates. However, no group of conventions was found to be a good approximation to economic income.

Introduction

Present climate in accounting profession—as well as academics—is markedly occupied with the need for an accounting reform due to the rampant

inflation and its acknowledged distortion effect upon the conventional financial reporting. Suggestions offered for adjusting the historical cost accounting framework to reflect the effect of changing prices have generated a great deal of debate on whether the traditional accounting model should be discarded all-together or supplemented, and if so, what alternative model should be adopted.⁽¹⁾ In U.K., the Accounting Standards Committee recently proposed that annual historical cost financial statements should be supplemented by a current cost-based income and balance sheet data (ASC: ED 24, 1979). In the U.S.A., the Financial Accounting Standards Board issued a statement of financial standards on inflation accounting which requires companies to disclose the effect of general inflation as well as current cost data, as supplementary to historical cost-based financial statements (FASB: SFAS No. 33, 1979).

Given this state of affairs one is inclined to think seriously of the implications for many of the controversies which occupied—and still some of them do—the attention in the past three decades or more, as to the choice among several accounting conventions within the historical cost accounting framework (e.g., conventions related to depreciation of fixed assets, stock (inventory) costing and valuation, tax allocation, treatment of R&D costs, accounting for leases, . . . etc.).

For one thing, if the historical cost accounting model is to be abandoned, in favour of an alternative model (or models) based on a different measurement unit (e.g., current purchasing power units) and/or different asset valuation bases (e.g., current cost basis), the ramifications for many such controversies are easily discerned: Inflation accounting renders these debates obsolete. Consider for example the choice among different stock flow assumptions for stock costing (FIFO, LIFO, Average Cost, . . . etc.). If historical cost-based financial statements' figures are to be adjusted for the general price-level changes, it has been shown that the adjusted figures in the adjusted statements will be the same irrespective of the inventory cost flow assumption used in the conventional statements under certain assumptions (Drebin, 1965). Consider also the debate over the choice among direct costing method and full (absorption) costing method for valuing stock in published reports. If stock is to be valued at current cost to reflect the changes in specific prices, there will be no room for debating the issue of direct vs. full costing, simply because stock value—so determined—is independent of which method was used in conventional statements.

However, there are some reasons to suspect that controversies over some alternative conventions within the traditional accounting model for reporting are going to be dismissed so easily. One apparent reason for such a suspicion is that the traditional model is still in force in addition to the suggested newcomers, and it seems that it will be with us for some time yet, at least until some of the problems related to the use of the newcoming models are to be solved. Another reason, related to the above, is that the acceptability of alternative model(s) in lieu of the conventional one will hinge eventually on furnishing convincing and adequate amount of evidence demonstrating the superiority of the alternatives over the well-established traditional model. The position taken by the FASB in the Statement No. 33 referred to above substantiates this belief, as the intention in issuing such a statement is to attempt to encourage experimentation that would help to develop techniques for providing useful information which reflect the effects of price changes:

“The Board intends to assess the usefulness of the information called for by this Statement. It proposes to carry out research to answer questions such as the following: Which supplementary information is used? By whom is it used? How is it used? The Board will review the requirements of the Statement comprehensively when it has obtained sufficient evidence on usefulness. (FASB: SFAS No. 33, 1979, p. 57)

No doubt, continuing the reporting on historical cost data during the experimentation period envisaged by the FASB along the supplementary information, and the need for assessing the relative usefulness of these supplementary information (relative to the historical cost information) calls for a continuing consideration of the alternative conventions to be used in generating historical cost data. Actually, testing the usefulness of alternative historical cost conventions *under inflation* should be considered not only necessary but also is a prerequisite to establishing the relative usefulness of the supplementary information. This is so, since the degree of relative usefulness of the supplementary information over the historical cost information may be affected by the choice of conventions used in deriving historical cost information.

The aim of this paper is to attempt to *provide evidence as to the relative desirability (usefulness) of some alternative conventions within the historical cost model, under conditions of inflation*. Some alternative methods for stock costing and stock valuation for preparing external financial reports based on historical cost model were chosen for this study.

A simulation model of a firm under some assumed internal and environmental conditions was used to generate the necessary data for the experiment. In the following section of the paper we describe the methodology used for assessing the usefulness of conventional accounting information under the conventions used. In part II we give a detailed description of the simulation model used in the investigation. Part III describes the results of the experiment, followed by a summary and conclusion of the study.

I Assessing the usefulness of Full and Direct Costing income under inflation

The controversy over full vs. direct costing has generated a voluminous literature during the past three decades.⁽²⁾ Such a controversy is largely a question of whether the costs (historical costs) allocated to units of output should include both fixed and variable costs of production or whether they should include only the variable cost. Under direct costing all (historical) fixed production costs of the period are charged to operating expense in the period in which they are incurred. The continuing flow of articles which deal directly or indirectly with comparison of the two methods,⁽³⁾ and the considerable space still devoted to this subject in most popular cost accounting texts⁽⁴⁾ testifies to undiminished interest in the debate.

Notwithstanding most analyses presented therein were in terms of the effect on accounting figures (mainly income) resulting from the application of one method rather than the other. In Ijiri, Jaedicke and Livingstone's often-quoted article [1965], the analysis of the difference between full and direct costing was extended to study the effect of using different cost flow assumptions. However, little attention has been given to study—analytically—the desirability of one method over the other in terms of its relevance to users of accounting information, and in particular, under conditions of changing prices.⁽⁵⁾

In assessing the degree of usefulness of alternative accounting information structure, consideration should be given first to defining how usefulness could be assessed. Recent position on the objective of financial reports concludes that financial reports should provide information to help users assess the amounts, timing, and uncertainty of future cash flows (FASB: Statement of Financial Accounting Concepts No.1, 1978). Given this future cash flow orientation in defining accounting objectives, a measure of firm's periodic income based on discounted cash flow of the firm (conve-

niently called economic income) is taken here as a bench mark against which conventional accounting income figures based on full or direct costing can be assessed. It is believed that the identity of the data used to calculate economic income and those assumed to be useful in meeting users' informational requirements is a sufficient condition in this study for considering economic income measure as an important contender for choice as a criterion against which alternative accounting measures of income might be assessed.⁽⁶⁾

Thus the degree of relative desirability of direct and full costing methods in terms of users' informational requirements, and the evaluation—in general—of the usefulness of conventional accounting income figures may conveniently be analysed by studying the relation between accounting figures and economic income figures. In this study we extend the analysis of the usefulness of full vs. direct costing by studying the effect of using three cost flow assumptions (FIFO, LIFO, and Average Cost) in determining the historical cost of stock. The analysis will be carried out under different rates of inflation and also various rates of growth in firm's output volume.

