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A MODEL FOR EVALUATING PRIVATIZATION FEASIBILITY FOR A DEVELOPING COUNTRY

Key Words

Privatization; Production Function; Strong Monitoring; Incentive; Production Factors; Decision Analysis Matrix.

Abstract

Privatization is one of the most discussed topics in current economics. It seems to be treated as the major tool to revitalize, turnaround and/or magically cure all problems that have accumulated over the decades of existence of public ownership in various countries. While some of the theoretical foundation behind "privatization" may agree with this statement, it is essential to stress that ownership arrangement is only one of many factors that play a role in revitalization. This paper examines privatization in the following steps: First, discussion of privatization theoretical foundations, advantages and disadvantages in general terms. Secondly, develop a general model along with a graphical rendition so that basic elements of privatization and their interrelation can be analyzed and discussed. Thirdly, derive and define a logically acceptable scale on which we could measure, rank or otherwise quantify the total utility or disutility of privatization for the case in question. Finally, as an example, apply the general privatization model to the Kingdom of Saudi Arabia.

Introduction

Privatization is one of the most discussed topics in current economics. It seems to be treated as the major tool to revitalize, turnaround and/or magically cure all problems that have accumulated over the decades of existence of public ownership in various countries in the world.

While some of the theoretical foundation behind "privatization" may agree with the above statement, it is essential to stress that ownership arrangement is only one of many factors that play a role in revitalization.

We deal with the subject in the following sequence of steps: First, discussion of priva-

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tization, its theoretical foundations, advantages and disadvantages in general terms and development of a general model along with a graphical rendition so that basic elements of privatization and their interrelation can be analyzed and discussed. Secondly, we derive and define a logically acceptable scale on which to measure, rank or otherwise quantify the total utility or disutility of privatization for the case in question. In the process, criteria for privatization will be explained. Finally, as an example, we shall apply the general privatization model to the Kingdom of Saudi Arabia.

Privatization: Some Introductory Remarks

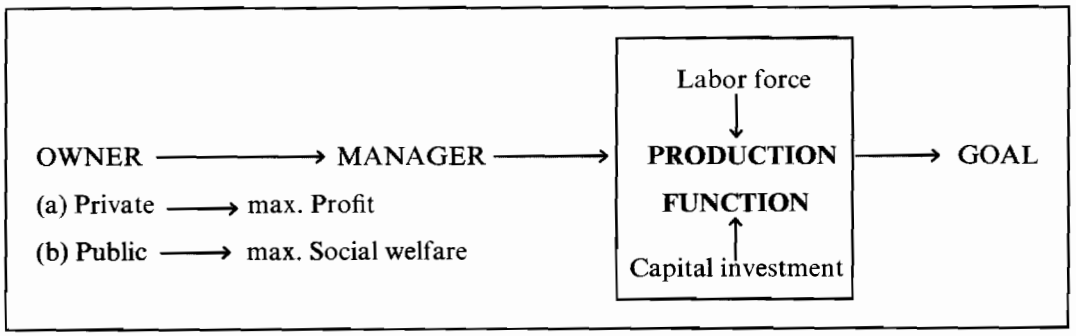
Generally speaking, privatization is the transfer of an ownership from public to private. The underlying *reason* for *such ownership transfer is one of a theoretical rise of productivity*, i.e. improvement of economic performance through more effective utilization of production factors, labor force and capital investment.

There are three additional gains and a potential problem of privatization, particularly for countries with highly underdeveloped private sectors and with cultural and historical traditions anchored in the market mechanism. **(1)** Privatization provides additional governmental resources, not merely from sale proceeds and eventual tax collection, but also from reduced expenditures on state subsidies. These resources can be subsequently used for various other projects. **(2)** Privatization speeds up necessary transfer of modern technology to obsolete public industries. **(3)** Even more importantly, yet not universally proven, is the benefit that accrues for the economy as a whole through the broader application and acceptance of the market mechanism.

On the other side of the coin, privatization without thorough planning can create further polarization of wealth and hence a potential for problems.

Further to develop the model for the privatization system, we assume that there exist several basic elements of any production unit, namely: a principal (owner), an agent (manager), a Production function and a goal. (See Figure 1)

Figure 1
Privatization System Model Basic Elements



The owner can be a private person or a group of persons, in which case we call the set up private ownership **(a)** or it can be government, in which case we call it *public ownership* **(b)**.

The manager is an appointed agent responsible to the *principal* for maximization of the *goal*. A *production function* (with its two main factors *labor force and capital investment*) defines the type of business or service in which the establishment serves the economy through its products.

The *goal* can vary considerably. In the environment of private ownership **(a)** the goal is usually the maximum profit. The goal can be achieved by 1) minimizing capital and labor costs, or 2) by increasing the production and sales with the same unit profit margin thereby decreasing relative overhead costs , or 3) in extreme monopolistic situations, by increasing prices. However the goal is achieved the essence is always the same, i.e. *maximizing profit through the market mechanism.*

Public ownership **(b)** has, on the other hand, different types of goals. They can be summed up as maximizing *social (public) welfare.*

In general, the owner, while not having the full information about the production processes involved, wants to induce the manager to act in the owner's interest. Managers, however, attempt to maximize their own benefit. This leads to the "owner → manager" coexistence theory which is concerned precisely with the problems of information, monitoring and incentives. (See Figure 2)

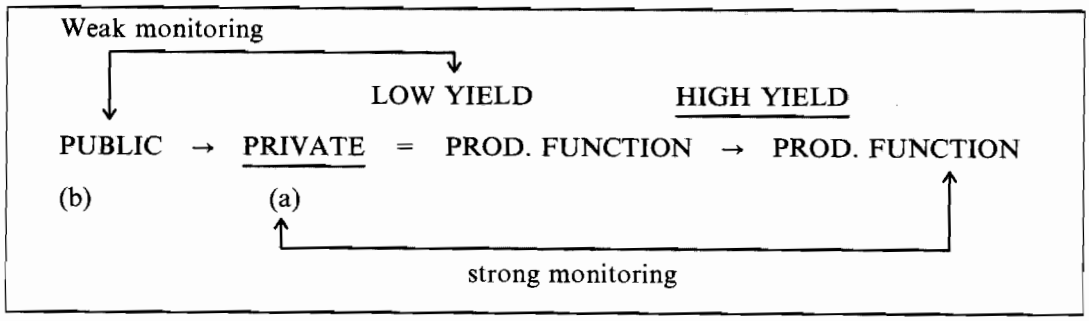
Figure 2
Owner - Manager Coexistence

No matter what type of ownership (**a** or **b**) we investigate, the monitoring *of firm management creates the biggest problem for the owners.* Typically, two situations arise: first that, enterprises have a complex production function that no owner, single or multiple (as in a shareholder situation), can be expected to grasp its complexity. Second, that enterprise is not so complex, but the owner(s) have no practical business experience. In any case, the drive to solve the problem of monitoring virtually creates a new industry of *management monitoring.*

