

Firm» is not relevant for the Yugoslav self-managing economy and attempted via a model to describe the real behaviour of a Yugoslav self-managing firm. The resulting model of behaviour of the Yugoslav firm has fairly good characteristics, much better than the theoretical »Illyrian Firm« which is often identified with a Yugoslav firm.

The performances of the Yugoslav self-managing firm can be improved. Discussing such possible improvements is the theme of this article.

The critical point in the behaviour model of Yugoslav self-managing firm is, in the author's opinion, accumulation. That is, if a Yugoslav firm is financed by credit, then the payment of a debt and the interest rates provide for an economizing with capital and its rational usage; on the level of the national economy, this also provides the necessary volume of accumulation. If, however, a Yugoslav firm operates with its own capital, for which it is not obliged, to pay interest, then the volume of its accumulation (and even the total, on the national level) is quite arbitrary and uncertain. The author suggests that by planning and agreement the obligatory accumulation of the firm's own capital be precisely established per unit value of its own capital. The article then deals with the effects of eventual introducing such »internal costs of usage of own capital« into the behaviour model of a Yugoslav self-managing firm. The effects are extremely satisfactory: the volume of accumulation could have been, with the help of that parameter, planned at the macroeconomic level; the social capital would be more effectively allocated and used; the principle of payment according to work results would be more consistently carried out (accumulation wouldn't drain into personal incomes); the number of employed would increase, etc.

THE PROBLEM OF MANPOWER SHORTAGE IN IRAN*

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I. Introduction

Recently there has been some widespread discussion about the state of manpower in Iran. Often, one reads in the newspapers that Iran anticipates importing many specialists from abroad. Or, there are some occasional discussions about the projected shortage of top echelon cadres.¹⁾ The official and semi-official publications also give credence to this growing concern about the state of manpower in Iran. For instance, the Plan and

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¹⁾ See, for example, *Kayhan-International Edition* (Jan. 8, 1975), p. 7, and the same publication (June 8, 1975), p. 2.

Budget Organization's publications reflect the current concern about the shortfall of manpower requirement, particularly at the skilled and semi-skilled level, within the Fifth Development Period.²⁾

A pamphlet put out by Kayhan Research Associated indicates that within the 1973—78 period, 1,389,000 people will be added to the labor force. However, the new jobs created by the Fifth Plan investment will exceed the incremental increase in the labor force so that a shortage of 700,000 in manpower supply will occur.³⁾ It is anticipated that »The greatest shortage will be felt at the skilled and semi-skilled worker level, where an additional 560,000 men and women will be needed«.⁴⁾

Like any other forecast, these estimates are subject to revision from time to time. This is necessitated by changes in planned investment priorities in accordance to financial and physical resource availability. For instance, when the Fifth National Development Plan was drawn up, the target output was set on the assumption that foreign exchange generated through the sale of oil revenues would not be a limiting factor. At that time, however, the ensuing worldwide decline in demand for sources of energy was not foreseen. When the fallen demand became a reality, some planned investment expenditures had to be either curtailed or adjusted downward.

Depending on target output, it is possible to have either manpower shortage or surplus within any plan period. This is so since the demand for employment opportunities is a direct consequence of target output. The shortages or surpluses stem from the divergence between the observed employment opportunities and the employment situation envisaged by the planned output. Ideally, economic planning should avoid the vagaries of the market in regard to shortages or surpluses because the planner presumably foresees bottlenecks at the outset and he is in a position to adopt remedial measures. The Iranian manpower shortage, to a great extent, is due to the phenomenal rate of growth of income in recent years. Additionally, the fourfold increase in the price of oil was not foreseen in due course. As a consequence of a significant increase in the volume of externally generated revenues, investment outlay rose substantially. Naturally, when human and physical resources available for ambitious rates of growth do not match the available financial resources, bottlenecks ensue.

As noted, the recent Iranian manpower shortage may be largely explained by virtue of the country's rapid rate of economic growth. The scarcity of skilled and/or semi-skilled manpower, if serious, could retard the tempo of economic growth. A temporary solution in reducing shortages is to import foreign specialists from abroad.⁵⁾ This is not without precedent in Iran. Ever since the early 50's, many Iranian agencies have had foreign advisors in their employ.⁶⁾ At present, many foreign advisors collaborate with the Iranian customs service, telecommunication system, universities, etc.