In order to compare economic and accounting measures of income we shall use a simulation model of a hypothetical firm. Simulation has been chosen, rather than a direct investigation of real world data, because of the great difficulty involved in obtaining sufficient information about actual business transactions from available sources to meet the data requirement of the experiment. In addition, simulation technique allows various experimentation on the model once constructed and computerised, thus enables to test the impact of varying values given to the model's important parameters in a more convenient form than if the same sensitivity analysis were attempted to real world data.

A description of the simulation model used in this investigation and analysis of the results are given in the following two sections respectively.

Description of the Model

The investigation was carried out using a model of a hypothetical firm, working under an assumed internal and environmental conditions. The hypothetical firm manufactures and sells only one product. In other

respects also the model is of a simple world; relationships describing cost and revenue behavior are straightforward and certainty is assumed throughout. In addition, the relationships assumed in the model do not necessarily imply optimal decision procedures. In what follows the model is described in terms of notation used, relationships assumed in calculating the various measures of income, and the initial values assumed for the model's exogenous parameters.

Notation

S_t	Quantity sold during period ended at time t (in units)
R_t	Selling price per unit during period ended at time t .
IZ_t	Stock of finished goods at time t (in units).
CIZ_t	Cost of stock of finished goods at time t .
Z_t	Production of finished goods during period ended at time t (in units)
$CPRD_t^{f,d}$	Manufacturing costs of production of finished goods during period ended at time t , according to full costing method (f) or direct costing method (d)
M_t	Quantity of raw materials purchased during period ended at time t (in units)
N_t	Cost per unit of raw material during period ended at time t
$CMAT_t$	Total costs of materials used in production during period ended at time t , according to one of the materials flow assumptions adopted (FIFO, LIFO, Average Cost)
IM_t	Stock of raw materials at time t (in units)
CIM_t	Cost of stock of raw materials at time t
L_t	Quantity of labour employed during period ended at time t (in hours)
J_t	Labour cost per hour during period ended at time t
X_t	Factory overhead expenses during period ended at time t
V_t	Marketing expenses during period ended at time t
Q_t	Productive capacity available at time t (i.e., for use in the period ended at time $t+1$) (in units of output)
D_t	Number of units of new plant purchased during the period ended at time t
Q	Productive capacity per period of one unit of new plant (in units of output)
E_t	Cost of one unit of new plant during the period ended at time t

DPR_t	Accounting depreciation charges for the period ended at time t
$COGS_t^{f,d}$	Cost of goods sold during the period ended at time t , according to full costing method (f), or direct costing method (d)
U_t	Tax payable in respect of the period ended at time t
A_t	Cash receipts (excluding cash from shareholders) at time t
B_t	Debtors at time t
F_t	Cash payments (excluding dividends) at time t
G_t	Creditors at time t
H_t	Cash balance required at time t
C_t	Dividend payment at time t
e	the ratio of the selling price to the buying price of one unit of plant on liquidation
nq	life of each unit of plant acquired (in years)
K	Materials turn-over rate (in number of times each year)
g	Rate at which sales quantity (expressed in units) is expected to grow each period.
${}^p R, {}^p M, {}^p L, {}^p X, {}^p V$	are price indices describing the changes in various revenue and cost relationships through time.

Relationships assumed in the model

(i) *Sales revenue*

Demand conditions for the product are assumed to be such that, given the pricing policy, the volume of sales will increase at a fixed annual rate, g . Thus sales quantity is assumed not to be the subject of a decision by the firm. The volume sold during the period ended at time t is described by the expression:

$$S_t = S_{t-1} (1+g) = S_0 (1+g)^t$$

Unit selling price for the same period is determined from the expression:

$$R_t = (a_R + b_R \cdot S_t) (1 + eR)^t; a_R > 0.0, b_R < 0.0 \quad (7)$$

Sales revenue for the period is $S_t \cdot R_t$.

(ii) *Cost of raw materials purchased and used*

Each unit of final output requires one unit of raw material. A minimum of stock of raw materials is required at the end of each period.

Enough raw materials must be bought to satisfy production requirements and to provide for end-period stock. Purchases of raw materials, in units, during the period ended a time t , are:

$$M_t = Z_t(1+b_M) - IM_{t-1} \quad ; \quad b_M < 1$$

The purchase price per unit of raw material during the period ended at time t is given by the expression:

$$N_t = N_0(1 + e_M)^t.$$

Cost of purchasing raw material during the period is $M_t \cdot N_t$.

The required stock of raw materials at the end of a period is equal to a proportion, b_M , of the quantity required for production during that period:

$$IM_t = b_M \cdot Z_t = M_t + IM_{t-1} - Z_t.$$

Cost of materials used in production during period ended at time t is calculated under three materials flow assumptions as follows:

Using FIFO flow assumption

Assuming that stock of materials turns over k times each year, material stock at the end of each year is assumed to be purchased at price prevailing during the $\frac{1}{k}$ th of the year. Average price during the last $\frac{1}{k}$ th of the year equals:

$$\begin{aligned} & \frac{1}{2} \left[N_{t-1} \left(1 + \frac{k-1}{k} e_{M,t} \right) + N_{t-1} \left(1 + e_{M,t} \right) \right] \\ & = N_{t-1} \frac{1}{2k} \cdot \left[1 + (2k-1) \left(1 + e_{M,t} \right) \right] \quad (8) \end{aligned}$$

Cost of material stock at time t , IM_t , depends upon the relation of units produced during the period to units of material stock at beginning of the period:

If $Z_t \geq IM_{t-1}$, then

$$CIM_t = (M_t + IM_{t-1} - Z_t) \cdot N_{t-1} \cdot \frac{1}{2k} \left[1 + (2k-1) \left(1 + e_{M,t} \right) \right] ; \text{ and,}$$

$$\text{CMAT}_t = \text{CIM}_{t-1} + M_t \cdot M_t - \text{CIM}_t$$

If $Z_t < \text{IM}_{t-1}$, then

$$\text{CIM}_t = \text{CIM}_{t-1} \cdot \left(\frac{\text{IM}_{t-1} - Z_t}{\text{IM}_{t-1}} \right) + M_t \cdot N_t ; \text{ and,}$$

$$\text{CMAT}_t = \text{CIM}_{t-1} \cdot \frac{Z_t}{\text{IM}_{t-1}}$$

Using LIFO flow Assumption

Under LIFO method, CMAT_t and CIM_t depend on the relation of units of materials used during the period to units purchased during the same period'

