Discussion Paper No. 9203 March 1992

General Equilibrium Effects of Investment Incentives in the Philippines

By

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GENERAL EQUILIBRIUM EFFECTS OF INVESTMENT INCENTIVES IN THE PHILIPPINES

Ramon L. Clarete

ABSTRACT: A general equilibrium model of the Philippine economy is developed to analyze the effects of investment incentives in the Philippines. The incentives consist of tax rebates and duty drawbacks on imported machineries of firms belonging to industries declared by the government as priority sectors. Three policy experiments are conducted with the model. In the first expriment, the tax incentives are withdrawn but the investment subsidies continue to be provided. In the second, investment subsidies are provided on a uniform rate basis. In the third experiment, both these experiments are simultaneously conducted. As expected, the user cost of capital falls because of investment incentives. Investments fall the first and third policy experiments but fall in the second policy experiment. Equivalent income variation associated with these changes indicate that the incentives improve overall welfare. The study however cautions that a correct evaluation of the welfare impacts of investment incentives would have to be done in a dynamic rather than static framework as in this paper.

GENERAL EQUILIBRIUM EFFECTS OF INVESTMENT INCENTIVES IN THE PHILIPPINES

Ramon L. Clarete*

I. INTRODUCTION

Fiscal incentives for promoting investments play an important role in the industrialization strategies of developing countries. Consisting typically of duty and tax exemptions on imported capital equipment, tax holidays, depreciation and investment allowances, and similar measures, these incentives are not part of the regular budgetary outlays of the government. However, the duties and taxes forgone in granting such incentives have opportunity costs, and accordingly, it would be interesting to find out if such costs outweigh the marginal benefits of the additional capital employed as a result of these fiscal incentives measures.

A related policy issue concerns the rationing of such investment incentives to the firms in the economy through such schemes as prioritizing the various sectors in the economy with respect to their strategic importance in the country's overall industrialization goal. Such discriminatory schemes for allocating these tax incentives significantly explain the way investment resources are allocated in the economy, and thus the direction of economic development in such countries.

This paper analyzes these policy issues using a general equilibrium model. The focus of this study is on the duty drawbacks and tax rebates on imported capital equipment in the Philippines.

None of the existing empirical work on Philippine investment incentives measures have been analyzed in a general equilibrium setting. Gregorio (1979) computed the effects of these incentives on the effective protection enjoyed by Philippine industries. The impacts of these incentives on the rates of return of industry and on factor prices and use were calculated using a partial equilibrium model by Manasan (1986). Sicat (1967; 1968) and Sicat and Hooley (1968) argued that the country's investment incentives law were inadequate to absorb the growing labor force because of savings constraints, complicated administrative procedures, and fairly regulated investments policy in the country. Other studies on Philippine incentives measures did not attempt to quantitatively analyze these measures (e.g. Manasan, 1988; de Leon, 1981).

A dynamic applied general equilibrium model of the Philippines consisting of twelve sectors was designed with 1989 as its

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benchmark period. This was necessary since existing applied general equilibrium models of the Philippine economy are mostly static in nature (Clarete and Roumasset, 1985; Clarete and Whalley, 1991; Habito, 1984). The existing dynamic general equilibrium models of the Philippine economy (Go, 1988; Gaspay and Gotsch, 1992) are designed to analyze policy measures other than fiscal investment incentives.

In the next section, the paper gives an overview of the general equilibrium model used in this study. In Section 3, it discusses how investments and savings are incorporated into the general equilibrium model. This is followed with a review of the current investment incentives measures in the Philippines. Section 4 describes the empirical data which were used to calibrate the Philippine model as well as the data on fiscal investment measures. The empirical results of the study are presented in the fifth section. The study's main findings are summarized in the concluding section.

II. OVERVIEW OF THE MODEL

The general equilibrium model used in this study is for a small open economy. It consists of twelve production sectors, each of which produces an import substitute and an exported good. The respective production technologies in these sectors use a constant elasticity transformation function (CET) between the import substitute and the exported good (see Figure 1).

There are three primary factors used in every production sector, namely labor, capital, and a sector-specific factor. Labor and capital are perfectly mobile in the model. The sector-specific factor consists largely of fixed capital inputs in production. The three factors are combined using a constant elasticity of substitution (CES) function to generate the value added of the sector.

Intermediate inputs are used in fixed proportion to total production of the sector. The individual commodities used as intermediate inputs are first aggregated using a Leontief function to produce a composite intermediate input. This composite intermediate input is then combined with the value added in that sector to produce the joint output of the sector. A Leontief function is used in aggregating the value added and the composite intermediate input.

The individual intermediate input used in production is an Armington-aggregated good. From a modeling point of view, it is convenient to form twelve additional production sectors. Each of these produces an Armington-aggregate good whose inputs include an imported good and its local substitute. These goods are in turn demanded both for intermediate and final use. Given this structure of production activities, locally produced goods are thus used only

as inputs in the Armington-sectors and for exports. All the other product demands in the model are supplied with Armington-composite goods.

The country is a price-taking economy in both imports and exports. A modeling problem associated with small-open economy models involves several sectors not producing at all in counterfactual simulations. As is well known in trade theory, competition will drive those tradable sectors in excess of the number of primary factors and relatively inefficient compared to the rest of the economy to shut down in the counterfactual equilibrium. This problem does not arise in the model for two reasons. One reason is the inclusion of sector-specific factors in the model which then ensures that we have at least as many non-traded factors as there are sectors in the model. The other reason is that we are assuming that local and imported goods are less than perfectly substitutable.

There is only one aggregate consumer in the model. He is endowed with the primary factors used in production which then provide him his income. His income is allocated between current and future consumption. Current consumption in turn consists of the 12 Armington-composite goods, while future consumption is made up of the various investment goods the consumer is willing to purchase in any given time period.

The government imposes the following tax measures. An excise tax is imposed at the manufacturerer's level or at the border on selected items. A value added tax (VAT) is a general consumption tax collected using the credit method. Primary agriculture and exports are exempted from the VAT system. From a modeling perspective, it would have been convenient to treat the VAT as a simple tax on value added. But due to an on-going policy debate in the country, it is crucial to retain the credit method of collecting the VAT in the model.[1] The VAT is therefore modelled as consisting of a sales tax and tax credits on the intermediate inputs. Imports are covered by the VAT.

In addition to the excise and value added taxes, imports are also taxed a duty based on the border price of the imported good in terms of the local currency.

