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PHILIPPINE MARKET FOR EDUCATED LABOR*

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THE PHILIPPINE MARKET FOR EDUCATED LABOR

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This paper attempts to analyze the Philippine market for labor with college degrees. By market we mean, on the one hand, the composite of economic sectors that demand educated labor, and on the other, the individuals who pursue higher education and thereafter join the labor force, and the schools that supply the education facilities for the latter.

The interest to write this paper rose from the explicit concern not infrequently heard nowadays about the weaknesses of our educational system. Among its weaknesses are the poor quality of instruction at all levels and the lack of control of the Department of Education over the dominant private (mostly profit) institutions at the secondary, and especially, at the collegiate levels. A second problem is the high rate of unemployment (and probably underemployment) of college graduates. There is also a question of whether the educational system supplies the right kind of professional skills - individuals with non-scientific training in the humanities, soci[illegible] education, etc.. and non-rigorous training i[illegible] One view argues that at the stage of develop[illegible]

Philippines, the educational system provides skills required by the different economic sectors. This argument seems to imply that the production of poorly qualified teachers, lawyers, secretaries and business managers is efficient simply because a large proportion of them are employed(1).

It can be shown that the particular output we observe is determined by the interaction of schools and students. As explained in the theory of the firm the price and output of a given commodity is determined by the cost function, by the degree of monopoly of the firm, and by the demand function for the product. To a very great extent, the same analysis may be applied to the production of professional skills. Works on education concentrate on the latter question, that is the demand for education by students and hardly on the school decision to provide facilities of each given type and at the observed prices or tuition cost. One reason for the neglect of this aspect of the market might be due to the fact that the motivation of schools is more complex than that of a business firm and cannot realistically be assumed for profit.

Much of the literature was developed in Western societies where schools are not for profit and are supported extensively by the government and/or fundations. A second reason is the lack of data on cost. Because of the absence of cost data, the analysis of the structure of the schools is deferred as a separate research*. The paper concentrates on labor market adjustment.

The paper tries to do two things: firstly, develop a theory of demand for education under specific imperfections in the education market to explain the persistence of the disequilibrium condition in the labor market; secondly, give an empirical analysis of the Philippine labor market for educated labor.

The empirical analysis of the supply of educated manpower would give us some objective picture of the labor market. It would measure the amount of investment that is not productive as a consequence of unemployment. At the same time, the time series data on graduates by field would indicate whether through time there is some adjustment of

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* An empirical study of the structure of Philippine Educational Institution is currently being undertaken by the author.

the market towards full-employment equilibrium. One objective of gathering this information is to be able to predict possible future demand for college graduates and to compare this to the annual expected increment in supply.

The paper is divided into three parts: Part I discusses the demand function for ~~ecuation~~ education under specific market imperfections. The theory tries to show how market imperfections lead to the persistent unemployment situation here both of those with college education and those without it. Finally, it discusses the problems of financing education.

Part II presents and analyzes important statistics on the labor market of the Philippines. It tries to evaluate, based on purely economic criteria the decision of the population in acquiring the different levels and fields of specialization shown in the statistics. The evaluation will be based on the estimated returns to investment in education, taking into account the high but varying unemployment rates and the cost of going to school.

Part III gives the concluding remarks that indicate some policy considerations.

Part I

Individual Investment Demand for Education

A. Relevant investment alternatives in education

This section tries to apply the investment theory to education under specific imperfections in both labor and capital markets.

The most basic refinement of the investment theory in education is the specification of the investment alternatives that a student of given personal aptitude and academic ability faces. Works by occupational psychologists (2) have helped us to group professional fields by dominant personal characteristics. Students who have similar dominant personality characteristic as those belonging to a professional group may regard the fields in the group as their investment alternatives. For each group of fields, G, consisting of fields i, j, ...m, the investment criteria of maximizing the present value of income from the investment may be applied. Under perfect conditions in the capital market including perfect information the only relevant alternatives are the choice of field and level, hence the investment function is as follows:

$$I_i = f\ (PV_i,\ PV_j, \ldots,\ PV_m)$$

Investment in educational field i will be made if $PV_i > PV_j > PV_m > 0$. PV is the present value of expected net income attributed to education discounted at the relevant rate of interest.

Therefore we may consider that the various levels and fields of specialization (grouped according to personality factors) are the basic education alternatives. These are the only alternatives under perfect market conditions and in a situation where the schools are of equal quality. The educational systems of England, Sweden, and Russia may approximate this condition. However, for a majority of countries the quality of education differs significantly among schools. In the U.S. the quality ranges from the ivy league and a few state-supported universities down to some diploma mills. Fortunately for the U.S., there is an effective and widespread accreditation system which probably helps to raise the quality of the majority of these institutions. The really "bad" schools are in the minority. The Philippine case is just the opposite of that in the U.S. where in our case accreditation covers an insignificant proportion of higher educational institutions, and where the reputedly good schools compose a very small minority.