In addition to the above comments, when a firm is transferred from the public sector to the private sector, the introduction of shares creates a market for corporate control. It can be argued that, whatever other implications of privatization may be, *the transfer of ownership will, under the assumption of strong management monitoring, produce powerful incentives toward internal efficiency in allocation and optimal use of production factors in production function.* Thus, a simple graphical equation in Figure 3 represents the statement:

There is obviously a way to improve the internal efficiency of major public firm(s) without going through privatization. We have already touched upon this topic when discussing Figure 1. The public enterprises should be confronted with competitive forces either by 1) allowing private firm(s) into the sector, or 2) by splitting the public utilities monopoly into several smaller "rivals". This will create *competitive threats for the managers of public firms, which might enhance internal efficiency.* However, even in this situation *effective management monitoring is a necessary prerequisite for both types of ownership to work.*

Figure 3
Monitoring Effect on Production



We can say that in a public environment **(b)** there exists, theoretically, three potential sources of disadvantage in the framework of control for publicly owned industries see Vickers (1988: 34):

(I) A preference for direct political intervention in managerial decisions between government and the firm which is supposed to closely monitor the setting of appropriate managerial incentive structures (which would otherwise require the right mix of proper monitoring and deep knowledge of the industry).

(II) Internal inefficiencies in bureaucracy. This case is typical in developed and developing countries alike where young inexperienced graduates are brought into positions wherein they are expected to oversee and regulate businesses. Without specialized training and lack of incentive to create or be creative, the industry is apt to be inefficient.

(III) *Inefficient levels of bureaucratic activities.*

At a more practical level, it is useful to regard the problem in public environment **(a)** as a "contest" between the government and the firm. With regards to possible strategies, the firm has to make decisions about prices, outputs, capital & labor investment, product quality, product innovation, etc. The government might seek to regulate some of these variables (for example prices, product quality, etc.). From statements **(II)** and **(III)** above, it follows that the government is unlikely to be able to regulate other aspects of the firms' commercial environment. The government can condition its policy only on deep knowledge of the firm. Two fundamental problems are thus left unsolved: **(1)** Capital investment that cannot be altered in the short run because sunk costs are involved, and **(2)** The level of firm's pricing and other economic policies that should exist theoretically from the point of economic efficiency.

There is a substantial difference in the approach to capital investment between the public owned and private owned firms. In the public environment **(b)** firms get their financing from governmental fiscal sources. This often means that *the subsidy or government borrowing creates a burden on the rest of the economy. Typically, taxing either income or some most used products or services is usually greater than the originally required financing of* **(b)**. In the long run, especially when government revenues do not grow fast enough, there is inherent danger of not having enough funds to support social infrastructure that could eventually result in future problems.

Privately owned firms in environment **(a)** can raise the investment requirements either via emission of (new) marketable shares (assumedly sold at foreign and domestic bourses) or by direct borrowing from banks or individuals.

Conditions for Privatization in a Country's Economy

Development of a Model:

Consider the situation of a private firm supplying homogeneous goods, and *suppose that*, according to the principal - agent theory mentioned previously, managerial *incentives to engage in cost-reducing activity are imperfect.*

Hence, manager is rewarded only partially for the benefit that the owners receive from cost reduction. To reflect this assumption we say, see e.g. Vickers (1988: 35) that the manager in a private environment **maximizes** profit π

$$\pi (q,x) = [p - c(x)] q - ax \qquad (1)$$

Where **q** ... is the output level, **x**... is expenditure on cost-reduction activities, **p**...is price, **c (x)**..... Is unit cost, and **a** measures the cost of effort to the private manager relative to the benefit to him of greater profit. Then, the following situations can happen:

When $a = 0$ (2)

The manager is not paid and thereby is not producing. Thus the element $ax = 0$, meaning that profit (would be instantly bigger; however , the enterprise would fold quickly. This situation is therefore out of the question.

When $a = 1$ (3)

The manager would have the "right" incentives for effort as he would be a profit maximizer and since $ax = x$, the owner is spending the minimum expenditure on cost-reduction activities . As this situation is also virtually impossible to contemplate, we should generally assume the last alternative.

When $a > 1$ (4)

This situation has imperfect incentives, whereby the manager is perhaps paid more (and thus his effort is less) than the actual achieved cost-reduction; still, there is a cost reduction of sorts. Finally; when

$$a < 1 \qquad (5)$$

Which means a is from the open interval (0,1), then the owner is spending less than the minimum expenditure on cost-reduction activities; the enterprise would fold quicker the a is closer to zero; but it would eventually fold nevertheless even if a is close to 1.

In a public environment **(b)**, **The** manager of the public firm is assumed to maximize economic welfare W,

$$W(q,x) = V(q) - cq - bx \qquad (6)$$

Where **V(q)** ... is consumer utility from output **q** and **cq** ... is cost of producing the output **q** .

Assume that the parameter b (equivalent of the parameter a in equation (1)) measures the cost of the effort to the public manager relative to the benefit to him of greater social welfare . If public and private monitoring systems were equally effective and incentives equal, we would have

$$a = b \qquad (7)$$

But, as Figure 3 suggests, and the discussion in the following section (Ownership and