The model also incorporates the corporate income tax. This tax is featured in the model as a tax on the profits of each production sector. Since profits are the imputed earnings on sector-specific factors, the corporate income tax is therefore important in explaining the investment decisions made by agents in the model.

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[1] This policy problem is described in Clarete (1991).

Out of its tax income, the government demands goods and services to produce government services. This is featured in the model with a utility function of the government whose arguments include the consumption and investment demands of the government sector. Investment demands of the government are assumed to be applied only in the services sector of the model. That is, government owned and operated corporations (GOCC) are not central in the model.

The model is calibrated to Philippine economic data for the year 1989. The substitution elasticities which underlie the calibration process are all assumed to be equal to one. The applied general equilibrium model of the Philippine economy is solved using the MPS/GE (version 1990) algorithm (Rutherford, 1989).

In the next section, the paper describes how investments and savings are featured in the model.

III. CAPITAL FORMATION AND SAVINGS IN THE MODEL

The standard analysis on the effects of investment incentives applies the concept of the "user cost of capital" (Jorgenson, 1963; Auerbach, 1983; 1990), defined as the shadow price of capital to which investors will equate the marginal product of capital. This incorporates the cost of credit and the economic depreciation rate net of the present value of investment incentives.

The amount of investment a firm wants to make (or equivalently the level of capital stock a firm wants to employ in production in period s) is obtained from solving the following optimization problem:

$$\underset{x}{Max}\ V_s - \sum_{t=s}^{\infty} \frac{(1-\tau)\,\pi_t}{(1+i)^t} - p_s^K(1-\Gamma)\,K_s\left(1+\frac{\delta}{(1+i)^t}\right) \qquad (1)$$

where V is the net present value of the gross investments in time period s, K_s, which is equal to capital investments made in period s and the depreciation cost per period is δK_s. π_t is the payment for services rendered by the capital stock in production in period t. τ is the corporate income tax rate and Γ is the value of fiscal investment incentives. i is the opportunity cost of money used to discount future to present value terms. p_s^K is the price of the capital asset in period s.

If the firm is in short run equilibrium in period s and expects that π, which incorporates the optimal mix of the variable factors of production, to persist to perpetuity at its level in period s, then the optimization problem can be expressed as

$$\underset{K}{Max}\ V_s = \frac{(1-\tau)\,\pi}{i} - p_s^K(1-\Gamma)\,K_s\left(1+\frac{\delta}{i}\right) \qquad (2)$$

The first order condition of the optimization problem is given by:

$$(1-\tau)\frac{\partial \pi}{\partial K} = p_s^K(1-\Gamma)\,(i+\delta) \qquad (3)$$

This can re-expressed in a form which portrays the concept of the user cost of capital:

$$\frac{\partial Q(K)}{\partial K_s} = \frac{(i+\delta)\,p_s^K(1-\Gamma)}{p_s^Q(1-\tau)}. \qquad (4)$$

Q(K;L,V) is the production function of the firm in which all variable factors (e.g. L and V) are optimally combined. p^Q is the producer price of Q. The right hand side of equation (3) is the user cost of capital, which consists of the the marginal cost of producing the capital good (p^K), the corporate income tax rate (τ), the investment incentives (Γ), and the cost of funds,i.

Fiscal investment incentives, Γ, lower the user cost of capital (c) and accordingly increases the desired level of capital stock. Since the rate of depreciation and the capital stock in the preceding period is known, the desired level of capital stock obtained from this optimization problem also tells how much investments the firm is willing to make in period s.[2]

Since corporate income tax rates and fiscal incentives are sector-specific, the user cost of capital is specific to the

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[2] A related concept is that of the effective tax rate which is the effective wedge "between the rate of return on investment and the rate of return on the savings used to finance the investment" (King and Fullerton, 1984). Auerbach (1990) decomposes this rate as consisting of first, the wedge between the "required rate of return r and the corporation's before-tax return" and secondly, the wedge between r and the return to the firm after all taxes.

sector:

$$c_j = (i+\delta)\, p^K \left[1 + \frac{(\tau_j - \Gamma_j)}{(1-\tau_j)}\right]. \qquad (5)$$

If I_{js} is the solution to the optimization problem (eq. 1) for a particular firm j, then

$$I_{js} = \frac{\pi_{js}(1-\tau_j)}{p_s^K (i+\delta)(1-\Gamma_j)} - \frac{\pi_{js}}{c_j}. \qquad (6)$$

Production of Capital Good

There is one homogeneous supply of a capital good which is produced locally using the following production function:

$$I^s = \min_{i=1}^{N} \left[\left(\sum_{s=1}^{2} a_{Is} A_{sil}^{\rho_I}\right)^{\frac{1}{\rho_I}}\right] \qquad (7)$$

which transforms producer goods into the homogenous capital good in fixed proportions. The producer goods are either locally produced (s=1) or imported (s=2). The two are combined in a CES production function to produce a composite producer good which then becomes an input into the Leontief production function for the capital good.

Allocation of New Capital Goods

The total supply of variable and fixed (sector-specific) capital in the economy is updated at the end of every time period with the new capital good produced in that time period. But these additional capital supply becomes productive only in the next time period.

In Koopmans and Hansen (1972), the economy is modeled as consisting of sectors which utilize old vintage capital and others which utilize new vintage capital, both of which produce the same identical producer good. Those sectors with the old vintage capital are stuck with the amount of fixed capital that they have until their sector-specific capital is completely depreciated. The

sectors with new vintage capital update their supply of capital every time period with the new capital goods that are produced in that time period. Also, the new vintage capital is mobile between sectors.

What this leads us to is that the new capital that is produced in every time period is either used as sector-specific or variable capital. But rather than introducing old and new vintage capital production sectors which increases the dimension of the model considerably[7], we use the following way of allocating the supply of new capital good (see also Figure 2):

$$T_K(F_I^S, K^S, -K) = 0 \qquad i=1,2,\ldots,N. \qquad (8)$$

The rationale is that of all the capital good supply produced in a given time period, there is really a part of it which is truly variable. Structures (e.g. buildings, office spaces) for example can be used by any production sectors in the economy. Other capital goods becomes part of the economy's fixed capital formation which is specific to the sector.