If $Z_t < M_t$ (i.e., $\text{IM}_t > \text{IM}_{t-1}$), then:

$$\text{CIM}_t = \frac{M_t - Z_t}{M_t} \cdot (M_t \cdot N_t) + \text{CIM}_{t-1} ; \text{ and,}$$

$$\text{CMAT}_t = Z_t \cdot N_t$$

If $Z_t > M_t$, then:

$$\text{CMAT}_t = M_t \cdot N_t + \frac{Z_t - M_t}{\text{IM}_{t-1}} \cdot \text{CIM}_{t-1} ; \text{ and,}$$

$$\text{CIM}_t = \text{CIM}_{t-1} \cdot \left(1 - \frac{Z_t - M_t}{\text{IM}_{t-1}} \right) = \frac{\text{CIM}_{t-1}}{\text{IM}_{t-1}} \cdot \text{IM}_t$$

Using Average Cost Flow assumption

$$\text{CMAT}_t = \frac{Z_t}{\text{IM}_t + M_t} \cdot (\text{CIM}_{t-1} + M_t \cdot N_t) ; \text{ and,}$$

$$\text{CIM}_t = \frac{\text{IM}_t}{\text{IM}_t + M_t} \cdot (\text{CIM}_{t-1} + M_t \cdot N_t)$$

(iii) *Plant cost and depreciation charge*

Plant capacity (expressed in terms of units of production) must be sufficient to meet production requirements, i.e., plant capacity at the beginning of the period ended at time t must be greater than or equal to the quantity to be produced during that period:

$$Q_{t-1} \geq Z_t.$$

If the inequality is not satisfied the company must buy a new unit of plant, giving a revised plant capacity at time $t-1$ (Q'_{t-1}) of :

$$Q'_{t-1} = Q_{t-1} + D_t \cdot Q$$

where D_t equals 1. If plant capacity is still insufficient to satisfy production requirements, a further unit of plant must be purchased so that:

$$Q'_{t-1} = Q_{t-1} + D_t \cdot Q$$

where D_t equals 2. Further plant units must be purchased until $Q'_{t-1} \geq Z_t$.

The cost of one unit of new plant in the period ended at time t is:

$$E_t = E_0(1 + \frac{P}{D})^t.$$

The cost of new plant in the period is $D_t \cdot E_t$.

The productive capacity per period of all plant is assumed to deteriorate each period by a proportion, b_Q , of its productive capacity at the beginning of the period. Thus the plant capacity at time t (available for production in the period ended at time $t+1$) equals'

$$Q_t = (Q_{t-1} + D_t \cdot Q) (1 - b_Q).$$

Plant is retained until its productive capacity is exhausted, at which time it has no value.

Charges for accounting depreciation during period ended at time t , DPR_t , were calculated using straight-line method. Assuming a uniform life for all units of plant acquired, and equals nq , depreciation on the unit of plant purchased at time j (where $j < t$) equals $\frac{D_j \cdot E_j}{nq}$

Thus depreciation charges for all units of plant which exist during the period ended at time t equals:

$$\text{DPR}_t = \sum_{j=0}^{t-1} \frac{D_j \cdot E_j}{nq} ; \text{ for } t \leq nq ; \text{ and,}$$

$$\text{DPR}_t = \sum_{j=t-nq+1}^{t-1} \frac{D_j \cdot E_j}{nq} ; \text{ for } t > nq.$$

(iv) *Direct labour cost*

Each unit of final output requires one hour of direct labour. Thus the quantity required during the period ended at time t is: $L_t = Z_t$.

The cost per hour during that period is given by the expression:

$$J_t = J_0 (1 + \rho_L)^t.$$

Cost of direct labour during the period is $L_t \cdot J_t$.

(v) *Factory overhead expenses*

Factory overhead expenses include a fixed element and an element varying according to the level of production. The cost for the period ended at time t is given by the expression:

$$X_t = (a_X + b_X \cdot Z_t)(1 + \rho_X)^t; \quad a_X > 0.0; \quad b_X: \quad 0 < b_X < 1$$

(vi) *Production costs of finished goods*

A minimum stock is required at the end of each period. The required stock of finished goods at the end of a period is equal to a proportion, b_Z , of the quantity sold during that period:

$$IZ_t = b_Z \cdot S_t = Z_t + IZ_{t-1} - S_t.$$

Enough finished goods must be produced to satisfy demand and to provide for end-period stock:

$$Z_t = S_t(1 + b_Z) - IZ_{t-1}.$$

Total production costs during the period ended at time t is described by the following expression:

Under full costing method

$$\text{CPRD}_t^f = \text{CMAT}_t + L_t \cdot J_t + X_t + \text{DPR}_t.$$

Under direct costing method

$$\text{CPRD}_t^d = \text{CMAT}_t + L_t \cdot J_t + b_X \cdot Z_t (1 + f_X)^t.$$

(vii) *Cost of goods sold*

The following is a derivation of the cost of goods sold during the period ended at time t , COGS_t , under full and direct costing, and according to the three different flow assumptions under investigation.

Full costing method

$$\text{COGS}_t^f = \text{CIZ}_{t-1}^f + \text{CPRD}_t^f - \text{CIZ}_t^f$$

where cost of stock at time $t-1$ and time t being calculated according to one of the stock flow assumptions adopted:

Using *FIFO* assumption; If $S_t \geq IZ_{t-1}$, then,

$$\text{CIZ}_t^f = IZ_t \cdot \frac{\text{CPRD}_t^f}{Z_t}. \text{ If } S_t < IZ_{t-1}, \text{ then,}$$

$$\text{CIZ}_t^f = \text{CPRD}_t^f + \text{CIZ}_{t-1}^f \left(\frac{IZ_{t-1} - S_t}{IZ_{t-1}} \right)$$

Using *LIFO* assumption: If $S_t < Z_t$, then,

$$\text{CIZ}_t^f = \text{CIZ}_{t-1}^f + \text{CPRD}_t^f \left(\frac{Z_t - S_t}{Z_t} \right). \text{ If } S_t > Z_t, \text{ then,}$$

$$\text{CIZ}_t^f = \text{CIZ}_{t-1}^f \cdot \frac{IZ_t}{IZ_{t-1}}.$$

Using *Average cost* assumption:

$$\text{CIZ}_t^f = IZ_t \cdot \left(\frac{\text{CIZ}_{t-1}^f - \text{CPRD}_t^f}{IZ_{t-1} + Z_t} \right).$$

Direct costing method

$$\text{COGS}_t^d = \text{CIZ}_{t-1}^d + \text{CPRD}_t^d - \text{CIZ}_t^d$$

where CPRD_t^d is given in (vi), and $\text{CIZ}_{t-1}^d, \text{CIZ}_t^d$ are calculated under each of the stock flow assumptions in the same way as under full costing method, except using CPRD_t^d instead of CPRD_t^f .

(viii) Marketing expenses

Marketing expenses include a fixed element and an element varying according to the level of sales. The cost for the period ended at time t is given by the expression:

$$V_t = (a_V + b_V \cdot S_t)(1 + r_V)^t; a_V > 0; 0 < b_V < 1.$$

(ix) Taxation

Taxation is payable each period, as a rate on accounting profit which is adjusted in accordance with assumed taxation regulations. The payment of dividends does not affect taxation payable.