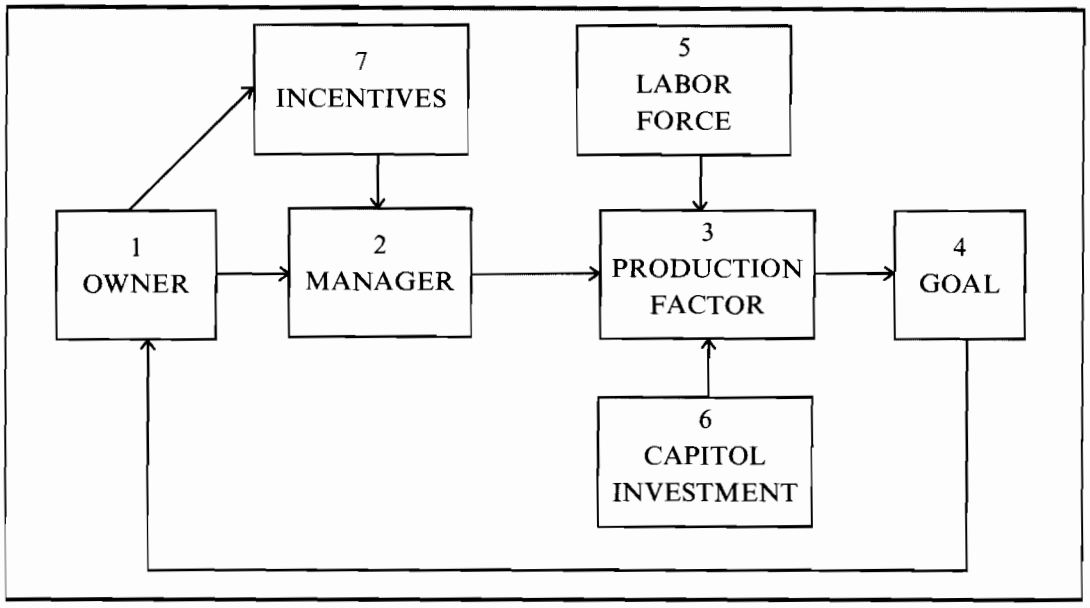
Monitoring) proves, it is clear that equation (7) is not expected to hold in reality.

Production Function and Production Factors:

As we look again at Figure 1, we find that in addition to the environmental differences between the public and private sectors, the production function is the heart of the whole privatization question. A necessary condition of Socio-economic progress is more cost-effective production of goods and services.

To achieve a cost-effective production, however, we must add *incentives* to the production system's factors. The resulting graph, Figure 4, will be used for more detailed analysis and modeling of the privatization specifics.

Figure 4
Cost-Effective Production System Factors



Ownership and Monitoring:

Let us start with "OWNER " (block [1]). In private environment (a) the owner(s) are either shareholders or single owner(s) , in public environment (b) the owner is the state. Both owners have one goal in common: to devise an appropriate "INCENTIVE" Schemes (block [7]) for their "MANAGERS" (or Agents) (block [2]) to be effective. The level of attractiveness and benefit for blocks [1] and [2] is directly dependent on the quality of "MONITORING", a loop from block [4] to block [1]. Therefore, we postulate:

Proposition:

As a rule, in private environment the incentives are keener and the monitoring system is better and stricter than in public environment. Therefore, in private environment (a), instead of equality in equation (7) we have

$$a < b \qquad (8)$$

This means that private managers achieve greater internal efficiency than public Managers.

Proof:

Assume that the public monitoring mechanism is no less efficient than the private monitoring mechanism. We stress this assumption by rewriting equation **(7)** as

$$a > b \qquad (9)$$

Due to statements on control of publicly owned industries, even equivalents to $(a = 1)$ and $(a > 1)$ are difficult to contemplate and thus it leaves only the alternative,

$$b >> 1 \qquad (10)$$

Where $>>$ means "significantly bigger than 1". From inequalities **(10)** and **(4)** we see that assumption **(9)** is false and hence the proof.

Two issues may be remembered: Firstly, there is a symbiotic relationship between public and private sector. In lit. Nguyen (1989 : pp.107-108) We read: ".... *Without the... Public sector that provides internal and external security, and a basic infrastructure, the private sector can hardly develop...*". Secondly, private firms' monitoring even in a developing country may well be as

Sharp and timely as in any firm in developed country. Indigenous owner (s) can theoretically bring any number of top specialists and professionals from virtually anywhere, given the right incentives.

Managers and Incentives:

Let us continue with Figure 4 , "MANAGERS" (block [2]) and "INCENTIVES" (block [7]) are vitally important to the privatization analysis for it is there where the two sectors, **public** and **private**, differ the most.

Managers' behavior in public sector **(b)** is shaped by the fact that: **1)** The (public) owners do not typically seek to maximize profits and thus the institution of monitoring and incentives is not vital to them as to the private owners. **2)** There are no marketable ordinary shares in the firm and thus the management does not have such a keen and immediate sense of responsibility to shareholders. **3)**There is no direct equivalent to the bankruptcy and/or takeover threat immediately following bad performance.

Managers' behavior in private sector **(a)**, whose elements we denote by a "hat"...$\hat{}$, is described below :

Suppose the firm's managerial utility is given by U(x), where derivatives $Ux < 0$, $Uxx < 0$, and where x can be interpreted as *either the level of managerial effort* on cost-reducing activities *or as a measure of the internal inefficiency* of the firm. The rationale here is that the negative weight attached to x captures the "benefit" from easing the pressure on the wages and effort levels of workers in the industry. Let $x\hat{}$ be the effort level associated with the optimal contract equation (3) for which $U(x\hat{}) = 0$. We can also assume this to be the utility of the management in the event that the (inefficient) firm becomes a takeover victim. It is further assumed that the **market value of the firm is an increasing function of effort such that higher effort** reduces the probability of takeover.

Suppose now that the probability of takeover, conditional upon the firm having survived until time t , is $h(x ; O)dt$, where $\mathbf{hx < 0}$ and O is a parameter affecting the relationship between effort and the likelihood of takeover.

The function h(.) Is called the **hazard rate** in reliability theory. Under these conditions the discounted present value of expected managerial utility could be given by:

$$U(x) / r + h(x;O) \qquad (11)$$

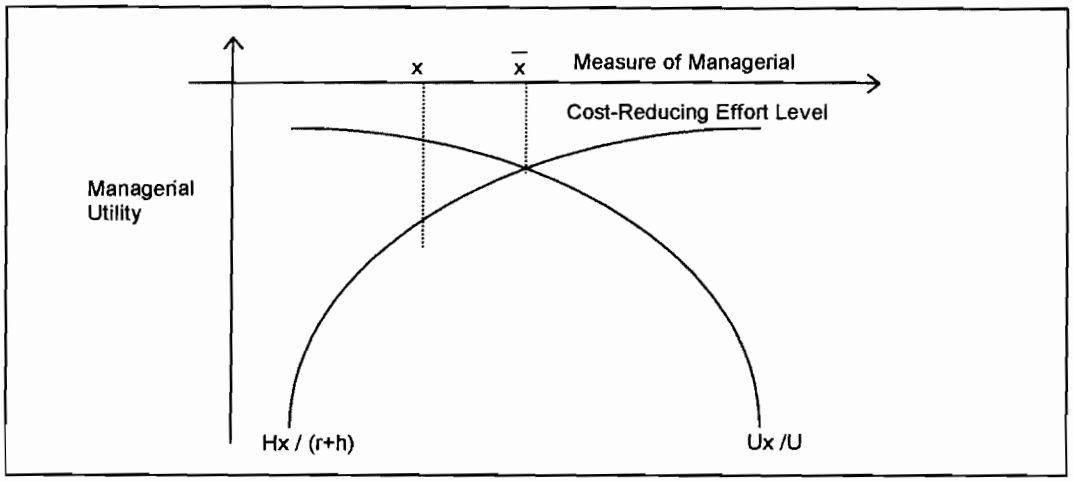
Where r is the discount rate whose increase (from r to r + h) the managers apply to future utility in case of the takeover threat.