Savings

The aggregate consumer in the model is assumed to maximize the following intertemporal utility function:

$$Max\ U(\bar{C}_t, \bar{C}_{t+1})$$

subject to:

$$\sum_I \bar{P}_{it}^C \bar{C}_{hit} + \left(\frac{\bar{P}_{i(t+1)}^{*C} \bar{C}_{t+1}}{1+i} \right) = Y_{ht}^d$$

where C denotes the vector of current or future consumption. p^{e*} is the vector of expected future prices of these goods. Y^d is the household's disposable income.

We can break down this utility maximization problem into first a problem of allocating disposable income between savings and current consumption, and into allocating each of the two into their component consumption and investment demands.

Suppose the utility function of the consumer can be

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[7] This is what Rutherford (1989) calls as the ''the curse of dimensionality''.

represented by a Stone-Geary utility function for the consumer. Let η^k be the marginal propensity to consume out of disposable income for the period t+k and e_k the subsistence consumption.

$$U_t = \sum_{k=0}^{1} \eta_k \ln(C_{t+k} - e_k), \tag{10}$$

The demand functions associated with this function are:

$$C_{(t+k)} = e_k + \eta_k \left(\frac{Y_t^d - \sum_{s=0}^{1} \frac{P_{t+s} e_s}{(1+i)^s}}{\frac{P_{t+k}}{(1+i)^k}} \right) \tag{11}$$

$$k=0,1.$$

If we restrict the η's to add up to one and $\sum_{s=0}^{1} P_{t+s} e_s = 0$, then one gets the familiar consumption function or savings functions of macro-economics:

$$C_t = P_t e + \eta Y_t^d \tag{13}$$

$$S_t = -P_t e + (1-\eta) Y_t^d.$$

The price expectation assumption implied in this derivation is myopic.

IV. FISCAL INVESTMENT INCENTIVES MEASURES

The structure of Philippine investments incentives had undergone several revisions, the latest being the issuance of Executive Order No. 226 also known as the Omnibus Investments Code of 1987. Before this, several pieces of legislation were promulgated modifying these fiscal measures which originated with

the Investments Incentives Act in 1967. The incentives provided for in this Code are administered by the Board of Investments and the Export Processing Zone Authority.

The 1987 Investments Code is a consolidation of the various incentives and privileges already in place and provides new measures including incentives to enterprises locating in less developed areas, privileges granted to holders of the Special Investor Resident Visa, incentives granted to regional headquarter and regional warehouse locating in the Philippines and to firms locating in the export processing zone. Two of the important additions are the income tax holiday for enterprises engaged in a preferred area of investments and the provision of a labor expenses allowance for tax deduction purposes. The tax holiday measure was introduced to make the country's investments incentive structure comparable with those in other ASEAN countries.

Following Manasan (1988), the country's prevailing incentives may be broken down into three categories, namely tax exemptions, deductions, and credits. The tax exemptions include the income tax holiday, tax and duty exemptions on imported capital equipment and spare parts, and tax and duty exemptions on imported raw materials used to produce export products. The tax deductions measures include an investment allowance equal to 100 percent of the infrastructure investments undertaken by eligible firms in preferred areas to disperse industries and where the infrastructure service system is inadequate; and a wage expense allowance equal to 50 percent of the expense. In order to avail of the latter, the registered firm has to meet the prescribed capital labor ration. If the firm is located in less developed area, the wage expense allowance can go up to 100 percent of the labor cost. The tax credits are for tax and duties on raw materials and domestic capital equipment and spare parts had these items been imported. The raw materials are limited to those used for producing export products.

The firms which are eligible to receive the above incentives measures are classified into those in pioneer and non-pioneer industries. Additional special treatment is provided to the former since these firms are in sectors declared by the government as critical in promoting the country's industrialization and export enhancement programs. Thus, non-pioneer firms receive income tax holiday privileges for a period of four years from commercial operation in contrast to six years for pioneer firms. In several cases, this period may be extended up to eight years provided the pioneer firm has met the prescribed local content, capital to labor ratio and earned a net foreign exchange income amounting to at least $500,000 annually in the first three years of operation.

Machineries and capital equipment which are imported by eligible firms are exempted from customs duties and internal taxes that apply. This privilege is available within five years from the

effectivity of the code. A similar benefit applies to imported stock and genetic materials within ten years from the start of commercial operation of agricultural producers, as well as to raw materials and intermediate inputs used in producing export products.

Investment allowances for tax deductions are provided up to 100 percent of the cost of major infrastructure and public utility investments needed by the firm in areas where such infrastructure facilities and public utilities are not available. If the total cost of the investments is not deducted in the year that they are undertaken, the remaining balance can be deducted in subsequent tax periods. This incentive is intended to help disperse industries to less developed areas of the country. Firms which locate in these areas are also accorded pioneer status.

Unlike in other countries, no additional investment allowances are granted for tax deduction purposes. The government also does not provide depreciation allowances.

A unique privilege is allowing eligible firms to deduct up to 50 percent of their direct labor expenses provided they meet the prescribed ratio of capital equipments to the number of workers. The benefit is available within five years from registration of eligible firms. The purpose of this incentive is to partly offset the capital intensive bias of previous investments measures and to increase the labor absorption of eligible firms.

Tax credits up to 100 percent of the expenses for purchasing domestic capital equipment and accompanying spare parts are provided within five years from the effectivity of the Code. Agricultural producers are also provided a similar benefit for a period of ten years in their purchases of domestic breeding stock and genetic materials.

Considering that taxes and duties are also waived for imported capital equipment, spare parts, breeding stock and genetic materials, these inputs are practically exempted for five years from the effectivity of the Code of all indirect taxes that apply. There is of course the extra five years of benefit which accrues to agricultural producers for breeding stock and genetic materials.

Credits are also provided for taxes and duties paid on imported raw materials and intermediate inputs used in the manufacture of export products. Like in the case of capital equipment, spare parts, breeding stocks and genetic materials, raw materials and intermediate inputs used in the manufacture of export products are practically exempted from applicable indirect taxes.

Other privileges include access to bonded manufacturing and trading warehouse system, exemption from wharfage duties and any export tax, duty, impost and fees, and contractor taxes. These are

available to exporters who are also entitled to tax and duty free importation of spare parts. Non-exporting eligible firms are allowed tax and duty exemptions on imported spare parts accompanying the imported capital equipment. Exporting firms are also exempted from local taxes and licenses and from real taxes on production equipment and machineries not attached to the real estate.