Before proceeding to the analysis of investment demand for education, let us assume that the productivity of a worker depends on how much he learned in school. In such a case, we might conclude that there is a positive relationship between salary and his education. We may further assume that employers recognize differences in quality among schools and that they rank them by their respective quality.

At the same time, how much a student of given ability learns depends on his effort and organization (we will call diligence) and on the school he enters. We hypothesize that there is an increasing marginal disutility of diligence, at least beyond a certain point. This might be very contrary to some philosophical arguments that the act of learning is an exercise of the intellect, which by itself gives pure joy. The economist might argue that there is a diminishing marginal joy from learning. In such a case, the student has to be compensated for succeeding degrees of diligence by increasing benefits. Looking at this naively or mundanely, we argue as on the graph below:

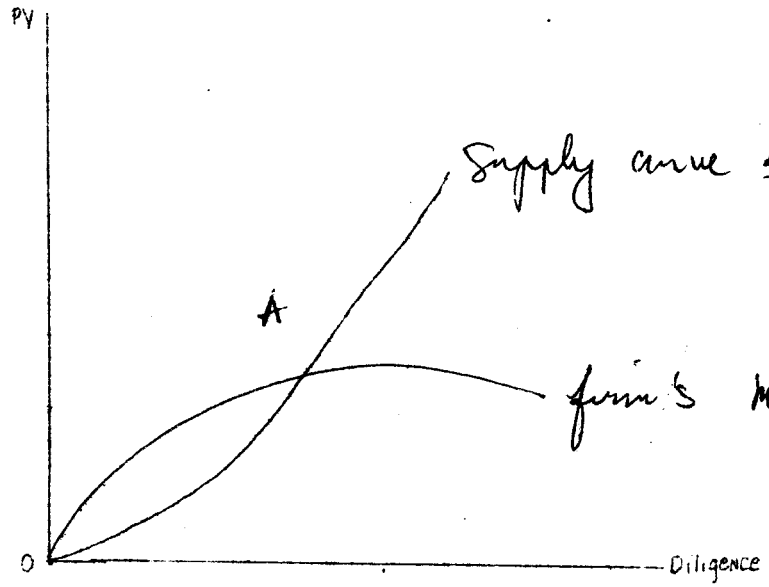

Chart 1

Assuming that the firm's MPV curve is as drawn above, the equilibrium point will be at point A where the market marginal product of diligence is equal to the individuals supply of diligence

Table 1.a. REGIONAL DI

The third important decision the student has to face is the selection of a school. The number of alternatives increases as the variation in quality increases. Private schools vary also in the tuition charges; very likely the charges are indirectly related to quality. In countries where there is a mixed system of privately and publicly financed institutions, the tuition and other charges at the public universities and colleges are of course lower than the private institutions. This mixture results in significant variation in cost to the student for each given quality.

The alternatives discussed have increased in number from the basic choice of level and field of specialization to the choice of school and once enrolled, how well to perform, given one's inherent ability.

To be able to make the best decision of maximizing the present value of income of his investment in the chosen level, field, school, and performance, he needs very extensive information about both labor and education markets.

The following section analyzes the adjustment in the two markets under two situations: (1) condition of perfect capital market and perfect information and (2) under varying degrees of perfect conditions.

(1) Perfect capital market condition and perfect information of both employers and students would result in equality of present value net of rent on ability within each group of fields. This means that if differences in income among members of each profession exist this could all be accounted for by differences in inherent academic ability. The market for educated people would tend towards full-employment equilibrium as no one would go to school if his employability at the margin is zero.

To explain this argument, let us assume an initial disequilibrium situation where we have unemployment in some fields or differential unemployment rate, where the present value (net of rent on ability) differs by institution where degree is obtained and by field of specialization within a group of fields.

The first adjustment will be to move away from fields where the rate of return is lower and where the unemployment rate is higher than in other fields. This adjustment in the supply of graduates would tend to equalize returns among fields. Secondly, there will be a withdrawal of students away from schools of poor quality towards those of good quality. Either of two things will happen which would upgrade the qua-

lity of graduates - the "bad" schools will try to raise quality (or lower tuition) to keep their students or that the "good" schools would expand their facilities. The over-all tendency would result in equality in present value of income net of rent on ability. Adjustment toward this equilibrium involves an interaction between students and schools.

There will also be a tendency towards full-employment in the educated labor market. We have assumed that income and probability of employment are a direct function of amount learned in school which in turn depends on quality of school, ability and diligence. When there is unemployment, students who have very steep marginal disutility of diligence curve and those of the lowest academic ability will be driven out of the education market. They have the smallest probability of being employed.

? Transitional paragraph is needed.

(2) Let us examine two cases. (a) where the capital market is imperfect and (b) where information is very limited.

Case 2 a. Imperfect Capital Market but with Perfect Information

The most common imperfection in the capital market occurs when students are not able to borrow an unlimited amount (un-

limited from an individual's point of view only) to finance investment in education. This problem is discussed in a separate section.