Maximizing **(11)** with respect to x yields the first-order condition

$$Ux / U = hx / (r + h) \qquad (12)$$

In lit. Vickers (1988 : p.20) we read: "... the equilibrium level of effort is therefore determined by the condition that the marginal proportionate increase in utility consequent upon a reduction in effort is equal to the present value of the marginal increase in the probability of takeover, where the latter is calculated at a discount rate equal to r + h ..." Properties **(10) - (12)** and management behavior (discussed herein) with equilibrium level **X** are represented by Figure 5.

Figure 5
Manager's Behavior in Private Sector



The vertical axis is one of *management utility* while the horizontal x-axis denotes *measure of managerial cost-reduction effort level* also known as internal efficiency of the firm. Since **x** denotes rather *internal inefficiency* of the firm (as has been discussed earlier) it is clear that any move of **x** to the right on the x-axis signals greater inefficiency. Two curves, one representing *hazard rate derivative over extended discount rate* (increasing) and the other representing *derivative of management utility over present utility* (decreasing) , provide an equilibrium point **x**.

As long as management in the private sector **(a)** feels the threat of bankruptcy or takeover it changes its effort and acquires greater internal efficiency shown by an increase of the absolute value of the derivative of hazard rate in hx. This shifts the right-hand-side of equation **(12)** downward ($hx < 0$) and hence moving $x^{\wedge}$ to the left on the x-axis's (See Figure 5).

The managers in the public sector **(b)** usually do not need to fear any financial crunch (in which the firm may perish), nor do they fear any sharp control counter-policies tying their own payoff to the management

effort from the government side. Instead, they let the managerial discount rates, (r + h), in equation **(12)** raise, whereby the right-hand-side of equation **(12)** shifts upwards and x moves to the right of the x-axis. Therefore, the following corollary can be formulated:

Corollary:

Publicly owned enterprises in sector (b) , particularly in developing countries, usually feature poorer performance than the comparable enterprises in the private sector (a) owing to the built-in lack of incentives of their managers and the lack of proper monitoring .

Proof:

The corollary stems directly from our discussion on ownership and monitoring and from the discussion of Figure 5.

Production Factors:

Production factors are usually simplified into "LABOR FORCE" (block [5]) and "CAPITAL INVESTMENT" (block [6]) of Figure 4.

Labor Force:

We start with block [5] because, for the sake of efficient functioning of both public and private sectors, it is necessary to have a pool of skilled labor force from which to choose. This can be a problem in developing countries. Some of the fast developing countries' private sector **(a)** solves this problem by hiring a large quantity of expatriate specialists and managers, sometimes at the expense of their own young talent.

The situation in their public sector is complicated by the demand for maximal utilization of the indigenous labor force (no matter how skilled and ready to contribute to country's well-being it is) on the one side, while the main goal of increasing the public (economic) welfare demands employment of quite a number of expatriate specialists on the other side.

One very important factor in the drive for privatization that concerns labor force and owners alike is strictly behavioral, i.e. people's thinking, habits, behavior and aspiration derived from the culture and traditions of their country. There has hardly ever been a direct causal relationship between the industrial (and technical) base and the cultural "superstructure" (in terms of Karl Marx' theory). At best, such a relationship is one of association. However, momentum of the cultural superstructure (that contain the people, hence the labor force) is always much greater and thus more difficult to change, than that of the industrial base and infrastructure.

To put it differently; *either the people (i.e. the labor force and potential owners of the enterprise alike) are ready for privatization or they are not; in which case no regulation, laws, economic policies, etc. can change it.* There are two **major economic problems : (I)** Lack of experienced managers who can think strategically to avoid both short-term shirking (when managerial discount rates are raised) and internal inefficiency (letting the absolute value of the derivative hx decreases). (See discussion of equation **(12)** and Figure 5). **(ii)** How to change the attitude of the older generation who still work for token wages that have nothing to do with their qualification and their potential. See Karasek and Quotah (1995), and Azzam (1996).

Capital Investment:

The second production factor in Figure 4 , is "CAPITAL INVESTMENT" block [6]. It is, indeed, the cornerstone of privatization. There are two main sources of financing the capital investment.

1) Internal financing, which is to make the shares or stocks of emerging establishments in the private sector **(additional resources)** available to local corporate and individual investors.

Two inherent problems, See Ispen (1994), with the internal financing for privatization in developing countries, particularly in the former COMECON countries, have appeared frequently. The following observations:

Many companies (particularly in Poland, Hungary and the Russian Republic) have been sold-off to the private sector but they are still run by the same managers and are operating in the same largely protected markets as they did under state control. If we look back to the **discussion on managers and incentives** and COROLLARY we see that this is a sure way to economic decline if such management continues.

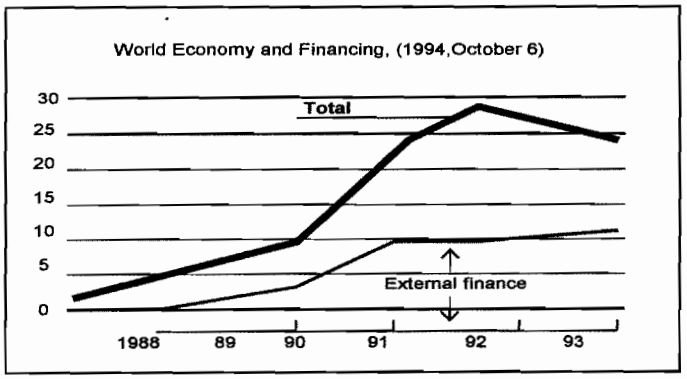
Even stronger negative effects have been seen when privatizing companies is done using a Voucher system (as it was used in the Czech Republic). Under this system, governments issue vouchers to citizens in lieu of cash to compensate for the lack of buying power among the public and thus to enable the transfer of ownership to take place . *But the voucher system does not introduce new capital or new management to the privatized companies .*

2) External financing, is where incentives, such as, a cheap local labor force and/or raw materials, tax havens, tax holidays, duty-free zones, repatriation of the relevant part of the profit, and, political stability can be seen by external investors to be feasible enough to invest. This type of financing represents the most viable way to finance and, indeed, privatize the projects in developing countries.