Non-fiscal incentives are also provided to investors. These measures include the simplification of custom procedures, unrestricted use of consigned equipment, employment of foreign nationals in supervisory, technical and advisory position within a period of five years from the date of registration, and preferential rates for publicly provided water and electricity.

The current investments incentives code does not offer any depreciation allowances, investment allowances other than for infrastructure investments, and interest cost allowances for tax deduction purposes. Accelerated depreciation allowances used to be a major feature in the country's investment incentives code until 1981 when it was withdrawn from the list of incentives available to investors.

Previous Investment Incentives

Before the current incentives legislation, four related laws were passed by the Philippine government to encourage investments. The first investment incentives legislation known as the Investment Incentives Act (RA 5186) was passed in 1967. This was followed by RA 6135 or the Export Incentives Act which was enacted in 1970 to encourage investments in export producing sectors. Presidential Decree (PD) 1789 ,also known as the Ominibus Investments Code of 1981, was issued by President Marcos in that year to consolidate the provisions contained in the two previous investment legislations. Batas Pambansa (BP) 391 was passed into law in 1983 to simplify the existing Omnibus Investment Code of 1981. EO 226 is the 1987 Omnibus Investment Code.

The country's list of incentives measures had been changed through time towards one with fewer fiscal measures. While this list has been made simple, the latest modification in 1987 however introduced a new measure in 1987 -- the income tax holiday. This recent measure was intended to make the country's list as competitive as those in the other ASEAN countries.

There are important differences of incentives measures between pioneer and non-pioneer firms and between export and non-exporting firms. For example, under the tax exemption or deferment measures, PD 1789 granted full exemption to pioneer firms and only half to non-pioneer firms. BP 391 granted full exemption to exporting firms, both pioneer and non-pioneer, full deferment to exporting pioneer firm, and half-deferment to non-exporting non-pioneer firm.

In the case of the measure providing tax and duty credits on imported capital equipment and spare parts. BP 391 granted full credit to exporting firms, full credit but repayable to non-exporting pioneer firms, and half credit but repayable to non-exporting non-pioneer firms. This is in contrast to exporting firms which got non repayable full tax credit under the same law. In the case of tax credit on net-value earned, BP 391 granted 10 percent tax credit on net value earned to pioneer firms and 5 percent to non-pioneer firms regardless of whether they are exporting or not.

Tariff Related Incentives

Trade-related incentives are important measure in the current set of investments incentives. These measures are in the form of duty exemptions and tax rebates. The government agencies in charge of supervising and granting of these measures vary by incentives measures. They include the Board of Investments, the Export Processing Zone Authority (EPZA), and Philippine Veterans Investment Development Corporation (PHIVIDEC). In order to avail of these incentives, the firm has to register with the government agency concerned. Once registered, they have to show their certificate of eligibility to the Bureau of Customs in the case of duty exemptions and additional documents and other needed papers which show how much tax credits they are going to get from the government in the case of duty drawbacks.

Assessment Studies

Early studies on the country's investment incentives measures are placed in the context of the then-going debate between the economic nationalists and those who recognize the importance of foreign investments to spur economic growth and employment in the country. Sicat (1967) regards the country's pioneering investments incentives law passed in 1967 as a workable compromise between economic nationalism and the recognition that foreign enterprises add to economic progress.

One gets the impression from reading the study that the country's incentives measures are mainly offered to foreign investors. In the same study, Sicat explains that the flow of foreign investments into the country would depend on the government's definition of "pioneer areas." He stressed the need to widen the scope of this definition to enlarge the participation of foreign investors. He referred to the rules on foreign investments as too restrictive making the investment climate less attractive to them, in turn resulting in a slower rate of economic growth and labor force absorption. Sicat also criticized the complicated procedure of monitoring and supervising the granting of such incentives.

The debate on the merits of offering investment incentives to

foreigners was again picked up by Sicat (1968). In this paper, he outlined a few arguments in favor of not only offering the existing set of measures to foreigners but also of liberalizing such measures. The arguments are encapsulated in such propositions as to complement the gap in domestic savings and investments, technology transfers, employment generation, competition enhancement which increases efficiency, and economic interlinkages among various sectors. Sicat noted that foreign investments (mostly American) were engaged in mining, public utilities, trade, agriculture and import-substituting manufacturing which has enjoyed high profit rates as a result of trade protection. He further noted that the amount of foreign investments which had responded to the 1967 legislation was not sufficient to absorb the growing labor force of the economy. The law must be modified further to attract more foreign investments as suggested by him in this paper.

Hooley and Sicat (1967) argued that the investment incentives will not necessarily alter the aggregate level of investments if there is a binding constraint on the level of domestic savings. What these measures would accomplish is the reallocation of existing savings into areas with higher rates of return which these incentives induce.[4]

The quantitative links between the package of investment incentives measures and the rates of return were estimated by Gregorio (1979). In this study, she computed the internal rates of return and the user cost of capital in the presence of the investment incentives measures. She found that the rate of return was increased by 2 percentage points as a result of accelerated depreciation, 2 percentage points due to tax exemption on imported capital equipment, 3 percentage points due to the expansion of reinvestment allowance and 4 percentage points due to additional deduction of direct labor and local raw materials cost. The user cost of capital was reduced by 14 percentage points due to accelerated depreciation, 15 percentage points due to tax exemption on imported capital equipment, 10 percentage points due to tax credit for withholding tax on interest on foreign loans, 19.7 points for reinvestment allowances, 3.5 percentage points for labor training allowances and 18.4 points due to labor expense allowance.

The above quantitative impacts indicate that the measures, if availed, will indeed affect the level or allocation of investment resources in the Philippines. Whether investments have increased or been significantly reallocated because of these measures depends upon the actual availments of the privileges. de Leon (1981) claimed that only 11 percent of total annual investments enjoyed the investments incentives. Even if the respective proportions of savings and gross domestic capital formation to gross national

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[4]This point is not necessarily unique to the Philippines. See Shah and Toye (1978).

product have increased, there was no strong reason to believe that this was the result of the government's incentives measures.

Manasan (1986) updated her earlier study (Gregorio, 1979), focusing on the changes in investments laws embodied in the Omnibus Investments Code of 1981 and the BP 391 in 1983. The 1981 changes consolidated the incentives measures to investments and exports contained in two separate pieces of legislation and did away with some of the measures such as accelerated depreciation allowances. BP 391 modified several areas of the investment incentives provisions of the investment code. Manasan used the internal rate of return and user cost of capital to measure the effects of these two laws for a representative industry.