(x) Cash flows

At time 0, initial capital of 1000 is received from equity shareholders (the company is all-equity financed). At the same time one unit of new plant is purchased at a cost of E_0 . All subsequent receipts and payments are assumed to arise on the last day of the period to which they relate.

Sales are on credit, and of the total amount due at the end of a period a proportion, b_A , is assumed not to be paid on the last day of the period. Thus cash receipts from sales at time t are given by the expression:

$$A_t = (B_{t-1} + S_t \cdot R_t)(1 - b_A).$$

Debtors at time t are:

$$B_t = (B_{t-1} + S_t \cdot R_t)(b_A).$$

The company purchases raw materials and incurs factory overhead and marketing expenses on credit. Of the total amount due in respect of these

costs at the end of a period a proportion, b_F , is assumed not to be paid on the last day of the period. All other costs are paid on the last day of the period in which they are incurred. Thus cash payments at time t (excluding dividends paid) are given by the expression:

$$F_t = (G_{t-1} + M_t \cdot N_t + X_t + V_t)(1 - b_F) + L_t \cdot J_t + D_t \cdot E_t + U_t.$$

Creditors at time t are:

$$G_t = (G_{t-1} + M_t \cdot N_t + X_t + V_t)(b_F).$$

The company is required to hold a cash balance at the end of each period, calculated as a function of sales revenue earned during that period:

$$H_t = a_H + b_H (S_t \cdot R_t).$$

(xi) Dividend payment

Any balance remaining on cash account at the end of a period, after providing for the cash balance required to be held at that time (H_t), is paid to shareholders as dividend. If a negative amount is involved, this is assumed to be paid to the company by the shareholders. Thus the dividend payment at time t is:

$$C_t = H_{t-1} + A_t - F_t - H_t.$$

(xii) Liquidation

On liquidation (at time n) all outstanding debtors are collected and all outstanding creditors paid. Stocks of raw materials are sold at the market price prevailing at time n , and stocks of finished goods at the selling price assumed for the period ended at time n .

The liquidation value of plant is calculated according to the plant capacity at time n , using the expression:

$$\text{Liquidation value of plant} = Q_n \left(\frac{E_n}{Q} \cdot e \right).$$

Accounting capital gains arising on liquidation are assumed to be taxed at the same rate as adjusted accounting profit. The cash balance at time n ,

after taking account of the above, is distributed to shareholders as a final dividend. If the cash account is in deficit, shareholders are assumed to contribute the amount required to meet the deficit.

(xiii) *Periodic account income*

Full costing income (after tax) for the period ended at time t is given by the expression:

$$AI_t^f = S_t \cdot R_t - COGS_t^f - V_t - U_t ; 0 < t < n$$

where $COGS_t^f$ depends upon the particular stock flow assumption being used.

Direct costing income (after tax) for the period ended at time t equals:

$$AI_t^d = [S_t \cdot R_t - COGS_t^d - b_V \cdot S_t \cdot (1 + \ell_V)^t] - [a_X (1 + \ell_X)^t + a_V (1 + \ell_V)^t] - U_t$$

The first term of the RHS of the above equation represents the total contribution margin, and the second term is the total fixed costs of production and marketing charged to period revenues.

III Results of the simulation

Using the simulation model postulated above, accounting income figures are calculated using six different combinations related to the use of full or direct costing method under the three stock flow assumptions for valuing materials and finished goods inventory (FIFO, LIFO, and Average Cost). For each of the six combination of stock costing and stock flow assumption, the model was run using three rates of growth in physical output ($g=.02$, $g=.05$, $g=.07$) and five rates of inflation ($\ell = .0$, $\ell = .05$, $\ell = .1$, $\ell = .15$, $\ell = .2$). All prices affected by inflation are assumed to change at the same rate ($\ell_R = \ell_M = \ell_L = \ell_X = \ell_V = \ell$), i.e., no relative price changes are assumed among prices of factors input and output. Thus, for each of the six combinations, fifteen accounting income series are calculated, one for each of the six combination of output growth

and inflation. Each income series extends to twenty periods which resembles the life of the firm simulated over twenty years, from the time of inception until liquidation. For the purposes of calculating depreciation, plant is assumed to have a four year life and to be worth nothing at the end of that time. Taxation is assumed to be payable at a rate of 50% on taxable accounting income. Other values given to the model's parameters are given in Table (I).

Table 1. Values assumed for model parameters .

Parameters related to:	Notations used	Values
Demand function	a_R , b_R	10, - 0.01
Inventory	b_Z , b_M	.15, .2
Factory overheads	a_X , b_X	60 , .2
Marketing expenses	a_V , b_V	40 , .15
Plant capacity	b_Q	.4
Minimum cash balance	a_H , b_H	100 , .05
Debtors & creditors	b_A , b_F	.15 , .25
Liquidation value of plant	e	.9

Generating economic income series

Economic income is also calculated for each combination of growth and inflation under each of the six combination of costing methods and inventory flow assumptions. Using the dividend payment series generated for each case ($C_0 \rightarrow 20$) economic income was calculated using the expression:

$$EI_j = C_j + K_j - K_{j-1} = r.K_{j-1}.$$

where EI_j is the economic income of the firm for the period ended at time j , and K_j is the economic value of the firm at time j calculated using the following expression:

$$k_j = \sum_{t=j+1}^n C_t (1+r)^{j-t}.$$

In the above expressions, r is the shareholders' marginal rate of time preference between certain cash flows at different points in time. For the purposes of the simulation analysis we assume that the value of (r) depends, in part, on the rate of inflation expected; in general, it is assumed that the greater the rate of inflation expected, the greater will be (r) , i.e., the higher the price shareholders demand for foregoing cash immediately in return for the expectation of cash in the future. In particular it is assumed that the value of (r) will be such as to satisfy the following equation:

$$(1+r)^{-n} = (1+s)^{-n} (1 + \ell)^{-n}$$

where ℓ is the rate of inflation relevant to shareholders (assumed to equal the relevant rate of inflation used in the simulation) and (s) is a constant, reflecting the shareholders' marginal rate of time preference between consumption (rather than cash) at different points in time. A value of 0.15 is assumed for (s) throughout the analysis. Re-arranging the terms in the previous expression, then:

$$r = s + \ell + s\ell .$$

So if the expected rate of inflation (ℓ) is 10% per period, (r) will equal 0.265 (or 26.5%) period.

Using the methods described above, measures of income and other relevant variables are calculated for each period. The output data from the computer are of the form shown in Table (2). The data in Table 2 relate to one of the six combinations of costing methods and inventory flow assumptions, one growth rate ($g = .05$) and one inflation rate ($\ell = .10$). To consider six combinations of accounting methods used, three growth rates and five rates of inflation, 90 tables (similar to table 2) are required.