²⁾ See Imperial Government of Iran — Plan and Budget Organization, *Summary of the Fifth National Development Plan: 1973—78*, Chap. 3.

³⁾ Kayhan Research Associates, *Iran's 5th Plan*, p. 29.

⁴⁾ *Ibid.*, p. 30.

⁵⁾ This, however has its own associated social, economic, and cultural repercussions. The non-indigenous workers, when they arrive in large numbers, may cause social imbalance. Economically speaking, the productivity of imported workers (specialists) in a foreign setting could slow down due to communication problems. If these problems are to be avoided, in the long run, manpower needs should be fulfilled from within.

⁶⁾ See G. B. Baldwin, »Iran's Experience with Manpower Planning: Concepts, Techniques, and Lessons«, in F. Harbison and C. A. Myers, eds., *Manpower and Education*, (New York, 1975).

Parenthetically, in many developed countries, the speed of economic advance appears to have depended on their educating and training a corps of competent managers, administrators, technicians, and skilled workers. This is so since inert capital could only be turned into a productive resource if there is a pool of capable people available.⁷⁾ This argument is consistent with Solow and Kuznet's findings. The latter has indicated that only 10 per cent of the growth of the industrialized countries is explained by capital increase. The rest is attributed to the »residual«. By residual is meant improved technology and increased productivity of human capital.⁸⁾

In passing, it should be pointed out that it is possible for a country to face manpower shortage while suffering from a high unemployment level. This is not a strange phenomenon since shortages or surpluses tend to persist side by side in all economies, be they planned or unplanned.⁹⁾ Of paramount importance in detecting shortages (surpluses) is the prevalence of a solid data base. This constitutes the foundation of many manpower analyses. Yet, one common characteristic of many developing economies is the inadequacy and infancy of the statistical system. In the absence of adequate data, there are some market clues to determine the imbalances: wages and salaries data, the ease with which new graduates find employment, job advertisement and so on.

At this juncture, it is relevant to ask: How has the Iranian manpower situation historically changed? What is the state of manpower in Iran? What is the forecast of future manpower needs? In the following, an attempt will be made to answer these questions respectively.

II. Manpower Planning in Iran

The manpower question was not raised in the Final Report of the First Seven-Year Plan. This report did not generate any discussion of manpower requirements or manpower availability. There was only a brief reference to the implementation of such projects as the training of health care instructors, hospital administrators, statisticians, cancer cytologists, etc. Actually, the manpower issue was not formally brought up until 1955. That is to say, initial manpower planning started after the inception of the Second Seven-Year Plan.¹⁰⁾

It is evident then that the manpower question did not receive much attention prior to the Third Plan. By the time the latter was ready to be launched, the country had acquired a manpower plan of 100 pages and an education plan of 250 pages. The financial allocation of the plan afforded a human resource development which reflected an interest in the manpower issue.¹¹⁾ The Third National Development Plan laid greater stress on manpower planning than had previously been the case. In fact, the final report

⁷⁾ B. Ahmad and M. Blaug, eds., *The Practice of Manpower Forecasting*, (New York, 1973), p. 3.

⁸⁾ H. Leibenstein, »The Impact of Population Growth on Economic Welfare-Nontraditional Element«, in the National Academy of Sciences, *Rapid Population Growth: Consequences and Policy Implications*, (Baltimore, 1971), p. 177.

⁹⁾ Cf. Ahmad and Blaug, *op. cit.*, p. 3.

¹⁰⁾ See Imperial Government of Iran — Plan Organization, *The Final Report of the Second Seven-Year Plan*, 1343.

¹¹⁾ Baldwin, *op. cit.*, p. 143.

of the Third Plan devoted a separate chapter to this subject and recognized the impact of manpower on the economic development of the country.¹²⁾ A brief review of the report revealed that manpower shortage was not a problem then, either. Rather, the concern rested with insufficient employment opportunities.

Nevertheless, as far as manpower availability is concerned, the report makes some revelations. For instance, it is stated that the Third Plan envisaged that 25,000 to 30,000 pupils would complete courses in industrial and agricultural subjects within the plan period. The report is quick to point out that the anticipated numbers were not realized. Out of the entire target estimate, only 9,200 pupils succeeded in completing these courses. The shortfall in quantity was compensated for by great progress made in the improved quality of vocational training, management training, and industrial reorganization.