Official Assessment

There is hardly any attempt on the part of the Board of Investments which supervised the granting of these incentives measures to measure the cost of the impact of the incentives measures. This agency seems to monitor only the aggregate increase in investments and exports and attribute whatever gains the country has to the investment incentives which it provides and whatever insufficient investment performance to exogenous factors such as the peace and order situation prevailing in the country. Hardly any pronouncement is made by the agency regarding the opportunity cost of these investment incentives.

The 1989 Investment Priorities Plan (IPP) contains a few paragraphs assessing the 1988 IPP. The following are the highlights of the official evaluation. There were a total of 288 investment areas in the 1988 plan. Sixty-two percent of these were in the manufacturing sector and 24 percent were in agriculture. The 1,337 investment projects which BOI supported yielded a total investments of 30.97 billion pesos which is "the highest investments so far recorded" according to the 1989 IPP. This amount was 47.5 percent over the 1988 target of 20 billion pesos and 160 percent over the 11.9 billion pesos investment target of the 1987 IPP. These new investments will provide about 128,052 jobs when the projects will be fully operational. This number is 56 percent over the 1987 figure of 82,101 jobs created by the 1987 investment projects.

The actual distribution investments made in 1988 differed significantly with the 1988 IPP. Seventy-four percent of the 1988 actual investments were in manufacturing and only 10 percent were in agriculture. The remaining share went to public utilities, energy-related and tourism-oriented projects. In manufacturing, the largest taker of investments was the chemical sector, followed by the electrical and electronic products as well as the textiles and garments groups. In terms of number of projects, the largest taker was the garments group followed by prawns, textiles, wood products and electrical and electronic products.

The regional dispersal of enterprises which was one of the objectives of the 1988 IPP appeared to be given a boost. In 1988, the share of Metro Manila in the total investment projects in 1988 (at least those supported by the BOI) declined to 47.4 percent fro 59.3 percent in 1987. The BOI attributes this change to its locational policy.

V. ECONOMIC EFFECTS OF FISCAL INCENTIVES IN A STATIC FRAMEWORK

In this section, the results of the analysis on investment incentives using a static general equilibrium model are presented. As mentioned in the introduction, the focus of the study is on the duty drawbacks and tax rebates on imported capital equipment. But before this, we discuss the salient features of the data on fiscal incentives and indirect taxes and how they are used in the model.

Indirect Taxes and Fiscal Incentives Data

Tables 1 shows the indirect and corporate tax rates of the Philippine economy using data for 1989. These rates reported in Table 8 are adjusted to take into account the inefficient administration of these taxes and the duty and tax forgone as a result of the fiscal incentives. We describe briefly these adjustments.

Let t, τ^*, s, and l be the book rate, actual tax revenue rate, implicit subsidy rate due to incentives, and leakage rate due to imperfect enforcement of the tax or duty. Then $t-l = \tau^*+s = \tau$. If there are no fiscal incentives, then the tax rate (τ) should be τ^*.

Since we are modeling fiscal incentives as well, we have to treat the government as receiving the actual and forgone revenue of the tax. Thus the average tax rate that is used in the model is equal to τ or the effective rate.

The duty or tax drawback incentive rate, s_j, is equal to $-(t_j-l_j)$ if the incentive applies to the entire volume of imported good. Since only a portion (e.g. say α) of the total imported good j is covered, then s_j is equal to $-\alpha(t_j+l_j)$. These tax and duty drawbacks are applied only on the importation of machineries in the model.

α is estimated using the proportion of the data on tax and duty forgone by the government as estimated by the Tariff Commission. In 1989, the amount of import duties forgone amounted 1.35 billion pesos while the amount of tax revenue forgone (for both the excise and the value added taxes) was 0.94 billion pesos. The proportions of excise and value added tax rebates are obtained

from the actual proportions of the two tax revenues to their total.

To obtain the data on indirect tax rates in Table 1, the book rates are adjusted for the tax and duty forgone and the inefficiencies in tax enforcement. This is done in the following way:

$$\tau_j = \left(\frac{R+D}{\sum_j (t_j+s_j) M_j} \right) t_j$$

where R and D are respectively the actual revenue and the duty and tax rebates. This adjustment implies that the inefficiency in tax enforcement is equally as bad in all sectors in the economy.[a]

The government then uses the duty and tax forgone on imported machineries to subsidize investments. The value of fiscal investment incentives, I_j, discussed in section III is estimated using the data provided in Table 2. Table 2 is about the equity investments in projects approved by the Board of Investments, which are eligible to receive the fiscal incentives.

The proportions in Table 2 are used to allocate the total tax and duty forgone to the various sectors in the model. These proportions are further adjusted to take into account the importance of capital equipment to the sector. This study assumes that owing to the relatively lower capital intensity of the primary agricultural sectors (sectors 1,2 and 3), these sectors do not receive any of the incentives in the form tax and duty drawbacks on imported capital equipment. If this assumption is an incorrect statement about the Philippine economy, the error that it causes is likely to be small.

Table 3 is used to allocate the aggregate investments reported in the country's national income accounts to the various sectors of the model. Table 4 shows the way fiscal incentives are allocated to the various sectors of the model using the information described in the preceding two tables.

Policy Experiments

Three counterfactual simulations were conducted in this study. One simulation involves the withdrawal of the duty drawback and tax rebates applied on imported machineries while continuing the subsidies on investments. The second policy experiment retains the

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[a] The ideal approach should have been to get sector-specific leakage rates but this kind of information is not available.

tax and duty drawback scheme on imported machineries but provides the subsidies on an equal rate basis. In doing this experiment, an endogenous uniform subsidy rate on investments was computed subject to the same level of real government spending. The third simulation withdraws the entire package of tax and duty rebates on imported capital equipment as well as discontinues the granting of investment subsidies.

These simulations are chosen to address the two policy issues mentioned in the introduction, namely the opportunity cost of fiscal incentives and the effect of a discriminatory scheme of allocating such incentives.

User Cost of Capital

Table 5 shows the changes in the user cost of capital by sector. The components of this cost include the marginal cost of producing the capital good and the sector-specific investment subsidy rate and the corporate income tax rate.