There are endogenous constraints to such financing; e.g. governmental policies in a given country may regulate the percentage share of foreign ownership, its geographical and/or political origins, etc. The *exogenous constraints* are independent of the recipient country's wishes and expectations. If the external sources of (capital) investment do not fancy the risk attached to the donor country's socio-economic and political climate (inclusive of legal framework) they simply will not invest there.

We can see the development of both types of financing, (a) and (b), in developing countries within the period (1988 - 1993) in Figure 6 (source from the World Bank, Financing Survey, 1994).

Figure 6
Privatization Proceeds in Developing Countries ($bn)



EVALUATION OF PRIVATIZATION STRATEGIES:

Any strategy evaluation is a decision analysis at its best and one of its most useful applications, because each strategy presents an alternative. It is also known that comparison of alternatives can be done even when some or even most of the factors are qualitative (behavioral, hedonic, etc.) since such factors are very difficult to quantify.

Elements of Decision Analysis:

Definition:

An alternative is a grouping of factors (operating together for a well-defined purpose) that interacts with its environment through the INPUT and OUTPUT factors. The INPUT FACTORS are those regarded for every alternative to start functioning as it is supposed to, while the OUTPUT FACTORS are, in fact, products of the alternative's functioning and as such they actually measure the alternative in terms of pay-off.

The above DEFINITION delineates minimally two factors (one *input* and one *output factor*) in the simplest alternative; the very graphical representation would translate into the term factor -tree. Then the modus operandi of the decision-making is to split the alternatives along the *factor-trees* such that *utility* of each individual factor can be assessed or measured. The number of these factors should be kept to a minimum so that we do not lose the proper perspective and the sense of proportion.

A graphical example of a factor tree is presented in Figure 7. Let A(k) denotes the k-th alternative , k = 1 ....N , featuring three *pivot factors*: F1 , F2 and F3 . These are the stems from which further branching originates, Karasek (1985: pp.20-40).

The question now stands: How to assess and evaluate various factors' scales with phenomena like "attitude", "skill", "aggravation" etc., so that such a multi-factor alternative can be assessed by one and only one characteristic ?

Of all possible conversion scales, only numbers (cardinal, ordinal) meet the requirement . If we are able to attach a certain numerical value to each factor, then the whole multi-factor alternative, in which the factors are heterogeneous, could be appraised in terms of homogeneous numeric.

To this end we adopt the scoring technique of White (1968). The technique transforms the so called "worth" of every factor and/or alternative into the bounded scale of rational numbers between 0 and 1. Such a one-dimensional scale and its verbal interpretation are seen in Table 1. We shall call the values in interval $<0,1>$ universal score function (USF) denoted as (f). They also happen to express our assessment of individual factors' utility (convenience) with regard to a given goal.

Table 1
Score Function Associated with Transforming Factors Worth

SCORE ; USF (f)	INTERPRETATION
1.0	excellent
0.8	good
0.6	fair
0.4	poor
0.2	bad
0.0	worthless

Calibrating the factor scale (for heterogeneous factors) and a detailed discussion of the methodology is available in Karasek

(1985). The final stage of a factor tree consists of *significant factors*; such factors that do not initiate any further sub-branching.

The final ingredient is the *system of importance weights* denoted as (w). The principle is similar as for determining the USF, i.e. via a transformation table seen in Table 2, based on White (1968).

Table 2
Decimal Scale Conversion of Importance

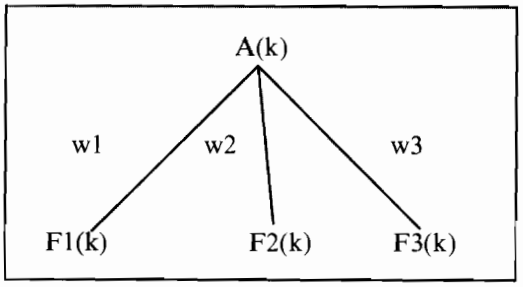
WEIGHTS (w)	LEVEL OF IMPORTANCE
0.1	extremely important
0.9	highly important
0.8	very important
0.7	important
0.6	fairly important
0.5	probably important
0.4	of some importance
0.3	of little importance
0.2	of very little importance
0.1	unimportant
0.0	no importance whatsoever

The total assessment , a, of the factor-tree-modeled alternative A had originally in lit White (1968) used weighted geometric average. However, in lit. Karasek (1985) it is proven that weighted arithmetic average of the form

$$a = \sum_i (wi \,.\, fi) \,/\, \sum_i wi \qquad (13)$$

is a good approximation of the weighted geometric average. It is easily computable and understandable and it would behave better when errors in factors' USFs are considered . An example of assessment of the three three-factor alternatives, based on formula (13), Where k = I, II, III; is seen in Figure 7.

Figure 7
Three-Factors Alternatives



The following equations are derived:

$$a(I) = \frac{w1 \,.\, f1(I) + w2 \,.\, f2(I) + w3 \,.\, f3(I)}{w1 + w2 + w3}$$

$$a(II) = \frac{w1.f1(II) + w2.f2(II) + w3.f3(II)}{w1 + w2 + w3} \qquad (14)$$

$$a(III) = \frac{w1.f1(III) + w2.f2(III) + w3.f3(III)}{w1 + w2 + w3}$$

From equations (14) and the factor-tree in Figure 7 it is clear that *the basic factor-tree together with its importance weight system become constant*. What vary *are only assessed utilities of individual factors pertinent to each alternative*.

A useful element of the alternatives' assessment technique, especially for a larger number of *significant factors*, is the *analytical matrix* whereby the first two rows would contain significant factors and corresponding significant weights, Karasek (1985: pp.80-85, p.92) and the other k rows would feature USFs for each individual significant factor for each k-th alternative .

The last element of the technique is *error analysis*. The error analysis gives the answer to a poignant question: How does a particular error in assessment (or judgment) of USFs

affect the final ranking of alternatives? To put it differently: What maximum error is tolerable for a particular significant factor's USF (significant weight) so that given ranking remains unchallenged ? The error analysis is explained and discussed at length in Karasek (1985).