A brief study of the Fourth Plan's report reveals that even at this stage manpower shortage was neither serious nor a problem. In fact, in the Employment Policy section of the report, a reference is made to the rapid expansion of the educational system (at all levels; primary, secondary, and higher education) as a measure to ease the potential pressure of the respective age groups on the labor market.¹³⁾ This report predicted a shortage in one specific area: in the field of engineering, particularly in the electrical and mechanical branches. A discussion of the projected number of required persons in Industry, Mining, and Construction is also given in this report. It fails, however, to indicate how the estimated number of manpower needs and manpower availability are to be matched. In fact, the report of skilled and specialized available manpower was put out in 1953, some time after the estimates of manpower needs were made. Obviously, neither a surplus nor a shortage can be detected when manpower supply is not set against manpower requirements. This drawback is somewhat remedied in the Fifth Plan's report. The supply of and the demand for manpower by occupations are brought together in this report.¹⁴⁾ As far as manpower is concerned, the Fifth Plan is very brief. The subject of technical and vocational training, too, is cursorily discussed.

III. The Manpower Projection Model

The estimates of manpower needs within the Fifth Development Plan are based on the results of a working paper by the Plan and Budget Organization.¹⁵⁾ This paper consists of two parts: an introductory survey and the manpower projection model. An analysis of past trends in regard to Iranian demographic characteristics, the employment situation, and the state of production and productivity is presented in the introductory part. The following conclusions are drawn from the analysis of relevant tables:

¹²⁾ Imperial Government of Iran — Plan Organization, *Third Development Plan — Final Report, 1966.*

¹³⁾ Imperial Government of Iran — Plan Organization, *Fourth National Development Plan: 1968—72*, p. 69.

¹⁴⁾ Imperial Government of Iran — Plan and Budget Organization, *Summary of the Fifth National Development Plan: 1973—78*, p. 16.

¹⁵⁾ Imperial Government of Iran — Plan and Budget Organization, *A Long-Run Manpower Projection model in Accordance to Major Economic Sectors and Occupational Groups: 1351—71*, (Persian, Working Paper No. 19, February 1975).

(a) Generally speaking, the productivity increase in agriculture and construction industries has been very insignificant.

(b) In the service sector, the productivity increase has been very significant; surpassing that of manufacturing, and

(c) The productivity increase in the oil and energy sector has been substantially high.

In connection with production and productivity, the paper attempts to determine the level of economic activity via the following formulation:

$$(1) \text{Log } E_j = a_j + b_j \text{Log } VA_j$$

where E_j is the level of employment in the j^{th} sector, VA_j the value added in that sector, and a_j a constant. In this equation b_j reflects the inverse of marginal productivity. In other words, as b_j gets smaller, the value of marginal productivity gets larger.¹⁶⁾

Next, the paper proceeds to present a table showing the relationship between employment and value added. It fails to specify how the values of a_j and b_j are determined. Presumably, they are obtained via a linear regression method. The paper does not specify the period of analysis either. Then, by asserting that there is a fixed long relationship between productivity and production, it is stated that:¹⁷⁾

$$(2) \text{Log } (VA/E)_j = U_j + r_j (VA_j),$$

where r_j is the Verdoorn coefficient. The latter is supposed to reflect the effects of factors such as improved production techniques, productivity of investment, and the quality of human resources. It is asserted that the value of r_j is greater than zero and $r_j = 0.20$ ¹⁸⁾ (a specific value) implies that the increase in production is more related to productivity than to increases in input. The estimated correlation coefficients (for 1338—50 period) are high for all sectors except transportation.

As far as manpower projection is concerned, the model uses a production approach. Forecasts are made for sectoral manpower requirements in agriculture, manufacturing, and services. The manufacturing sector is disaggregated into modern and traditional subsectors. The former provides services in areas of education, health, tourism, and recreation. The traditional subsector includes commerce, retailing, and personal services. Manpower requirements of oil, energy, and construction industries are forecasted separately.