The withdrawal of the duty drawback package of incentives (Case A) increases the user cost of capital. This is because the policy change increases the cost of producing capital goods in the economy. With the duty drawback scheme removed, the cost of imported machineries rises and with that, the cost of producing capital goods. Except for services, all the sectors display an almost uniform rate of increase in the cost of capital good. The cost of capital for the majority of the sectors increases by 0.75 percent, while that for services rises by close to one percent. There seems to be a pattern that the smaller the volume of investments the lower the rise in the user cost of capital. For example, the primary agricultural sectors have the lowest and services have the highest percentage increase in the user cost of capital. The cost of machineries increase less than those of the other manufacturing sectors because this sector receives a higher rate of investment subsidy.

Making the investment subsidy rate uniform (Case B) also increases the user cost of capital, although at a lower rate than in the case of removing the duty and tax rebate package of incentives. The result apparently is consistent with the expectation that a uniform investment subsidy encourages investments everywhere in the economy. In order to attract resources into the capital good producing sector, the marginal cost of producing the capital good has to rise.

The decline in the user cost of capital for services is a result of the adjustment in government investments. In this policy experiment, we are computing a uniform subsidy rate subject to holding the real government spending constant. By making the subsidy rate uniform, the government's obligation in providing investment subsidies rises as the volume of investments in the

economy increases. Since the total government spending is held constant, a reallocation of such spending occurs. One such item in the government's budget which declines is government investments which are all applied in the services sector. Thus the demand for capital good in the services sector declines and accordingly this reduces the user cost of the capital good used in this sector.

Removing both the duty and tax rebates on imported machineries as well as the investment subsidies also increases the user cost of capital. This percentage increase is lower than that in case A because investment subsidies are discontinued causing investments in previously subsidized sectors to decline. This increase is higher than that in case B because the cost of imported machineries increases with the duty drawback removed, which causes the cost of producing the capital good to rise. The cost of capital in the services sector rises by more than that for this sector in case A because this sector has the largest volume of investments and accordingly has to make the largest adjustments resulting from the increase in the cost of producing the capital good.

Changes In Investments

Table 6 shows the effects of these experiments on the volume of investments. In Case A, total investments decline by roughly 650 million pesos when the fiscal incentives measures are withdrawn. This is consistent with the result obtained for the user cost of capital. Since the cost of capital is higher, the amount that is demanded of the capital good decreases. Majority of the downward adjustments in investments occurs in the services sector. Agricultural processing is a far second in terms of reduction in investments. This sector consists of construction, public utilities, trade, financial and personal services, and accordingly is fairly large in terms of output. Of the 92.61 billion pesos in investments in 1989, 65.49 billion pesos are in the services sector, and mostly in the financial services firms based on the data published by the Securities and Exchange Commission (see Table 3). Thus based on the results that we are getting, it appears that the financial services sector will receive slightly less investments if the fiscal incentives are withdrawn.

The agricultural processing sector is next to services in the size of investment cutbacks. Consisting mostly of food, beverages and tobacco, this sector is at least a third of the country's entire manufacturing sector. About 57 million pesos in investments are expected to disappear if the fiscal incentives are withdrawn. This figure is roughly an insignificant percentage of the 10 billion pesos of investments made in this sector in 1989.

Natural resources, textiles, wood and other industries also get lower investments in the range from 10 to 20 million pesos. The remaining sectors of the model also experience cuts in investments at the rate of at most 10 million pesos.

These numbers on changes in investments appears to be consistent with what is observed in existing studies that the fiscal incentives measures hardly change the investment behavior of businesses in the country (e.g. see Manasan, 1979). A word of caution ought to be mentioned here. The package of investment incentives which is offered by the government consists also of depreciation and investment allowances, tax holidays, and related measures and these are not considered in this study. This is a plausible reason why we are getting insignificant numbers in investment changes when the tax and duty drawbacks are withdrawn.

In case B, we expected increases in investments because both the fiscal incentives are in place and the investment subsidy rate is made available to all sectors at a uniform rate basis. As discussed above, government investments go down by 312 million pesos. It is interesting to note that the reduction in the user cost of capital as a result of the decline in government spending stimulates investments in the services sector which obtains over a billion and a half pesos of new investments.

Case C results are similar to that of Case A. A total of 680 million pesos of investments may be cut as a result of withdrawing the entire package of investment incentives based on the duty and tax rebate scheme on imported machineries.

Welfare Effects

Table 7 shows the welfare implications of the policy experiments. In the benchmark case, the real income of the government amounts to 107.14 billion pesos while that of the private sector is 777.38 billion pesos. The total gross domestic product of the economy is 884 billion pesos. In case A, the government's real income rises to about 109 billion pesos because of the elimination of the tax rebate and duty drawback incentives applied on imported machineries. However, that of the private sector falls to 774 billion pesos. The economy is therefore made worse off with the elimination of the fiscal incentives for investments. The equivalent income variation is about 310 million pesos or .04 percent of the benchmark gross domestic product.

The policy experiment conducted in case B involves retaining the tax rebate and duty drawback incentives but making the investment subsidy rate uniform to all the sectors in the model subject to holding real government spending constant. Thus, the real income of the government in Table 7 for case B is the same as in the benchmark case. The real income of the private sector falls slightly to about 80 million pesos. In case C, the real incomes of the government and the private sector fall by a combined amount of 340 million pesos, representing .05 percent of the benchmark gross domestic product.

Can we conclude on the basis of these numbers that the current package of investment incentives are Pareto-superior to the alternative policy environments conducted in this study? The numbers cannot be used to support this statement since these are static welfare impacts. A correct evaluation of the welfare implications of the policy experiment would have to involve computing the present value of the stream of real incomes accruing to the government and the private sectors of the economy which are induced by the policy environment and comparing this with the benchmark aggregate income. Thus, we do not have any ground to conclude whether the economy is made better or worse off by the fiscal incentives measures which are analyzed in this study.

Being small relative to the benchmark figures, these numbers appear to tell us that the fiscal incentives hardly matter at all. Manasan (1979) has argued that indeed this is so. On this issue, one should distinguish between the level of the distortion from the incentive structure which the distortion causes. The size of the changes is affected by the level of investment subsidy. This number is 2.67 billion pesos, hardly a percent of the gross domestic product. If we calibrated the model to 1988, we would have been working with over 6 billion pesos of tax and duty forgone due to investment incentives and clearly the equivalent income variation would have increased significantly.