Statistical analysis of the results

To reduce the difficulty in comparing and interpreting the considerable data produced by the simulation, we make use of two statistics (mean squared relative error and the mean relative bias) to summarise the divergence between economic and accounting measures of income (a measure of the relative accuracy of each accounting method under test), and a third (the coefficient of determination, r^2) to estimate the usefulness of accounting measures of income as predictors of economic income.

The first two statistics are based on the relative difference between accounting and economic income. The relative accuracy of accounting income for period $j-1$ to j (RA_j) is:

$$RA_j = \frac{AI_j - EI_j}{EI_j}$$

The first statistic (the mean squared relative error) measures the average size of the difference between accounting income and economic income over the life of the firm. This statistic is calculated using the formula:

Mean squared relative error (MSLR) = $\frac{1}{n} \cdot \sum_{j=1}^n (RA_j)^2$. By squaring the relative accuracy measure for each period, the direction of the difference is eliminated, thus avoiding negative differences cancelling out positive ones.

The second statistic (the mean relative bias) measures the average direction of the difference between accounting income and economic income over the life of the firm. This statistic is calculated from the formula: Mean relative bias (MRB) = $\frac{1}{n} \cdot \sum_{j=1}^n RA_j$.

The third statistic (coefficient of determination) measures the proportion of the variations in economic income that may be accounted for (but not necessarily caused) by changes in accounting income.

Measures of the mean squared relative error, the mean relative bias and the coefficient of determination for the data used in the simulation are summarised in Tables 3 to 8, each corresponding to one of the six combinations of costing methods and inventory flow assumptions. The statistics provide a basis for making some comments about the relative accuracy and

Table (2). Example of form of computer output
Full Costing, Average Cost, $g = .05$, $\ell = .10$

Period ended at time :	Economic value	Change in economic value	Dividends paid	Economic Income	Accounting income after tax	Relative accuracy
0	1,818.9					
1	1,526.5	-292.4	774.4	482.0	229.2	-0.5244
2	1,653.0	126.6	277.9	404.5	266.4	-0.3414
3	1,996.3	343.3	94.8	438.1	275.8	-0.3705
4	2,136.7	140.5	388.6	529.0	320.2	-0.3947
5	2,284.1	147.4	418.9	566.2	406.3	-0.2824
6	2,736.6	452.5	152.7	605.3	430.8	-0.2883
7	2,881.1	144.5	580.7	725.2	531.1	-0.2677
8	3,411.8	530.7	232.8	763.5	566.0	-0.2587
9	3,553.5	141.7	762.5	904.1	654.2	-0.2765
10	4,160.1	606.7	335.0	941.7	737.6	-0.2167
11	4,269.5	109.4	993.1	1,102.4	860.4	-0.2196
12	4,939.9	670.4	461.0	1,131.4	969.1	-0.1435
13	4,972.7	32.9	1,276.2	1,309.1	1,123.0	-0.1421
14	5,678.2	705.4	612.3	1,317.8	1,261.5	-0.0427
15	5,520.8	-157.4	1,662.1	1,504.7	1,455.3	-0.0329
16	6,188.1	667.3	795.7	1,463.0	1,631.7	0.1153
17	5,701.8	-486.3	2,126.2	1,639.9	1,874.3	0.1429
18	6,172.5	470.6	1,040.4	1,511.0	2,091.7	0.3843
19	6,495.6	323.2	1,312.5	1,635.7	2,188.2	0.3378
20	0.0	-6,495.6	8,217.0	1,721.3	3,156.9	0.8340

Summary statistics:

Mean squared relative error	=	0.1096
Mean relative bias	=	-0.0994
Coefficient of determination (r^2)	=	0.852

predictability of direct costing method versus full costing method, under different rates of growth and inflation. Two main questions will be given consideration: First, the relative performance of direct and absorption costing under various inventory flow assumptions (in terms of accuracy and association with economic income) and attempt to identify those conventions that result in accounting income figures which approximate to and/or associate with economic income most closely. Second, to consider whether any of the conventions used produced accounting income figures that are significantly good approximations of and/or good predictors of economic income.

The divergence between economic and accounting measures of income based on full and direct costing methods

In this section we consider the degrees of relative errors in measuring economic income as a result of the use of full costing or direct costing method when FIFO, LIFO or average cost are used for valuing materials and finished goods inventory.

Consider first the effect of using different inventory flow assumptions on full costing income, and then on direct costing income. Under full costing method, degrees of mean squared relative errors (MSLR) reported in Tables 3, 5, and 7 involve calculations based on full cost valuation, and whose only difference lies in the flow assumption used for identifying stock. The relative error measures for FIFO and Average Cost are very similar for all growth and inflation rates considered, and are significantly lower than the relative error measures for LIFO under the same growth and inflation rates. The relative superiority of FIFO and Average Cost over LIFO increased as the inflation rate becomes higher. The above conclusions are largely unaffected by changes in the growth rate, but the size of the relative error of all three methods decreases as the rate of growth increases. The relative bias measures suggests that all three methods result in accounting income figures that tend to overstate economic income at low inflation rates and to understate it at higher inflation rates (approximately 10% and above). The degree of understatement increases as inflation increases. The extent of overstatement or understatement tends to be more pronounced using LIFO than using FIFO or Average Cost.

By comparing Tables 4, 6, and 8 we may again consider the relative merits of FIFO, LIFO and Average Cost, now calculating stock cost at Direct Cost rather than Full Cost. The choice of Direct Cost as opposed to Full cost has little effect on the conclusions outlined previously; FIFO and Average Cost result in accounting income figures that are better approximations to economic income than the figures resulting from the use of LIFO. It is also of interest here to notice that all three stock flow assumptions used in conjunction with Direct Costing method are producing identical results under *zero inflation* rate, and for all positive growth rates considered. This is not the case when using Full costing method, except only under the static condition of *zero inflation* rate, coupled with *zero growth* rate. This is true since, under the conditions postulated in the deterministic simulation model used, using Full Costing method under positive growth rates will have the effect of shifting a part of the fixed production costs from one period to another, depending on the relation of production volume to sales volume. Fixed production costs applicable to each period

Table 3. Full Costing Method, FIFO Stock Flow -

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1343	.2317	.114	.1447	.2028	.168	.1020	.1902	.024
.05	.0992	.0692	.475	.1028	.0324	.739	.0686	.0294	.905
.10	.0984	-0.0395	.796	.1036	-0.0805	.867	.0770	-0.0763	.957
.15	.1088	-0.1185	.842	.1175	-0.1589	.894	.0964	-0.1526	.954
.20	.1233	-0.1788	.857	.1353	-0.2178	.905	.1185	-0.2108	.948