To estimate manpower needs, the procedure followed may be summarized as follows:

¹⁶⁾ The manner in which b_j is defined is unclear. Actually, from (1), $b_j = \frac{dE_j}{dVA_j} \cdot \frac{VA_j}{E_j}$. This implies an inverse relationship between b_j and marginal productivity only if $\frac{VA_j}{E_j}$ remains unchanged.

¹⁷⁾ The fixity relationship is questionable.

¹⁸⁾ It is not clear why r_j should equal 0.2 in the first place. Further, it is not known why $r_j = 0.2$ should have the associated implication.

(a) The average productivity in each sector is related to value added in that sector via a single log linear function.

(b) It is assumed that the regression coefficients change over time in the following fashion:

$$(3) \quad r_{t+n} = r_t (1+p)^n, \quad n=1, \dots, 20.$$

(c) The level of employment in each sector is obtained by relating employment to value added in that sector, either via a simple linear relation or through a single log linear function.

(d) To determine the desired level of employment in accordance with different occupational groupings, use is made of the following formula:

$$(4) \quad \text{Log } (E_{ij}/E_j) = \alpha_{ij} + \beta_j (V_j/E_j)_{t+n},$$

In equation (4), E_{ij} is the level manpower of i^{th} occupational group required in j^{th} economic sector.

(e) To obtain the manpower needs of each sector in accordance with their level of schooling, the following formula is used:

$$(5) \quad \text{Log } (E_{kj}/E_j) = K_j + K_j (V_j/E_j),$$

where E_{kj} indicates the K^{th} level of education of needed manpower in j^{th} sector. Six different levels of schooling: illiterate, primary education, incomplete secondary level, secondary level, higher education, and postgraduate studies are considered.

(f) The forecasts of macro figures (value added in each sector, total employment in each sector, and so on) are exogenously determined. Based on the foregoing steps, the number of required manpower is forecasted both in terms of occupational groupings and the level of schooling.

The following criticisms of this model may be raised:

(a) The independent and separate derivation of manpower estimates is somewhat suspect. A reasonable approach would entail the simultaneous forecast of manpower estimates through either an input-output approach or a linear programming approach. Further, it seems more logical for macro figures to be generated endogenously.

(b) The paper is vague and imprecise. In some sectors the log of average productivity is related to value added in that sector. In others (e. g., in manufacturing), average productivity is related to the level of investment. It is not precisely explained why value added should be used in one sector and investment in another.

(c) The model is unclear about the rate of change of regression coefficients. For instance, the dynamic changes of the Verdoorn coefficient is specified as (3) above. However, q in the same formulation is defined as a variable reflecting the effect of technological progress. Notice that r is defined to be inclusive of technological progress. As a logical consequence, q should reflect the rate of growth or decline of r over time.

IV. Summary and Conclusions

(a) Despite its shortcomings, the aforementioned model provides us with a benchmark in Iranian manpower analysis. Consequently, until a more thorough study is undertaken, the projected number of manpower estimates would have to be reckoned with, albeit with some reservations.

(b) Casual empiricism indicates that shortage is more pronounced at medium-level skilled manpower. For instance, it is observed that there is an acute shortage of electricians, mechanics, carpenters, etc. A long-run solution would entail a further expansion of existing vocational schools. At present, only 2.1 per cent of total students enrolled in all levels of schooling attend vocational schools. It would be wise and also possible to triple or quadruple this small number within ten years time.

(c) In this respect, a further step would be the establishment of a junior college system throughout the country. These colleges may put their primary emphasis on the practical aspects of education. That is, by offering extensive courses of study in accounting, computer science, machine tools, carpentry and so on, a large cadre of trained people would be forthcoming within a two-year period of education. A fraction of graduates (e.g., top 25 percent) may be admitted to the universities.

(d) The military forces (the Army, Navy and Air Force) could play a significant role in meeting the country's manpower needs. This may be accomplished through the training and retraining of surplus conscripts. Presently, to some extent, the military establishments play a role in supplying the country with trained manpower. For instance, during the Third National Development Plan, 34,800 soldiers underwent short vocational training courses in agriculture and industrial subjects. Aside from the literacy corp, the rural revelopment corp, the military establishments are charged with some specific manpower training programs. For instance, the Air Force trains commercial pilots. The armed forces could play a more significant role, the foregoing notwithstanding.