It is the incentive structure induced by the fiscal incentives measures which is worrisome. This structure tends to accord more investment resources to a portion of the economy which are deemed important in the government's industrialization strategy. Our figures on investments, although small, indicate that there are significant investment allocation effects of the fiscal incentives. What is the long run welfare implication of such an incentive structure? Is the economy better of under the current investment incentives program or under an alternative one such as for example making such incentives uniformly available to all sectors (Case C). Unfortunately, these issues cannot be addressed in a static framework.

VI. CONCLUSION

This paper develops a general equilibrium analytical framework for analyzing some investment incentives measures currently used by the Philippine government and applied it to analyze the static economic effects of such measures on the user cost of capital, investments, and economic welfare. The current package of incentives measures consisting of tax rebate and duty drawbacks on imported machineries and which are apportioned to the various producers of the economy on a priority/non-priority rationing scheme may be described as inducing two sets of policy distortion. One is that it makes imported machineries cheaper than other imported products in the economy. The other issue is that the package discriminates among the various industries or firms in

allocating such subsidies. The paper examines both issues in a static framework.

The withdrawal of the duty drawback package of incentives (Case A) increases the user cost of capital because by withdrawing the tax rebate and duty drawback incentives on imported machineries, an important input in producing capital goods, the government increases the cost of producing capital goods in the economy. If the investment subsidy rate is made uniform (Case B), the user cost of capital also rises, although at a lower rate than in the case of removing the duty and tax rebate package of incentives. These effects also hold in case C when both changes A and B are applied. Thus one can conclude that the current package of incentives examined in this study has the effect of lowering the user cost of capital.

The response of investments to these changes in user cost of capital is mixed. In both cases A and C, investments fall because of the withdrawal of the tax and duty drawbacks on imported machineries. In this case, the supply of investment good shifts leftward increasing the cost of capital and reducing quantity of investment good demanded in the economy. But when the investment subsidies are made uniformly available to all sectors, which also increases the user cost of capital, investment rises. This implies that the increase in the demand for investments more than offsets the decline in investment demand in the priority sectors. In case C, it appears that the shift in the supply curve dominates that of the decline in demand caused by the eliminating the investment subsidies.

In all three policy experiments (A, B and C), the economy is worse off in a static sense. But these results cannot be used to conclude that the current package of investment incentives are Pareto-superior to the alternative policy environments conducted in this study. A correct evaluation of the welfare implications of the policy experiment would have to involve computing the present value of the stream of real incomes accruing to the government and the private sectors of the economy which are induced by the policy environment and comparing this with the benchmark aggregate income. Thus, we do not have any ground to conclude whether the economy is made better or worse off by the fiscal incentives measures which are analyzed in this study.

The incentive structure induced by the fiscal incentives measures which tends to provide more investment resources to priority industries is an important policy concern. The results on investments indicate that there are significant investment allocation effects of the fiscal incentives. Would the long run welfare implication of such an incentive structure be beneficial to the economy? Would the economy be better off if the government simply allocates investment subsidies in a non-discriminatory manner in the long run? These questions are not addressed in this paper.

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Table 1
Average Indirect Tax Rates
(in percent)

Sector	Tariff Rates	Excise Tax Rates	VAT Rates
Crops	28.35	0.00	0.00
Livestock	26.91	0.00	0.00
Fishery	23.31	0.00	0.00
Nat. Resources	11.76	2.21	1.14
Ag. Processing	31.53	0.89	1.39
Textiles	34.53	0.00	1.60
Wood,Paper & Rubber	29.91	0.00	1.47
Chemicals	19.63	0.00	1.25
Petroleum Refineries	13.29	9.81	0.00
Machineries	21.25	20.44	1.60
Other Industries	23.43	8.17	1.60
Services	0.00	0.00	1.28

Table 2
Equity Investments In Projects Approved By the BOI: 1989
(in billion pesos)

Sectors	Amount	Share
Agriculture	1604.94	4.04
Fishery	838.92	2.11
Mining	3140.08	7.91
Manufacturing	26909.77	67.81
Energy-related projects	82.56	0.21
Public Utilities	260.19	0.66
Export traders	54.27	0.14
Commerce	817.46	2.06
Service exporters	19.23	0.05
Tourism Oriented Projects	2895.02	7.30
Services	1369.24	3.45
Construction	19.10	0.05
Financial institutions	2.50	0.01
Real estate	1651.38	4.16
Regional headquarters	19.67	0.05
All industries	39694.33	100.00

Source: National Statistical Coordination Board

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Table 3
Capital Investments of Newly Registered Domestic Stock Corporations and Partnerships By Sector: 1989
(in million pesos)

Sector	Amount	Share
Agriculture, Fishery & Forestry	256.30	3.19
Mining & Quarrying	211.02	2.61
Manufacturing	1902.30	23.49
Construction	276.16	3.41
Electricity, Gas & Water	0.63	0.01
Trade	1015.58	12.54
Financial Sector	3871.85	47.81
Transport	274.81	3.39
Services	288.27	3.56
All Industries	8098.91	100.00

Source of Data: Securities and Exchange Commission

Table 4
Computing Incentives Rate For the Twelve Sectors of The Model

Sector	Allocator (in percent)		Amount (in billion pesos)		
	Invest-ment	Incen-tives	Invest ment	Incen-tives	Incent ives Rate (%)
Crops	1.67		1.54		
Livestock and Poultry	0.81		0.75		
Fishery	0.71		0.66		
Resource Industries	2.61	8.12	2.41	0.22	9.88
Agricultural Processing	11.35	32.77	10.51	0.88	9.08
Textile,Apparel, Ftwr & Leather	3.17	9.14	2.93	0.24	9.08
Wood,Paper & Rubber	2.30	6.65	2.13	0.18	9.08
Chemicals	1.39	4.02	1.29	0.11	9.08
Petroleum Refineries	1.47	4.23	1.36	0.11	9.08
Machineries and Transport Equipment	1.58	10.73	1.47	0.29	24.29
Other Industries	2.23	6.43	2.06	0.17	9.08
Services	70.72	17.91	65.49	0.48	0.74
	100.00	100.00	92.61	2.67	

Table 5
Percentage Change In Prices of Capital Goods, By Sector

Sector	Case A	Case B	Case C
Crops	0.7532	0.4682	0.6127
Livestock	0.7532	0.4682	0.6127
Fishery	0.7532	0.4682	0.6127
Natural Resources	0.7533	0.4683	0.6123
Agricultural Processing	0.7535	0.4683	0.6124
Textiles	0.7535	0.4683	0.6124
Wood, Paper and Rubber	0.7535	0.4683	0.6124
Chemicals	0.7535	0.4683	0.6124
Petroleum Refineries	0.7535	0.4683	0.6124
Machineries	0.7534	0.4680	0.6122
Other Industries	0.7535	0.4683	0.6124
Services	0.9933	-0.0588	1.1617

Notes: 1. In Case A, the duty drawbacks and tax credits are withdrawn.
2. In Case B, the discriminatory manner of providing investment incentives is replaced with a uniform subsidy rate on investment purchases.
3. Both cases A and B.