Among the private schools, the better the quality of school the higher the tuition charges (even in the presence of big subsidies from foundations and government). It is expensive to provide good education. Lack of sources to finance education would prevent some students from enrolling in the "good" schools. If these students are forced to go to second-rate schools, the supply of these graduates relative to graduates from the better schools will increase. This will result in differences in income among persons of given ability. The inability of students to borrow to enroll in the better schools when the present value of investment in education from "bad" schools is smaller than that from a "good" school will not permit the attainment of equilibrium in the capital market, where the present value net of rent on ability is equal.

More specifically, the marginal present value of going to a "good" school is greater than its marginal cost. But students cannot make optimal decision because the marginal cost cannot be financed. The schools would tend to have

greater variation in quality than in Case 1 with a larger proportion of poor than good quality schools, and a larger number of students from "bad" schools than from "good" ones.

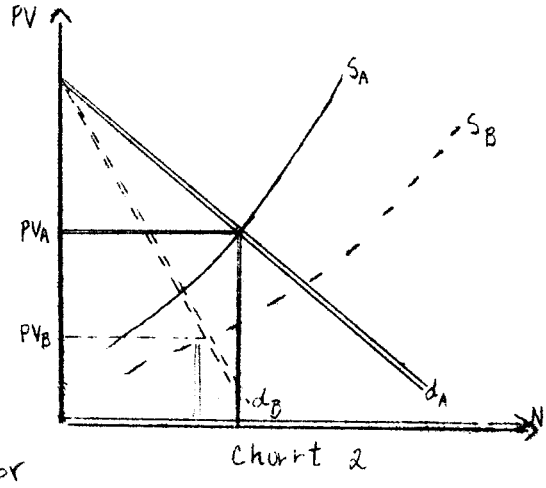

Chart 2

The market for educated labor in this case may be differentiated - a market for college graduates from good quality schools where the supply function is S_A and another for college graduates from poor quality institutions where the supply function is to the right of S_A at S_B. One may argue also that the marginal productivity of better educated labor for each given job, diminishes less slowly than that for the poorer educated labor, hence the demand curve for labor, B type, is steeper and to the left of d_A. Equilibrium present values will not be equal, for labor of equal inherent ability.

Case 2 b. Imperfect Knowledge With Unlimited Supply of Investment Funds

Lack of knowledge about the schools where one can pursue best each given specialization at a given level, the market opportunity (income and employment) for each type of education (level, field, school), and the premium paid on good academic performance would clearly result in half-hazard choice of education. The student will not be able to make an optimal decision unless he knows well all the relevant alternatives. If the student thinks that his choice is limited to investment of money in alternative levels and fields of specialization, he will not be able to make a correct choice. An example will best illustrate the problem. Let us take an above-average student who chooses to take a mechanical engineering degree, after observing that among engineering fields, it has the highest average present value and the lowest unemployment rate. A poor choice of school and an undistinguished academic performance will give him a return to his investment much below the average on which he based his decision. At worst, he might even experience some difficulty in finding a job. If by chance he chose a "good" school and could show a good academic record, the return to his investment would be close to what he expected.

If a significant number of students exists in a limbo of ignorance, which may not be far from the truth in our society, equilibrium in the education and labor market will never be attained, except by some happy accident.

In the next section dealing with Philippine labor market, imperfections in the market will be used as an explanation of the disequilibrium condition of unemployment of educated labor.

B. The Unemployment Situation

Let us examine the markets for two types of labor - those with higher education and those without. We wish to take into consideration the effects of the existence of an alternative occupation, agriculture, and the existence of minimum wage legislation.

Persistent urban unemployment of those without higher education can be explained in terms of malfunctioning of the labor market so that supply and demand for labor cannot be equilibrated; there is no value which will simultaneously "solve" the two functions.

In chart 3 the demand and supply schedule for un-

better: "cannot attain equilibrium."

skilled labor are presented. The demand curve for labor,

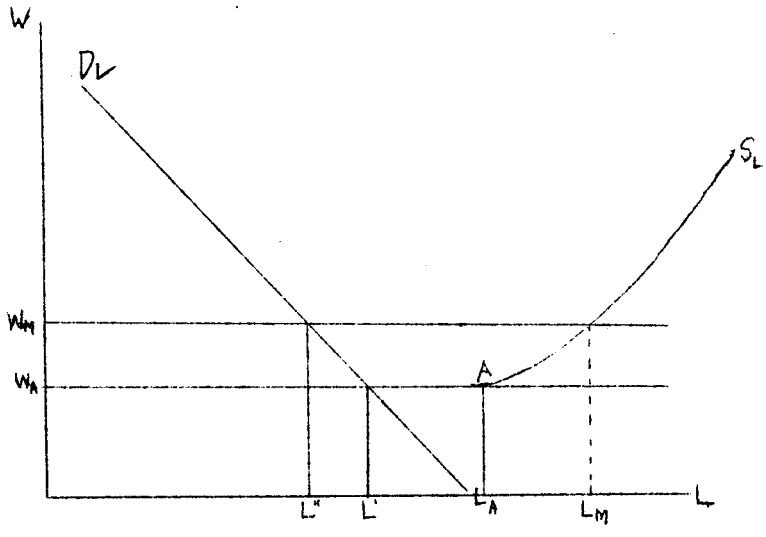

Chart 3

d_L is the traditional function - the downward-sloping marginal product of labor, curve. The supply curve of labor is upward-sloping from point A showing that at successively higher real wages, more workers will make themselves available for urban employment.