Table 4. Direct Costing Method, FIFO Stock Flow -

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1676	.2423	.153	.1690	.2097	.201	.1123	.1965	.048
.05	.1229	.0724	.406	.1189	.0312	.698	.0784	.0294	.883
.10	.1165	-0.0407	.760	.1163	-0.0829	.843	.0866	-0.0795	.938
.15	.1238	-0.1222	.816	.1285	-0.1631	.875	.1060	-0.1576	.937
.20	.1364	-0.1841	.837	.1455	-0.2231	.889	.1280	-0.2168	.933

Table 5. Full Costing Method, LIFO Stock Flow -

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1419	.2329	.074	.1460	.2027	.153	.1215	.1898	.017
.05	.1606	.0766	.295	.1393	.0323	.634	.0890	.0295	.838
.10	.1711	-0.0400	.648	.1498	-0.0859	.771	.1117	-0.0842	.872
.15	.1786	-0.1284	.721	.1656	-0.1722	.806	.1384	-0.1685	.867
.20	.1882	-0.1963	.754	.1836	-0.2373	.826	.1641	-0.2332	.864

Table 6. Direct Costing Method, LIFO Stock Flow .

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1676	.2423	.153	.1690	.2097	.201	.1123	.1965	.048
.05	.1750	.0792	.265	.1522	.0335	.606	.1000	.0303	.806
.10	.1785	-0.0400	.639	.1574	-0.0867	.760	.1197	-0.0854	.857
.15	.1829	-0.1291	.717	.1707	-0.1735	.800	.1443	-0.1704	.857
.20	.1911	-0.1973	.751	.1874	-0.2388	.821	.1688	-0.2352	.858

Table 7. Full Costing Method, Average Cost Stock Flow .

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1340	.2313	.100	.1448	.2027	.165	.1018	.1902	.023
.05	.0997	.0691	.477	.1035	.0303	.737	.0689	.0293	.905
.10	.0994	-0.0398	.795	.1096	-0.0994	.852	.0777	-0.0766	.956
.15	.1101	-0.1190	.840	.1187	-0.1595	.891	.0975	-0.1532	.952
.20	.1249	-0.1796	.855	.1369	-0.2187	.902	.1200	-0.2118	.946

Table 8. Direct Costing Method, Average Cost Stock Flow .

Growth (g) Inflation (ℓ)	.02			.05			.07		
	Error	Bias	r ²	Error	Bias	r ²	Error	Bias	r ²
.00	.1676	.2423	.153	.1690	.2097	.201	.1123	.1965	.048
.05	.1236	.0725	.404	.1195	.0313	.697	.0788	.0294	.884
.10	.1176	-0.0407	.757	.1172	-0.0830	.841	.0873	-0.0798	.936
.15	.1251	-0.1225	.814	.1296	-0.1635	.873	.1071	-0.1581	.935
.20	.1380	-0.1846	.834	.1469	-0.2238	.887	.1293	-0.2176	.930

revenues, using Full Costing, are not the same under positive growth rates differ from zero, and so stock values under different flow assumptions. However, this is not true under Direct costing method. Direct Costing income figures are function of sales volume as opposed to Full costing which are function of production and sales. Therefore, average variable cost per unit will be constant among periods if there is no price changes, and this is true for all rates of growth in output assumed in the model (no economies of scale were assumed under growth situation).

We now turn to comparison of Full Costing and Direct Costing under the three stock flow assumptions — FIFO (Tables 3 and 4), LIFO (Tables 5 and 6) or Average Cost (Tables 7 and 8). Under all three stock flow assumptions, accounting income figures calculated using Full Cost are better approximations to economic income than those calculated using Direct Cost. However the difference between the two measures tends to be smaller at higher rates of inflation and growth. Both methods of costing result in accounting income measures that tend to overstate economic income at low inflation rates and to understate it at inflation rates of 10% and more. The degree of overstatement or understatement is less pronounced when Full Cost is used than when stock is costed at Direct Cost.

We now summarize the above discussion by considering whether any of the combinations of conventions used in the analysis produces accounting income measures that are good approximation to economic income. The relevant statistic is the mean squared relative error. This statistic is the average of the squares of the periodic relative accuracy measures. Thus, a measure of the average periodic relative error is given by the square root of the mean squared relative error. For example, if the mean squared relative error is 0.1, the average periodic relative error is $\sqrt{0.1}$, or 0.3162. That is, accounting income overstates or understates economic income each period by an average of 31.62%.

Examination of Tables 3 to 8 reveals that the lowest calculated mean squared relative error is 0.0686 (Table 3, $g = .07$, $\ell = .05$). This implies an average periodic relative error of $\sqrt{0.0686}$, i.e., .2619 or 26.19%. The highest calculated mean squared relative error is 0.1911 (Table 6, $g = .02$, $\ell = .20$), implying an average periodic relative error of 34.51%. This may suggest that none of the combinations of costing methods and stock flow assumptions analysed here leads to accounting income measures that are good approximations to economic income in the internal and environ-

mental conditions assumed for the firm in this analysis. From the above results, some general conclusions about the effects of inflation and growth on the relative accuracy of conventional accounting measures of income may be drawn. The size of the difference between accounting and economic income (measured by the mean squared relative error) seems to be smallest for inflation rates between 5% and 10%, increasing for inflation rates above and below this range. The mean squared relative error is largely unaffected by a change in the growth rate from 2% to 5% but drops significantly when the growth rate increased to 7%. The direction of the difference between accounting income and economic income is virtually unaffected by the rate of growth assumed, for a given rate of inflation. However, there is a clear tendency for the direction to change as the rate of inflation changes. At low levels of inflation (5% and below) accounting income tends to overstate economic income. At higher rates (10% and above) accounting income tends to understate economic income.

Full and Direct Costing income as predictors of economic income

We now turn to a consideration of the third statistic reported to summarise the results of the simulation — the coefficient of determination (r^2). The coefficient of determination is a measure of the proportion of changes in economic income that may be accounted for by changes in accounting income. As such, it provides an indication of the likely usefulness of accounting measures of income for a particular period as predictors⁽⁷⁾ of economic income for the same period.

When prices are not subject to inflation, Direct Costing figures show better degrees of association with economic income figures than those produced under Full Costing method. This is true for all growth rates considered, and under the use of all stock flow assumptions. However, under inflationary conditions the position is reversed: Full costing income figures are relatively better associated with economic income, although the superiority of Full Costing over Direct Costing is less apparent at higher inflation rate. This is to say that inflation has the effect of lessening the superiority of Full Costing over Direct costing in terms of association with economic income figures, particularly at relatively high inflation rates.