(e) Finally, it is recommended that the government require nearly all students graduating from domestic universities to work within the country. Presently, the government maintains such a policy with one exception. Those who have not benefited from a subsidized education are allowed to pursue advanced studies abroad. This policy could be modified via a selective process, i.e., fulfillment of certain qualifications for Ph. D. studies with the country's needs establishing the criteria.

The authors have estimated (for the sake of brevity, the discussion is dispensed (with) that the country will face surplus Ph.D.'s in ten years time should certain trends continue. To reach this conclusion, a few simplifying assumptions have been made. The estimates of the Fifth National Development Plan in regard to enrollments are used, and the absorptive capacity of the country for Ph.D.'s based on the figures of the Plan and Budget Organization are considered. Since all facets of economic life are incorporated into the national plan, the prospect of surplus highly-trained manpower demands serious attention.

PROBLEM NESTAŠICE RADNE SNAGE U IRANU

Mahmood YOUSEFI — Tumay ERTEK

Rezime

U poslednje vreme u Iranu su veoma rasprostranjene diskusije o nestašici radne snage. Tako, npr., prema podacima jedne istraživačke ustanove, u periodu Petog razvojnog plana (od 1973. do 1978. godine) zaposliće se 1,389.000 novih radnika. Međutim, broj novih radnih mesta koja će se otvoriti na osnovu planiranih investicija premašiće pomenuti porast zaposlenosti, tako da će se pojaviti nedostatak od 700.000 radnika. Predviđa se da će se najveća oskudica osećati kod kategorija kvalifikovanih i polukvalifikovanih radnika — oko 560.000.

Oskudica radne snage koja se u Iranu javlja u poslednjih nekoliko godina može se najvećim delom objasniti visokom stopom privrednog rasta koja je, pre svega, posledica intenzivnog investiranja izazvanog opet snažnim prilivom dohotka ostvarenog na osnovu višestrukog porasta cena nafte.

Da ne bi oskudica (pre svega kvalifikovane i polukvalifikovane) radne snage usporila tempo privrednog rasta, u Iranu se prišlo proceni sadašnjih i budućih potreba za radnom snagom, a u cilju preduzimanja određenih mera u oblasti obrazovanja, odnosno planiranja radne snage. Autori članka se kritički osvrću na model koji je poslužio kao osnova za projekciju ponude i tražnje radne snage u periodu Petog razvojnog plana. Prema njihovom mišljenju, uprkos izvesnim nedostacima, pomenuti model može korisno da posluži u analizi pitanja oskudice radne snage.

Ta oskudica je izraženija na srednjim nivoima kvalifikacija radne snage. Na primer, zapaženo je da postoji akutna nestašica električara, mehaničara, tesara itd. Dugoročno rešenje stoga treba svakako da sadrži dalju ekspanziju postojećih stručnih škola. Trenutno, samo 2.1% od ukupnog broja učenika i studenata pohađa stručne škole. Bilo bi korisno, a i posve ostvari-vo, da se ovaj broj u sledećih deset godina utrostruči ili učetvorostruči.

Sledeći korak trebalo bi, prema mišljenju autora, da se sastoji u uvođenju dvogodišnjih viših škola u kojima bi naglasak prvenstveno bio na praktičnim aspektima obrazovanja, čime bi se u relativno kratkom roku obezbedio znatan broj obučenog kadra. Deo diplomaca sa tih viših škola (npr. 25% od najboljih) mogao bi da bude primljen na univerzitet.

Armija bi takođe mogla da igra još značajniju ulogu u zadovoljavanju potreba za kvalifikovanom radnom snagom, od one koju danas igra. Ni ta današnja uloga, međutim, nije zanemarljiva; npr., u periodu Trećeg nacionalnog razvojnog plana oko 34.800 vojnika prošlo je kratke obrazovne kurseve iz poljoprivrede i industrije.

Na kraju, preporučuje se vladi da zahteva od skoro svih studenata koji diplomiraju na domaćim univerzitetima da rade u zemlji. Izuzeci bi bili samo oni koji odlaze u inostranstvo na doktorske studije i to u deficitarnim disciplinama, s obzirom da, prema proceni autora, ako se postojeći trend nastavi, Iran će kroz deset godina biti suočen sa viškom doktora nauka.