Table 6
Changes In Investments, By Sector
(in million pesos)

Sector	Case A	Case B	Case C
Crops	-7.80	39.55	-4.78
Livestock	-3.82	19.33	-2.34
Fishery	-3.33	16.88	-2.04
Natural Resources	-13.28	67.31	-8.13
Agricultural Processing	-57.50	291.50	-35.20
Textiles	-16.04	81.27	-9.83
Wood, Paper and Rubber	-11.67	59.10	-7.15
Chemicals	-7.06	35.72	-4.32
Petroleum Refineries	-7.43	37.66	-4.55
Machineries	-8.92	45.17	-5.46
Other Industries	-11.30	57.22	-6.92
Services	-399.50	1649.70	-471.40
Government Investments	-109.00	-312.20	-118.50
Total	-656.65	2088.21	-680.62

Notes: 1. In Case A, the duty drawbacks and tax credits are withdrawn.
2. In Case B, the discriminatory manner of providing investment incentives is replaced with a uniform subsidy rate on investment purchases.
3. Both cases A and B.

Table 7
Welfare Effects of Investment Incentives
(in billion pesos)

Scenarios	Gov't.	Private	Total
Real Income			
Base Case	107.14	777.38	884.52
Case A	109.25	774.95	884.21
Case B	107.14	777.30	884.45
Case C	111.90	772.21	884.11
Percentage Change			
Case A	1.97	-0.31	-0.04
Case B	0.00	-0.01	-0.01
Case C	4.44	-0.67	-0.05

Notes: 1. In Case A, the duty drawbacks and tax credits are withdrawn.
2. In Case B, the discriminatory manner of providing investment incentives is replaced with a uniform subsidy rate on investment purchases.
3. Both cases A and B.

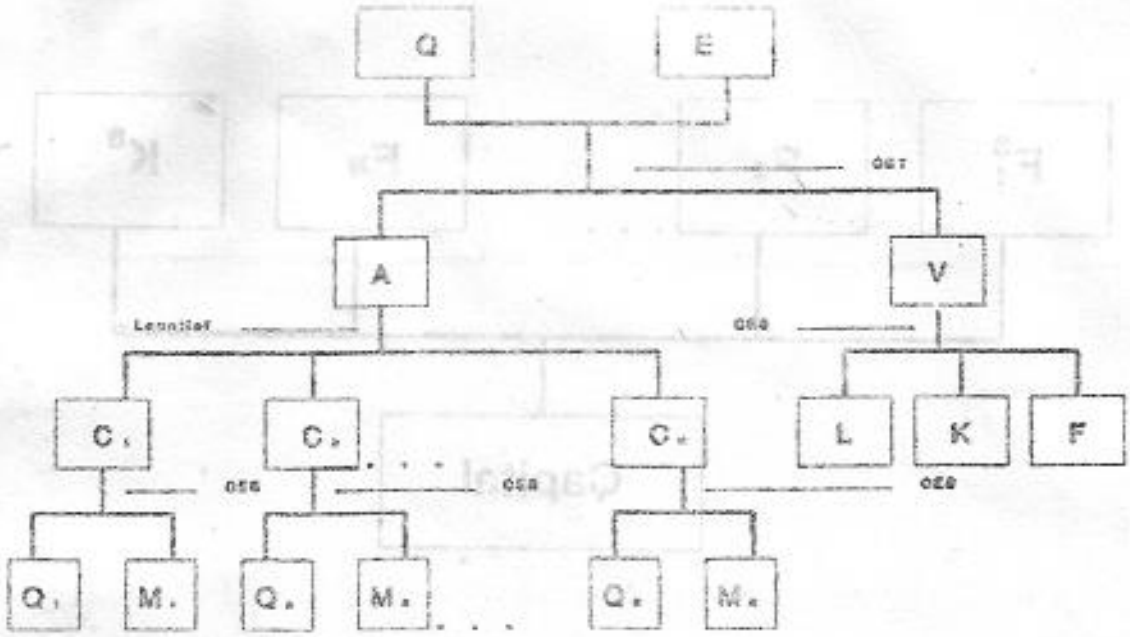

Figure 1. Production Technology Structure

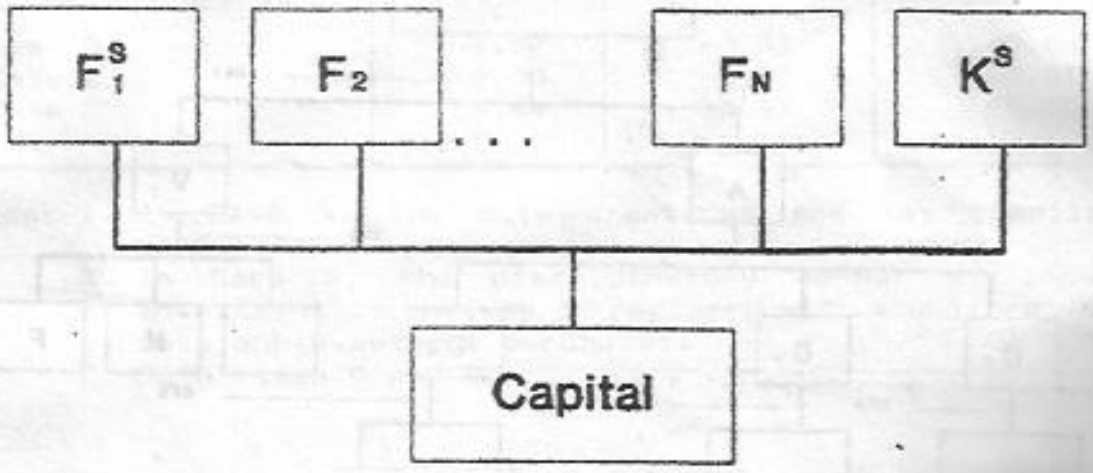

Figure 2. Allocation of New Capital Good Production