Using different stock flow assumptions produces insignificant impact on the performance of both Full and Direct Costing methods in terms of

degrees of relative association with economic income. However, LIFO method was outperformed by both FIFO and Average Cost methods in the association test when combined with Full Costing or Direct Costing method. This substantiates earlier observations regarding the performance of LIFO method under the relative accuracy test.

We now attempt a general conclusion as regards the degrees of association between economic income and accounting income produced via alternative costing methods and stock flow assumptions. At first sight, the r^2 values reported previously suggest that, in a large number of circumstances, conventional accounting figures may be good predictors of economic income. In a majority of cases, r^2 is greater than 0.8, i.e., in such cases over 80% of the change in economic income is associated with a change in accounting income. The results must be viewed with caution, however. The highest values of r^2 are associated with high rates of inflation and growth. It is important to note that there is virtually no correlation between accounting and economic measures of income when zero inflation is assumed. It seems possible that for the data in our simulation, the impact of inflation and growth is very great relative to the impact of other factors affecting the relationship between accounting income and economic income. The conclusion is that, in these circumstances, the prediction of inflation and growth rates may be more important than the identification of the relationship between accounting and economic measures.

A further reason for viewing the high r^2 values with caution is that they may be caused by the particular relationships assumed in the model. More extensive testing, under wider range of assumed internal and environmental conditions, is necessary before any firm conclusions can be reached about the usefulness of conventional accounting measures of income as predictors of economic income under inflationary conditions.

IV Concluding Remarks

In this paper we presented a model for assessing the relative usefulness to external users of some alternative conventions within the historical cost accounting measurement framework. Given the conditions postulated in the model, it was concluded that certain accounting conventions result in measures of conventional accounting income that are significantly better approximation to, and predictors of, a discounted future cash flow measure of periodic income, than are the measures calculated using other conven-

tions. However, it has been also concluded that inflation has the effect of lessening the superiority of some conventions over others, particularly at relatively high inflation rates. Also, of equal importance it was found that no group of conventions tested leads to a measure of accounting income that is a good approximation to economic income, or a consistently good predictor of it. The results have implications both to the current debate on the relative desirability of alternative measurement bases under inflationary conditions, and to the debates over the effects and desirability of the alternative conventions within the historical cost framework.

As regards the last point stated above, if one accepts the kind of evidence presented in this analysis, one expects that high inflation rates and the application of the models suggested as alternative to the conventional accounting model will render the controversies over alternative accounting conventions considered here to be laid to their final graves. Of special relevance to this matter is the speculation made, more than fifteen years ago, by Fremgen regarding the debate on the choice between Direct and Full costing methods:

“. . . it is possible that the controversy over variable costing may be discarded in lieu of being resolved. . . . Whether the controversy will ever be resolved — let alone what the resolution will be — in an unanswerable question at the present.”
(Fremgen, 1964, p. 51)

Given the acceptability of evidence submitted here, one can conclude that the above speculation is a warranted one.

Footnotes

1. For an evaluation of the alternative models suggested under inflation, see, for example: Arnold and El-Azma [1978], Baxter [1975], Dean and Wells [1977], Gynther [1966], Scapens [1977], Revisine and Weygandt [1974], Vancil [1976], Lee [1974].
2. See for example articles and bibliography appeared in Anton and Firmin [1972], part six.
3. For example: DeCoster and Ramanathan [1973], Eichhorn [1978], Fekrat [1972], Bell [1977], Grinnell [1977], Kaplan and Welam [1974], McIntyre [1974], Klipper [1978], Ricketts and Purdy [1974], Treacy [1977], Zimmerman [1979].

4. For example; Dopuch, Birnburg and Demski [1974], Homgren [1977], Crowningshield and Gorman [1979].
5. A notable exception here is Greenball [1968].
6. See Arnold and El-Azma [1975], [1978] for a discussion of the relevance of the economic measures of income and value.
7. a_R is the intercept parameter in this demand function at time 0, assumed to be positive; and b_R is the slope parameter of the function at time 0, assumed to be negative. This formulation of the demand function implies that the firm operates in an imperfect market and the quantity to be sold (S_t) affects the price which can be charged. Moreover, it is assumed that the product selling price is subject to a specific price change at the annual rate of ℓ_R . This is introduced into the demand function by letting the demand parameters a_R and b_R change annually by the rate of ℓ_R , so:

$$R_t = a_R (1 + \ell_R)^t + b_R (1 + \ell_R)^t \cdot S_t = (a_R + b_R \cdot S_t)(1 + \ell_R)^t.$$

8. This can be derived as follows:

Average price during the last $\frac{1}{k}$ th of the year equals

$$\begin{aligned} \frac{1}{2} \cdot N_{t-1} \cdot \left[(1 + \frac{k-1}{k} \cdot \ell_{M,t}) + (1 + \ell_{M,t}) \right] &= N_{t-1} \cdot \frac{1}{2k} \left\{ \left[K + (k-1) \cdot \ell_{M,t} \right] + \right. \\ &\left. k(1 + \ell_{M,t}) \right\} \\ &= N_{t-1} \cdot \frac{1}{2k} \left\{ \left[1 + (k-1) + (k-1) \cdot \ell_{M,t} \right] + k(1 + \ell_{M,t}) \right\} \\ &= N_{t-1} \cdot \frac{1}{2k} \left\{ \left[1 + (k-1) (1 + \ell_{M,t}) \right] + k(1 + \ell_{M,t}) \right\} = N_{t-1} \cdot \frac{1}{2k} \cdot (1 + 2k - 1)(1 + \ell_{M,t}) \end{aligned}$$

It is noticeable that in this expression by putting $k=1$, the price for valuing the ending inventory according to the FIFO method will be reduced to $N_{t-1} (1 + \frac{\ell_{M,t}}{2})$, i.e., the ending inventory is to be valued at the average price during year t . The above generalized formulation allows for the computation of the historical cost of materials for goods inventory when $k \geq 1$.

9. It should be noted that "predictor" as used here refers to the accounting measures of income as useful figures in predicting the economic income of the same period, i.e., the contemporaneous values of economic income.

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الجدل بين التكاليف المباشرة والإجمالية في ظروف التضخم هل من نهاية؟

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يتسم الشعور العام في مهنة المحاسبة والدوائر المحاسبية الاكاديمية بالحاجة الملحة في الآونة الأخيرة إلى التغيير في طرق المحاسبة التقليدية بسبب التضخم وما له من أثر في إفساد النتائج المرجوة من القوائم المالية التقليدية. ويتناول البحث الحالي المقارنة بين طريقة التكلفة الاجمالية (المستوعبة) وطريقة التكلفة المباشرة وأثرهما على القوائم المالية في إطار نموذج التكلفة التاريخية وفي ظروف التضخم.