The positively-sloped supply of labor begins at point A. There is some wage rate, say W_A, higher than the subsistence or current agricultural wage which will draw agricultural workers away from the farm. At wages less than W_A, no workers will make themselves available for urban work because they could earn higher real wages in the agri-

cultural sector. When wages equal W_A, one has a point of transition and urban employment is suddenly more attractive than agricultural work for L_A number of workers. As wages rise above W_A, the number of workers transferring from agriculture to the urban sector is indicated by the supply of labor schedule, AS. It can readily be seen that if point A lies to the right of the demand for labor curve, there is no wage which will equilibrate the market. Wage must be equal to or greater than W_A so that urban employers can hire labor, but at W_A real wage, unemployment emerges as more workers are available for work than will be hired. Under competitive conditions, wage will remain at W_A, L' workers will be employed with $L_A - L'$ unemployed. Therefore, it is possible under competitive conditions, without minimum wage regulation to have chronic, urban unemployment, which may last indefinitely.

Market disequilibrium of the type described above is likely to occur when the urban sector of the economy is very small relative to the agricultural sector, so that the urban demand for labor is small relative to the total labor force. Under these circumstances the number of workers hired at the lowest wage consistent with urban employment is likely to be

smaller than the initial response on the supply side of the market. If agricultural income is exceedingly low, especially if it is below "subsistence", then the urban supply response will be especially large, leading to high levels of urban unemployment.

The presence of a minimum wage will reinforce the market disequilibrium situation. Assume that the government institutes W_M as the legal minimum wage. The number of workers seeking work will rise to $L_M - L''$. Urban unemployment, therefore, can emerge in the absence of minimum wage legislation but the latter can cause unemployment to be greater than it would otherwise be.

Persistent unemployment will increase or decrease over time depending on the relative speed of the rightward shift of the supply and demand curves for labor. If the supply curve shifts faster than the demand curve, unemployment will increase, and the converse will be true if the demand curve shifts faster.

In the case of educated labor, the adjustment toward full-employment involves inter-action between three markets; the labor market, the capital market and the education market

Under perfectly competitive market conditions, adjustment in the market for educated labor necessarily involves adjustment toward an optimal investment allocation among relevant education alternatives. The market for educated labor will tend towards full-employment.

Assuming we have the following long-run supply and demand functions for educated labor for professions i and j, S_i, d_i, S_j and d_j. Let us assume an initial condition of equilibrium in the capital and education markets as indicated by the equality of present values, $PV_i = PV_j$

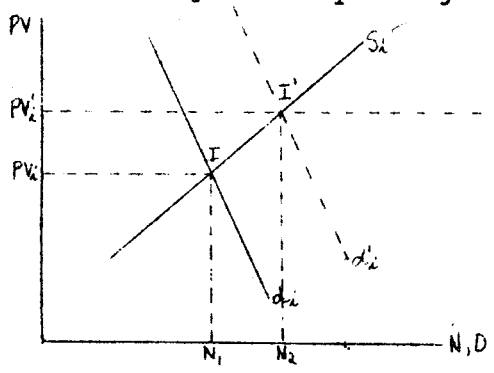

Chart 4a

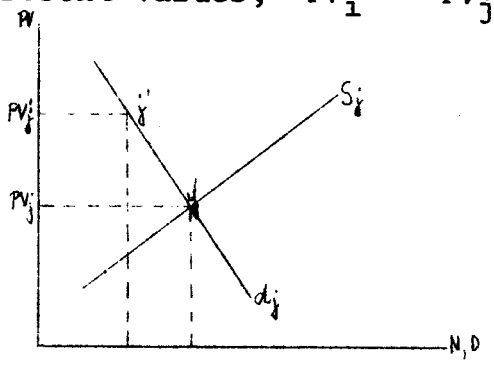

Chart 4b

Let us assume an outward shift in demand for labor in profession i from d_i to d'_i.

Students will shift among fields until their marginal present value of net returns are equal at PV_i and PV_j.

Under perfect market conditions, it is not possible to have unemployment. Unemployment would mean that expected mar-

ginal present value is negative. We made a general assumption that there is a positive relationship between job opportunity (income and employment probability) and amount learned in school. If this assumption is realistic and under perfect information in the market, students of weak academic ability would not decide to go to college since the probability of their being unemployed is relatively high and may mean a negative present value. The labor market would undergo a selective process of employing the best college graduates. If this fact is well known, students would continue to pursue only quality higher education. The adjustment in the labor market would involve a leftward shifting of the supply curve of educated labor till the market is at full-employment. The adjustment is illustrated in the chart below, where the supply curve of labor shifts leftward till full-employment is achieved. The most interesting implication of this adjustment is that the economy allocates its education facilities according to academic ability of its people. The adjustment is given in Chart 5.