APPLICATION OF THE PRIVATIZATION ANALYSIS METHODOLOGY FOR SAUDI ARABIA

Elements of Owner---Manager---Production---Goal---Monitoring System (Figure 4)

"OWNERS" block [1] & "MANAGERS" block [2] :

The history of wealth in sector **(b)**, privately owned by the Saudi owners-principals, parallels the history of oil revenues. In the 1970's and early 1980's when oil revenues were huge and economy overheated, virtually every private enterprise had Western expatriates in the management positions and in most of the skilled labor positions, while non-Western expatriates occupied non-skilled positions. With the decline in oil revenues in the 1980s and 1990s the private sector was confronted with enormous reduction in the manpower budget. Competitive bidding procedures for major labor intensive contracts led a number of Saudi contractors to resort to less costly human resource markets to satisfy their expatriate labor needs to maintain or increase their profits. This was intended to serve as a "cost saving" device to the Kingdom, but in reality these workers and managers seem to be far less productive. What actually happened could be easily seen theoretically in Figure 5 when managerial inefficiency pushes x to the right of x-axis .

"MONITORING" (A loop from block [4] → block [1]):

Monitoring starts with the expatriate-substitution process. Despite the low productivity of the cheaper labor, Saudi contractors were successful in using the low-cost argument to convince economic planners (i.e. "MONITORS") and kept hiring the cheap labor in great numbers. This *process of selecting the alternative of short-term gains resulting in long-term decline*, was continually repeated, (See Figure 5).

Similar arguments slowly permeated into the private sector **(a)** too. Some of the Saudi owners decided to monitor their enterprises themselves, believing that a fresh university degree was all that was needed to fulfill the role discussed in **Figure 2 and Figure 3**.

"LABOUR FORCE" block [5]:

The Saudi economy has been traditionally supported and dependent on expatriate labor. This trend is likely to continue for several reasons: 1) The continuing divergence between the talents and skills of the indigenous labor pool and the talent and skills that are needed.2) The refusal of some Saudi nationals to fill certain unskilled positions, (See Manpower Focus: Labor in Saudi Arabia, 1988).

"CAPITAL INVESTMENT" block [6]:

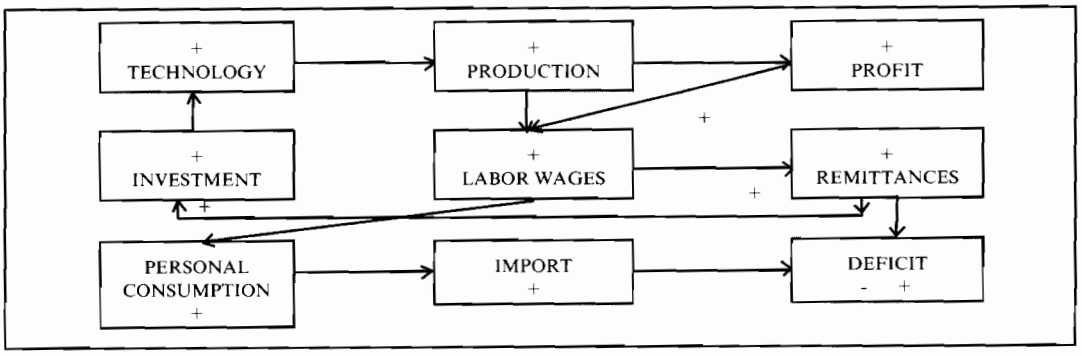
Capital investment has special importance in the economic growth and history of Saudi Arabia. Due to the huge crude oil deposits and a jump-start in their large-scale recovery and lifting, the huge revenue enabled the Kingdom to build industrial & socio-economic infrastructure. This served as a stepping

stone to future development of mostly publicly owned downstream industries, civil aviation, road & rail transport, shipping and other key industries. As the industrialization of the Kingdom grew, the expatriate labor force soon reached the record of almost 75% of the total labor force in 1982-84. (See Saudi Arabia to the 90s. 1989).

The number of active investors in Saudi Arabia is still very low, this due to several factors. There are *no incentives for investment inputs from the Saudi population in the local economy*. Foreigners cannot own nor invest in the local private sector. The banking sector has just recently been waking up to modern investment outlets. *Money leakage's*, in terms of Remittances of expatriates to their home countries or other foreign investment opportunity by Saudi. In lit. Azzam (1996) we read: "*...the number of active investors in the Gulf region as a percentage of total adult population is still very low, on the average less than 5 percent, compared to 20 - 30 percent in the developed world...*"; This is due to lack of information and education given in this particular area to the general public. And yet, according to The Financial Times (Equity Souk Open for Foreign Business, Feb. 20, 1995), there is an: "*untapped huge market in Saudi Arabia with a capitalization around $50bn.*" which, in the uncertain crude oil futures, may yet become another welcome and necessary source of the country's revenue.

One way to slash deficits and, at the same time, ease up government spending on capital investment (which may be invested into social infrastructure instead) is seen in Figure 8. In this graph it is clearly seen that channeling some (or most) of the remittances back into the "INVESTMENT" block along the + arrow from the block "REMITTANCE" yields the - sign (i.e. diminished deficit) in the block "DEFICIT" . It also, through channeling of more technology investment into "PRODUCTION", creates bigger profit that can be partly taxed and thus create additional governmental revenue and partly returned to "LABOUR WAGES" (along another + arrow). Although the increase of "LABOUR WAGES" flow might increase "REMITTANCE" flow, it is equally possible that opening up the investment opportunity for expatriates will automatically channel some of the money back into the economy along "REMITTANCE" ---- "INVESTMENT" flow.

Figure 8
Privatization Control Methodology



It is useful to remind the reader that the government capital investment was absolutely necessary and the only viable condition for the Saudi economic growth . What has been missed was *a concise policy whereby built-in incentives would have assured that much more general public investment capability stayed in the country*. Long-term reasonable-yield government bonds , shares of newly built Saudi industrial ventures with possibility of easy tax-free repatriation of "yield" are just a few examples of what could have been done . The situation was not any better for the Saudi nationals . In fact, even until now the investment opportunities for Saudis, similar to those offered by any other foreign bank , simply do not exist . As proposed in Figure 8, the private investment, which is the backbone of privatization, might well be started by these general public investment schemes.