وقد استخدم نموذج محاكاة لمشروع اقتصادى في ظروف داخلية وخارجية مفترضة لتوليد بيانات تجريبية لهذا البحث. أما معيار المقارنة بين طريقة التكلفة الاجمالية وطريقة التكلفة المباشرة في نموذج المحاكاة فهو مشتق من هدف المحاسبة في إعكاس القوائم المالية للتدفق النقدي المستقبلي.

وقد أخضعت بيانات نموذج المحاكاة للتحليل الاحصائي من أجل النتائج. وفي الظروف المفترضة لنموذج المحاكاة فقد وجد أن بعض المفاهيم المحاسبية التقليدية تتفق أكثر مع فكرة التدفق النقدي المستقبلي عن المفاهيم الأخرى ولكن هذا الفرق ينقص بزيادة معدل التضخم. وعموما فلا توجد مجموعة من المفاهيم المحاسبية التقليدية تتفق بدرجة جيدة مع مفهوم الدخل الاقتصادى.

Book Reviews

Fiscal Analysis of Ibn Khaldoun*

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In this article fiscal writings scattered in Ibn Khaldoun's famous work ELMUQADIMA will be collected and rewritten in a fiscal language. Few people may have come across Ibn Khaldoun's writings in this field. His writings on the growth of tax structure caught the attention of the writer as they reflect the impact of both taxation and expenditure policies on the economic life of the period studied by Ibn Khaldoun.

1. The Growth of Tax Structure (1p.279)

The tax structure of societies studied by Ibn-Khaldoun passes through certain stages reflecting the political and cultural developments in any society. The first stage according to Ibn Khaldoun is when 'El Wazie' or total tax burden is little or put differently adverse effects are minimal and 'Elgumla' or total revenue is adequate. At this stage the state adheres strictly to religion and bedoine culture prevails while only few levies are imposed such as Zakah, Jeziya, Kherag and fees levied in strict adherence to Islamic sharie. According to Ibn Khaldoun such few levies will have little tax burden consequently people will be encouraged to work hard and therefore 'Itmar' or economic growth takes place.

A second stage as 'Itmar or economic growth takes place; a political change occurs and pious rule is replaced by autocratic rule with lavish consumption spreading from the rulers over to the whole society. Due to increased "Itmar" more revenues are collected from tax bases that expanded following increased economic activities and imposition of new taxes.

*He is Muhammad Ibn Khaldoun Al Hadrami born in Tunis 1322 (for a short biography see (2.)

Taxes on sales on town gates and increased rates on Kherag (or land tax) were major sources of revenue, at this stage, used to meet the lavish government consumption.

A third stage starts as a result of increased levies which lead to reduced incentives to work, as a result, 'Itmar' will be reduced which will in turn reduce revenue base and ultimately less revenue. The government not knowing the real cause of the fall in revenue collection will raise tax rates or may introduce new levies to compensate for lost revenue and to finance the deficit. The vicious circle will continue leading to less 'Itmar' due to adverse effects of new and increased levies on work efforts and incentives to invest. For Ibn-Khaldoun the main factor that fosters 'Itmar' is less taxation on those who contribute more towards 'Itmar' or whom he called "El Mutmireen"; less taxes encourage individuals to work hard and enable them to reap the best of their work.

2. Tax Handles at the Third Stage and their Impact on Itmar

Faced with financial imbalance as a result of lavish government consumption and reduced tax revenues due to reduced 'Itmar' the state resorts to extra levies and increased rates on sales and market fees. It may introduce 'Gibala' whereby Kherag revenue will be given to one person in lieu of fixed payment or it may resort to expropriation of property owned by its officials through 'Gibala' or through other means.

More seriously, for Ibn Khaldoun, the government in an attempt to close the gap between its expenditure and revenue may undertake some commercial or agricultural activities. This in his view may have detrimental effect on private business. The government enters a market which was previously under conditions of free competition; and with its huge financial resources it will monopolize the market as a monopolist and a monopsonist. This situation will hamper traders and farmers who will sell cheap to the government and buy from it at higher prices, and to lead to a decline of working capital. A recession will start and tax revenues will decline, a decline that may outweigh profits accruing to the government from those activities. In, his view, it is more beneficial to the government to allow traders and farmers to compete freely as this will increase 'Itmar' and consequently more 'Gibaya' or tax revenues.

Reduced government expenditure due to reduced revenues will

ultimately lead to reduced Gibaya or tax revenues said Ibn Khaldoun (1p.286); when the government reduces its payment to the public, this will in his view reduce 'Gibaya'. For Ibn Khaldoun the state is the instigator of 'Umran' or economic well being. If the government collects taxes while not spending those funds, incomes of government officials will be reduced which will in turn reduce their expenditures. As their expenditure represents a sizeable portion of the total expenditure recession takes place and traders profits will be reduced. Reduction of trader's profits will lead to reduction of tax revenues and at the end "Itmar" or economic growth will decline.

3. *The Final Stage: Further Analysis (lp. 296)*

With political tyranny that dominates the final stage extravagance prevails among the ruling classes and it spreads to the public. The government in order to meet the lavish desires of its citizens increases their pay leading to more extravagance among the whole population. New taxes on sales will be levied by the government seeing the lavish life of the urban population as a sign of ability to pay such taxes, as well as using such levies to finance increased government expenditure. Despite such levies, the financial imbalance continues and to meet growing expenditure the government resorts to more unjust measures such as confiscation and expropriation of properties held by wealthy government officials. More serious, seeing the weakness of the government discontent among soldiers starts and they challenge the authority of the government; to stop political unrest and to please the army the government increases the army's pay and to meet those expenditures Gibaya had to be increased.

4. *Adverse Effects of Injustice on Economic Growth (lp.286)*

Ibn Khaldoun argues that the main cause for the destruction of the economic life is injustice. When governments confiscate or expropriate people's properties, an unjust act; people will loose interest to increase their properties hence further investments will be stopped.

5. *Urban Levies and Their Impact on the Cost of Living in Urban Areas visa-vis Rural Area (lpp. 364—372—395)*

Ibn Khaldoun gave an explanation to a phenomenon that prevailed

during his time that prices were higher in urban areas compared to rural areas. He attributed this to levies that were imposed on sales, market fees and other levies on urban population while no such levies were imposed on rural population. These levies were imposed due to luxurious life prevailing among urban population at his time and such levies were in turn shifted to prices of goods by traders. Traders, in Ibn Khaldoun view, when pricing their goods add all expenses they meet including those of levies imposed on their trade on the price of goods sold. Such levies according to Ibn Khaldoun will lead to rising prices in urban areas and urban population will face a situation whereby their expenditures go beyond their incomes, the privileged become more hypocrite while they masses get poorer, recession prevails and 'Itmar' will decline due to extravagance and extensive urbanization.

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