Let us have the conditions of Case 2 b. in Part I, where there is imperfect knowledge but under unlimited supply of investment funds. The known alternatives are the different levels of education and fields of specialization. The student is ignorant of the relationship between job opportunity on the

one hand, and performance while in school and quality of school, on the other. His decision of level and field is based on the average job-opportunity (income and employment rate) of those currently in the labor market.

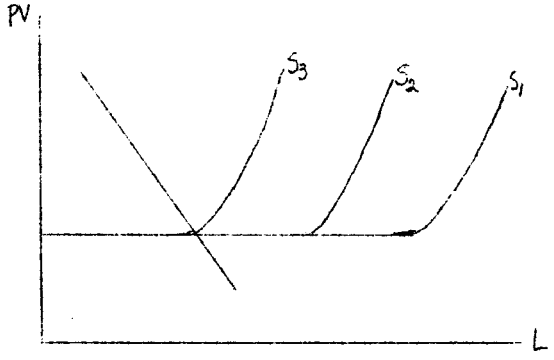

Chart 5

Let us consider the case of high but differing unemployment rates among fields and level of education. The lower the level of education, the higher the rate of unemployment. We want to argue that ignorance of all the alternatives (level, field, school, and performance) will prevent the market from adjusting towards full-employment. Instead the decisions of students based on meager information will result in persistent unemployment. Decisions are likely to be based on the average income of those employed and on the average incidence of unemployment if the estimated average returns to education at the higher levels is positive. Students will continue pursuing degrees as long as the ave-

rage returns are positive. The marginal students who enroll in schools of poorest quality and who perform very badly, have no chance of employment under this condition of high unemployment. But they continue going to school since the basis of their decision is the average rate of return which is definitely higher than what they should expect the returns to be. The case of the brighter students is just the opposite. The expected income from their education is higher than the average and the probability of employment is close to 100 percent. Therefore students' lack of knowledge of their education alternatives will result in a large supply of graduates (including those whose employability is almost zero) than the market can employ at the current wage rates;

C. Capital Market

The capital market consists of the institutions that channel savings from households and business to be made available for investment. It also permits individuals to exchange one form of financial asset into another.

The usual assumption in investment theory of education is that the capital market is perfect and that the market that supplies funds to business is the same one that finances

investment in education. A perfect capital market is one when through the rate of interest, the supply of savings is allocated to the best investment alternatives. Assuming that the supply of domestic savings and funds from other sources is upward sloping and the demand for investment funds is downward sloping as in the chart below, the equilibrium rate of interest will be at r_1. The equilibrium is institutionally accomplished through financial institutions such as commercial, savings and investment banks, insurance companies, stock brokers, etc.

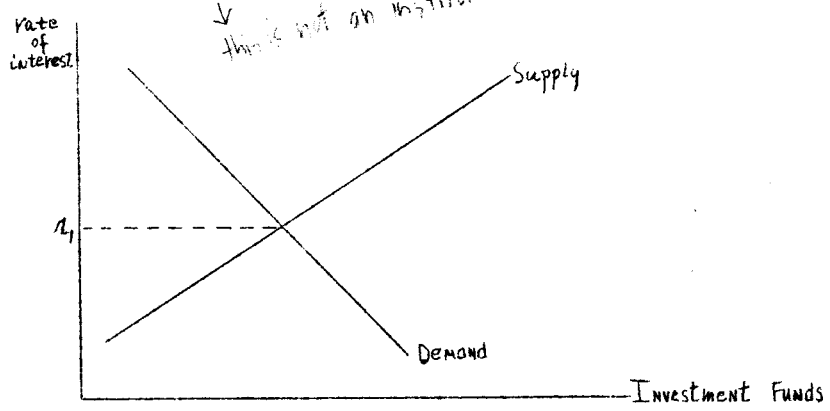

Chart 6

Savers deposit their money at the banks, pay their insurance premiums, buy stocks. The funds deposited in the financial institutions are now available for investments. Loan applications are evaluated as to ability of repayment which involves an evaluation of the investment project in

terms of its computed profitability, and risk. We can array investment projects in terms of their respective profitability and risk. For projects of equal profitability, those with higher risk will be ranked lower than those with lower risk.

The lending institutions usually require that the risk is covered by collateral. The collateral should be large enough to pay for the principal and accrued interest, and whatever cost is incurred in settling the account. The greater the risk involved in an investment plan, the more likely that the credit institution will require a collateral. In the Philippines, the most acceptable asset is real estate and agricultural land. The industrialization, increases in population, technical improvement and increases in demand for agricultural products all combine to make people regard real estate and land very desirable forms of assets and therefore good collateral. There are not very many forms of assets in which to hold wealth and it might be argued that majority of families know of very few investment alternatives. Very likely, the few alternatives they know have a lower rate of return than the national average. If such is the case, education might give them a higher rate of return. In other

words, the private cost of investment in education is lower than the social cost, or that the rate of return on non-human investment is higher than that on education.