An Application of the Decision Analysis for Evaluating of Potential Privatization in Saudi Aarbia

To make an initially simple example of privatization strategies that can be derived from the flow-chart in Figure 8 and on which we can discuss merits of the decision technique, let us consider two major *input factors* and a *weight system* that is based on generally assumed priorities . To start the application, we will define "SIGNIFICANT FACTORS" as those that do not initiate any further sub-branching and composite utility of alternative, say, A1 is a significant factor, Karasek (1985: pp.81-84). *Also we will underline the Significant factors.*

F1 ... reallocation of the labor force (with **w1 = 0.8** if it moves proper skills to the newly allocated technological processes); this factor involves blocks "LABOR WAGES", "INVESTMENT", "TECHNOLOGY", and "PRODUCTION" in Figure 8,

and

F2 ..... wealth polarization & potential tension (whose weight , for reasons discussed in potential problem of privatization (4) , is much lower , say, **w2 = 0.4**) ,

and three major outputs factors :

F3 ... direct financial flows to the treasury (here, "well-being" priority gives it **w3 = 0.9**); part of the block "REMITTANCES" used instead of government expenditure in Figure 8,

F4 ..... Increase of productivity and consumers surpluses (with just a notch-down importance weight at **w4 = 0.8**); this is based on additional investment coming from block "REMITTANCES" to block "INVESTMENT" (into "TECHNOLOGY") and also on extra "PROFIT" arrow to block "LABOUR WAGES" in Figure 8, **and**

F5 ... increase of expenditures in the social infrastructure (with the same high priority rating importance as F3; i.e. **w5 = 0.9**); this is direct byproduct of "REMITTANCES" to "INVESTMENT" arrow in Figure 8 that saves part of government expenditures, previously earmarked for production sectors, for use in social sphere .

Pivot factor F_1 can be branched into at least two subsequent factors :

F11 ..... indigenous labor force reallocation (which is considered to be of high priority with **w11 = 0.9** if, similarly to F1, it allows full utilization of indigenous labor) ,

F12 ..... change in the expatriate labor force (whose importance is low at **w12 = 0.3**).

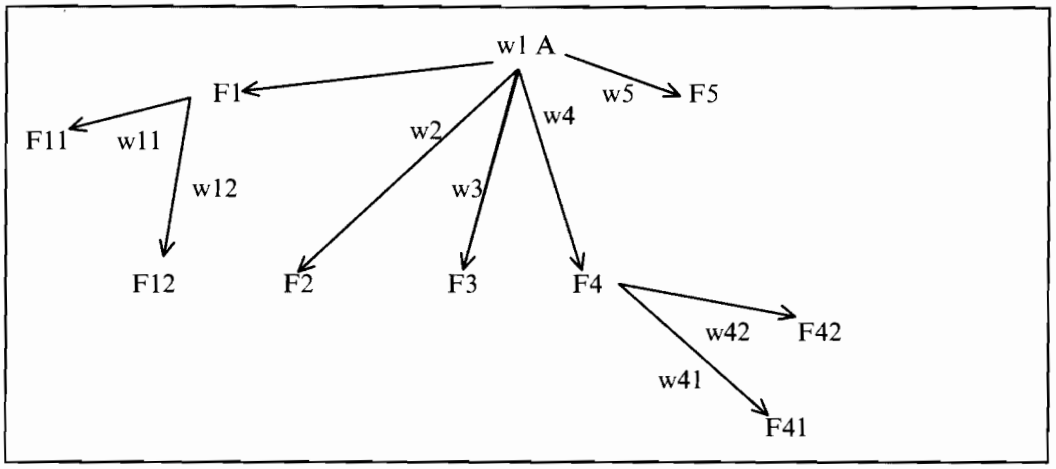
Likewise , pivot factor factor F4 can also be branched into , at least, two factors :

F41 ..... Technology transfer speed-up (Which is highly important with **w41 = 0.8**) is made possible by private flow of investment from "REMITTANCES" block (in Figure 8) to the block "INVESTMENT", See Karasek and Quotah (1995),

F42... increased production (obviously important with **w42 = 0.7**).

The final factor-tree with importance weights discussed above can be then represented by a graph in Figure 9.

Figure 9
Factor-Tree Method with Important Weights



a (1) = o 11 . f 11 + o 12 . f 12 + o 2 . f 3 + o 41 . f 41 + o 42 . f 42 + o 5 . f 5 (15),

where for example SIGNIFICANT WEIGHT **o 11** (pertaining to factor F 11's universal score function , USF , (or ***utility***) **f11**) is calculated as

o 11 = o 1 [w 11 / (w 11 + w 12) (16)

and where

o1 = w 1 / (w1 + w2 + w3 + w4 + w5).

Thus, we can now construct the first two rows of analytical matrix for the factor three in Figure 9, Karasek (1985: pp.85-95] . See Table 3.

Table 3
Factor Three Analytical Data

Significant Factors	F11	F12	F2	F3	F41	F42	F5
Significant Weights	0.157	0.052	0.4	0.9	0.112	0.098	0.9

Now, since the row of Significant Weights is (in relation to each appropriate Significant Factors) **constant** we are free to investigate any alternative or policy of privatization we choose provided that the only variables are individual factors' USFs.

Assume, for the start, three alternatives:

A1 ..... No action on privatization.

A2 ..... privatize (with none or only up to 49% foreign participation) only smaller Establishments.

A3 ..... privatize (with up to 49% foreign participation) only ARAMCO, PTT, SAUDIA and a few other big firms.

It was stated that *universal score functions (utilities)*, USFs, in the analytical matrix change for each individual alternative .

Let us therefore briefly discuss the individual significant factors' *universal score functions* with the help of the USF conversion table in Table 1, assuming that the following USFs of *significant factors* in Table 3, are reasonably close to objective reality:

F11(I) .... *indigenous labor* force will be under "ceteris paribus" conditions of the first alternative , on the one hand , undisturbed but it may be , on the other hand , underutilized and thus we assess it only as 0.8 (GOOD);

F11(II) ..... *indigenous labor* force will be partially reallocated when some of the management and specialist labor will be reallocated to make room for brought-in expatriates; assessment is **0.8** (GOOD because not many are affected , and the overall productivity should grow);

F11(III).... It as in previous USF except more indigenous workers will be affected; thus the USF is **0.6** (FAIR).

F12(I)..... *expatriate labor force* share on national economy is, under "no change" conditions, relatively decreasing.Therefore USF is at the very best only FAIR, i.e. **0.6**.

F12(II)..... this alternative can bring expatriate share of the economic environment up to GOOD position with USF = **0.8**.

F12(III)..... there is similar reasoning there; while F12(II) was more small increases, here is few bigger ones with the same effect; i.e. USF = **0.8**.

F2(I).....wealth polarization is, under the unchanged conditions, prevalent in this society already anyway and not many people mind let alone any significant disturbances or tensions are expected as a result; therefore the USF is ("tentatively") set at **0.8** (as in GOOD).

F2(II)..... with only small establishments affected there should not be any significant increase of polarization (and envy and subsequent tensions) resulting from this alternative; USF is therefore the same as in the first alternative, i.e. **0.8**.

F2(III)..... since the big establishments are involved it is possible that more polarization can be detected; in any case (especially given the Kingdom's social tradition) not significantly deteriorating. Thus the USF is FAIR i.e. = **0.6**.