On the other hand, the cost of borrowing for education may be higher than that for investment in ordinary capital. Stigler argues that for a given amount of investment, the cost of collection of payment and collecting information on the person may be higher than in investment in ordinary capital. Part of the reason for the higher cost per unit is the smaller scale of investment per unit or per student. At the same time social values prevent the lender from infringing on the personal and civil rights of the borrower in case of default. Human capital cannot be sold and human effort is employed at the sole volition of the individual. Under this situation the lender will have to require a collateral or charge a higher interest to cover the greater risk.

The ability to offer an acceptable collateral usually determines the ability to borrow; oftentimes, the primary criterion applied to loan application is the collateral given. Loans to finance education may be obtained from the financial institutions if real estate is offered as a collateral. To a limited extent loans on paid insurance premiums

are used for education.

On the whole borrowing is closed to the majority of families that cannot put up a collateral or if they can, the value of their collateral is not adequate to cover the total value of investment. Financing education through the existing financial institution in this situation is further limited by both the number of such institutions and their concentration in very few places. Banks are not accessible to a substantial portion of the population. *Statistics show that many students finance their education from current savings of their families or in accumulated savings for the express purpose of paying for the children's education. In the latter case the size of savings of a family, which is dependent on the level of income, will determine what level of education and field of specialization a student can afford. In general, more will be able to afford less expensive education. If some fields are more costly to provide, less students can pursue these fields. Distance to school will increase the cost borne by the students. Anything that raises the cost of a given type of education will reduce the number of students who can afford it.

The above imperfections in the capital market will tend

to make the demand curve for education relative to private cost very elastic. Enrollment will be highly sensitive to cost. Under this condition and where most educational institutions are established mainly for profits, there will be a tendency for schools to offer lower quality education which costs less than good quality education. This tendency may be generalized for all levels and fields.

The argument is subject to empirical test of how much the cost of education influences the student's educational choice. Future research, when data become available, will show how much the cost influences education output, by level, by field and especially by quality.

Another implication of this capital market imperfection is that as per capita income increases, transportation facilities to schools expand, more and more people are going to school at each level and with a given demand for educated manpower. In fact the proportion of college enrollment over the population of college age has increased from 4.27 in 1948 to 10.01 in 1969. This trend in enrollment occurs under unemployment condition throughout.

Part II

The Philippine Labor Market

There are seven major groups of fields analyzed in the paper:

I - Sciences
II - Technology
III - Medical Sciences
IV - Social Sciences and Humanities
V - Business and Commerce
VI - Education and Home Economics
VII - Law, Jurisprudence and Criminology

We have further breakdown for some of the major groups: the natural sciences, the technological fields, and the medical sciences.

The most striking feature of the Philippine market for labor is the relatively high proportion of labor with college education at the stage of our economic development and the continuing increase in the supply of educated labor in spite of its high unemployment rate.

On Table 2 we have the total number of degrees conferred annually from 1950 to 1966, for the aggregate and by field of specialization. Table 1 gives the indexes of secondary and college enrollment from 1955-56 to 1965-66, and their respective annual growth rates for the same period. College enrollment is rising at a faster rate than that of elementary and high school levels. This trend is also shown

on Table 3 which gives the ratio of the first-year college enrollment to high school graduates. In the later years, the ratio is greater than one which indicates that all the high school graduates, plus some of the backlog of ~~the~~ earlier years who could not right away go to college, enrolled in college. However, the rates of growth ~~are not the same~~ differ for all fields of specialization. Looking at Table 2 we find that some fields attract an increasing proportion of students while some, just the opposite. The proportion attracted in others has remained more or less constant. In some the increase has been very gradual.

The proportion of graduates of medical science; law, jurisprudence and criminology; and business and commerce, combined, has declined substantially in relative proportion from 63.0% to 16.6% from 1955-56 to 1965-66. The graduates of other broad fields except education, showed very slight changes in relative proportion. The proportion of students going into education and home economics has increased at a very fast rate from 13.1% to 55.42% for the same period. The reduction in the proportion of graduates in the three major fields above seems to have gone mostly to the education field.

Within each group, we can also observe a change in the relative proportion of graduates. In the Scientific fields, Pharmacy degrees declined in relative proportion from 87% to 22% whereas the proportion in agricultural sciences increased from 6% to 46% from 1950 to 1966. In Engineering, Chemical Engineering seemed to have drawn students away from Civil Engineering. The proportion of graduates in Civil Engineering declined from 48% to 23% while that for Chemical Engineering increased from 4% to 19%. The proportion in other fields showed relatively small fluctuations with the Other Engineering increasing consistently. Other Engineering consists of new fields like aeronautics, industrial engineering, etc.

The changes in the relative proportion of graduates within each group and among big groups of fields indicate that students choice is not fixed by tradition as has been the belief of some social scientists. It is true that one of the remnants of colonial influence in developing economies was the prestige put on the law and the administrative professions. Statistics show that it does not take very long for society to grasp and to respond to market opportunities offered by education in non-traditional fields of

specialization. The rapid rate of growth of enrollment at all levels and the relatively fast shifts among fields indicate that Filipino families try to invest rationally in education. Whether they all succeed to make an optimal investment decision is another question.

Unemployment Rate

Tables 9 and 10 show the rates of unemployment for various occupations. The unemployment rate is defined as the ratio of those who are looking for work but cannot find work at the current wage rate to the labor force. The labor force consists of those who are employed and those looking for work.

There are several sources of information on unemployment. The International Labor Organization, with the assistance of the Office of the Manpower Services, conducted an inquiry into employment and unemployment of those with High School education and those with College Education by field of specialization. The Bureau of Census Philippine Statistical Survey of Households gives annual employment in some broad groups of occupations from which estimates of unemployment can be made. Estimates of unemployment for some occupations that are not available from the above sources are given below.

The unemployment rates for most occupations are very high including those that require college education. However, the rate varies widely among those with high school education, those with college education and for the labor force as a a whole. For labor with a given level of education, the rate varies also by occupation.

The Bureau of Census PSSH shows that from 1956 to 1965, the unemployment rate ranges between 4.6 to 10.0 per cent of the labor force. From observation it would seem that this rate is understated. The rates given by the Bureau of Census is certainly very much lower than those given in the ILO survey and those estimated in this paper. New estimates were made to correct the census rates and it is shown that our estimates are not too far from those by ILO.

Tables 8 and 9 are reproduced in part from the ILO Report except that the unemployment rate is corrected to fit the definition of unemployment given above. The high school average unemployment ranges from 35 per cent to 50 per cent for both sexes. Those with agriculture educational background showed the highest unemployment and those with vocational showed the lowest unemployment incidence. Those with higher education show unemployment rates ranging from 6.9%

for medical graduates to 50% for graduates in collegiate Secretarial courses. The second highest unemployment rate of 35.7% is found for graduates of liberal arts. However, the unemployment rate for the medical fields might be slightly understated as doctors are not easily included in the category of unemployed. They can practice independently of institutional employers for a very small portion of the working day. If they do they are not classified as unemployed in the definition used in the surveys. At this point we have no way of adjusting the unemployment figure given in the survey reports.

Aside from this unemployment rates given by the ILO surveys, we also estimated the rates for some labor categories where data are available for teachers, professionals and for the non-professional categories. The unemployment rate, u, is estimated as defined above:

$$u_t = \frac{N_t}{L_t}$$

where N_t is employed labor and L is the labor force at time period t.

Data on employed teachers, N, are given on Table 16

for medical graduates to 50% for graduates in collegiate Secretarial courses. The second highest unemployment rate of 35.7% is found for graduates of liberal arts. However, the unemployment rate for the medical fields might be slightly understated as doctors are not easily included in the category of unemployed. They can practice independently of institutional employers for a very small portion of the working day. If they do they are not classified as unemployed in the definition used in the surveys. At this point we have no way of adjusting the unemployment figure given in the survey reports.

Aside from this unemployment rates given by the ILO surveys, we also estimated the rates for some labor categories where data are available for teachers, professionals and for the non-professional categories. The unemployment rate, u, is estimated as defined above:

$$u_t = \frac{N_t}{L_t}$$

where N_t is employed labor and L is the labor force at time period t.

Data on employed teachers, N, are given on Table 16

for 1956 to 1965. However, we do not have data on the labor force. The available data are increments to the labor force which consist mostly of new graduates in education. Therefore, the incremental unemployment rate, instead of the average unemployment rate is computed for teachers for the years 1961 and 1965. The increment to the employment is equal to $(N_t - N_{t-1})$ plus the number of those employed in N_{t-1} who are retiring, R. The increment to the labor force of teachers are the sum of new graduates from time period t-1 to time period t, adjusted for mortality rate, m. The incremental unemployment rate for teachers is then computed as follows:

$$u_t = 1 - \frac{(N_t - N_{t-1}) + R_t}{\sum_{t-1}^{t} G(1-m)}$$

For 1961, the rate is 27.2 per cent. It went down to 20.3 per cent in 1965. These rates are much higher than those given in the ILO survey for 1961 but this could easily be accounted for the part-time employed teachers and those who are not in the labor force because they gave up looking for work. We can consider the ILO rate as the lower limit and

the estimate of incremental unemployment rate the upper limit for teachers. The important implications of the estimated incremental unemployment rates lie in the direction of change through time, from 1961 to 1965. There has been a tremendous decrease in the unemployment rate from 27.2 per cent to 20.0 per cent.

Unemployment rates for two other broad occupational categories, professional and non-professional workers were estimated. The estimates were based on the employment statistics given by the Bureau of Census PSSH from 1956 to 1965.