F3(I)..... *monetary flows to treasury* are nonexistent (with respect to privatization policies; none has been tried yet). For the first alternative we have therefore USF = 0.0 (as if WORTHLESS).

F3(II)..... since only smaller establishments are involved in privatization, the total buy-out monetary flow to the state treasury is not as big as needed; relatively much more significant that zero extra cash of the first alternative; thus the USF is branded POOR with numerical label at **0.4**.

F3(III)..... with big establishments and firms involved, the buy-out money flows should be bigger than in the second alternative; we give it a tentative USF notation FAIR, i.e. numerically = **0.6**.

F41(I)..... *technology transfer speed-up* can be, under present cuts in capital expenditures, branded only as POOR with USF = **0.4**.

F41(II)..... with smaller establishments (with not enough overall share in the econo-

my), the overall utility might go up to FAIR assessment; i.e. USF = **0.6**.

F41(III)..... only in big industrial complexes the expenditures on technology (i.e. technology transfer) will yield a significantly stronger overall impact; USF branded as GOOD with numerical value = **0.8**.

F42(I)..... *increased production* is under present, virtually stopped, technology transfer very difficult to achieved; therefore the USF is denoted as BAD with numerical conversion = **0.2**.

F42(II).... It one-qualitative-level gain on the first alternative as between F41(I) and F41(II) only, because the effect of production increase is delayed,it is one level lower plateau. Thus the USF is defined as POOR and reads **0.4**.

F42(III).... for the reasons mentioned above the USF reads FAIR and turns into numeric **0.6**.

F5(I)..... *increased expenditures on social structure* are under present tight budgetary constraints (and different budgetary priorities) market as BAD with numerical USF = **0.2**.

F5(II)..... the same increase in qualitative levels is seen as in the previous two SIGNIFICANT FACTORS' USFs; thus the utility is marked as POOR and numerically equals **0.4**.

F5(III)..... One level increase gives us reading FAIR and it converts into **0.6**.

This completes the entries into the analytical matrix, whose first two rows are shown in Table 3. Altogether we can present the matrix in Table 4.

Table 4
Alternatives Policy of Privatization Analysis and Associated Composite Utility

significant factors	F11	F12	F2	F3	F41	F42	F5	comp.
significant weights	0.157	0.052	0.4	0.9	0.112	0.098	0.9	util. a
Alternatives :								
A1	0.8	0.6	0.8	0	0.4	0.2	0.2	0.72
A2	0.8	0.8	0.8	0.4	0.6	0.4	0.4	1.31
A3	0.6	0.8	0.6	0.6	0.8	0.6	0.6	1.60

To understand the lower part of the analytical matrix in Table 4 (i.e. the one featuring alternative USFs for individual significant factors) it is important to realize two advantages the matrix arrangement brings up:

(1) The composite *utility*, in the last column of the matrix, is much easier and virtually foolproof to compute for each individual alternative k, k = 1, 2, 3, with the help of formulas (15) - (16), see White (1968: pp. 85-95) summarized into algebraic form.

$$a(k)_j = \sum_j (s.f.(j).\ s.w.(j) \qquad (17)$$

Where s.f.(j) is j-Th *significant factor's* USF and s.w.(j) is j-th *significant weight*.

(2) It allows us to analyze, virtually at the first glance, the **robustness of the solution**. Suppose that we have some misgivings about the composite utility (an alternative) ranking

and, for the sake of numerical example, let us follow the numerical entries in Table 4. To reverse the ranking A3 > A2 < A1 to A3 > A1 > A2 (which would negate our conclusion and prove the necessity of ceteris paribus conditions) **we would need to increase simultaneously: f11** from 0.8 to 1.2 (which is impossible since the upper limit is 1) f 12 from 0.6 to 1.1, **f 3** from 0 to 0.4, **f 41** from 0.4 to 0.6 and **f42** from 0.2 to 0.4, and even **then the original ranking would prevail**. Needless to say definition and the rest cannot do those first two changes, albeit not impossible, strains the logic of economic interrelations.

Conclusion

It has been demonstrated in this example, without using any high sophistication in terms of factor-tree design and factors' utilities assessment, that *almost any (no matter how primitive and small-scale) privatization policy and strategy (once launched) would carry far higher overall socio-economic utility than a ceteris paribus situation*. This claim has been demonstrated by the numerical example in analytic matrix in Table 4. The stability of resulting preference inequalities in the following

$$A3 > A2 >> A1 \qquad (18)$$

has been analyzed by arbitrarily increasing alternative **A1** factor utilities (USFs). It was found that even an impossible simultaneous increase of these factor utilities cannot reverse the major finding **A2 > > A1**, which is the crux of the example we have undertaken to analyze in the study.

Finally, Privatization is a way to let the enterprising part of the population have access to proper means of investment, thereby contributing to the efficiency of a country's economy. As a result of privatization, the population will have two sources of income, one from their work and one from investing in private properties.

Summary

Privatization is one of the most important policy actions in today's economic policy debates in developing countries. Evaluation of privatization programs is a very important issue for such countries, who are seeking improvement of economic performance through the more effective utilization of the production factors labor force and capital investment.

The aim of this paper is to set a model of evaluating project privatization in developing countries. The methodology the authors followed is to discuss privatization, its theoretical foundation, advantage and disadvantages in general terms, and to develop a general model of the basic elements of privatization. The model is applied to the case of Saudi Arabia.

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الملخص

نموذج لإمكانية الخصخصة ومدى فاعليتها في الدول النامية

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يعتبر موضوع البحث «تحويل المشروعات العامة إلى مشروعات خاصة» من الموضوعات الهامة لتقييم جميع الاعتبارات لعملية الخصخصة والتي تحتل مكاناً بارزاً في الفكر الإداري والاقتصادي لوضع السياسات السليمة للقيام بهذا التحويل. وهدف هذا البحث وضع نموذج رياضي لإمكانية الخصخصة ومدى فاعلتيها وتم معالجة الموضوع على أربع مراحل: أولاً، مناقشة الجوانب والنظريات المتعددة للخصخصة من حيث أهدافها وأغراضها ومدى نجاحها. ثانياً، النظر إلى العوامل المؤثرة على المشروعات الخاصة وتلك العوامل التي تؤثر على المشروعات العامة. ثالثاً، القيام بوضع نموذج خاص بالعناصر الأساسية لعملية الخصخصة (من حيث الكفاءة، التقنية، الإنتاج، الأرباح،...). وأخيراً تم تطبيق النموذج على إمكانية الخصخصة في المملكة العربية السعودية بغية الخروج بتوصيات ومقترحات هادفة.

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