For the non-professionals, employment data are given annually from 1956-1965. However, data on the labor force are not available. We estimated the increments to the labor force instead of the labor force itself. For 1956 to 1961, the increment in the labor force of non-professional categories are assumed to be those who became of working age during this period, minus those who died and those enrolled in college. Those who came of working age P_{wa} during the period 1956-1961 were those aged five to nine in the last population census in 1948.

$$L_{56-61} = P_{wa} (1-m-c)$$

where m is mortality rate, c is the proportion of college enrollment to the population aged 17-21. As in the case of teachers, the incremental, instead of the average unemployment rates are estimated.

$$u_t = \frac{(N_t - N_{t-1}) \div R_t}{P_{wa}\,(1-m-c)}$$

The increment in the working age population from 1961 to 1965 is assumed to be those aged 13-16 in the Population CEnsus of 1960. The college enrollment rate applied to 1961 is the average of the college enrollment rate for 1948 which is equal to 4.2 per cent and that for 1960 which is equal to 10.07 per cent. The latter rate is applied in computing the increment in the working-age non-professional labor for 1965.

The incremental unemployment rate for non-professional workers is 52.3 per cent in 1961 and 40.5 in 1965. The unemployment rate for 1961 is not very much higher than that reported in the ILO survey for those with high school education. As in the case of teachers, the important implication of the estimates is in the direction of change. Unemployment seems to be decreasing for the big bulk of the labor force, those without college degrees. The reduction is quite substantial over a relatively short period of time.

The same method was used to estimate the unemployment rate of those with college education. Data on professional employment, N, are given annually in the PSSH survey. The problem lies with the estimate of the labor force for the professionals. The labor force in 1961 is estimated to be employed in 1956, adjusted for mortality and retirement rates, plus the sum of college graduates from 1956 to 1960, adjusted for mortality rate.

$$u_{1961} = \frac{N_{61}}{L_{61}} \text{ , where}$$

$$L_{61} = N_{56}\,(1-m-r) + \sum_{56}^{60} G$$

The estimated unemployment rate for 1961 is only slightly higher than the rate reported in the ILO survey. However, the rate for 1965 is much higher than that for 1961. This might be explained by the very fast rate of growth of college graduates especially in the recent years. There is no sector that increases at the same rate as the college graduates. Given the unemployment rate at the beginning period, a higher increase in college graduates relative to the increase in employment opportunities, would result in increasing unemployment rates. On the other hand, population is not increasing as fast as the increase in employment in various industries as given on Table 11.

In an evaluation of the utilization of scientific and technological manpower, Mrs. dela Cruz of the NSDB made a five-year projection of demand and supply of technical and scientific monpower in the Philippines.

1965 data of graduates and employed scientists and engineers in three sectors of the economy: private industry, government agencies, and educational institutions were used as baseline to estimate the supply and demand for scientists and engineers for the next five years (1966-1970).

She used the following formula to estimate the yearly supply S_t of scientists and engineers:

$$S_t = \sum_{i=1}^{N} (S_{it-1} + G_{it} - 1_{it})$$

where S_{it-1} = number of scientiests in field i for year, 1965

G_{it} = graduates of field i at year t

1_{it} = estimated losses in field i at year, t

t = years 1...5 (1966-1970)

Again 1965 data on employed scientists and engineers were used in estimating the growth rate of demand:

$$D_t = \sum_{i=1}^{n} d_{it-1} (1 + r_i) \quad \text{, where}$$

$$r_i = \frac{Y_{it} - Y_{it-1}}{Y_{it-1}}$$

and d_{it-1} = employed scientists and engineers of industry i for 1965

Y_i = income of industry i

t = the time periods (1966 - 1970)

This projection formula is based on rather naive assumptions; first, that technique of production will remain constant over this period. The assumption implies that there is a stable relationship between industry output and demand for professional labor. The second assumption is that the growth rate of national income, its industrial composition and the growth rate of college graduates by fields based on historical experience, will remain constant through the projection period. The validity and accuracy of the projected figures depend on the realism of these assumptions. It may be argued that the projected demand is understated. Under the present administration there seems to be a more deliberate effort for faster industrialization especially for export manufactures where the market is larger. Secondly, the attention put in improvement in agricultural productivity and in the construction of

infra-structure for agricultural marketing would require larger scientific and technical labor. Certainly the success of the present government programs depends on who wins the election and on political expediency in the 1970's.

The average annual rate of growth of college graduates was 12.9% from 1957-66. From 1957 - 1966, the average annual rate of increase was 12.5% with the rate increasing to 13.6% from 1962-1966. The PSSH showed an average annual growth rate of 8.08% in employment of professional, technical and related workers from 1957-1961, and a 10.04% average rate of growth from 1965.

Mrs. dela Cruz' projected surplus are consistent with the above fact that employment was growing less slowly than the supply of professionals. If these projections prove to be accurate, the estimated demand and supply table shows that only an average of 55.1% of these new professionals may be absorbed by the different sectors.

However, her projections should not be taken in terms of the accuracy of their absolute values but in the likely bias in the projections, given expected changes in the economy. At the same time the projected excesses or shortages of labor

in specific professions would indicate what will be the trend of the unemployment rates - whether the unemployment situation will continue at same rates or at an increasing or decreasing rates.

All fields studies show a surplus of graduates over estimated demand. The figures indicate that there is not likely to be a reduction in the unemployment rates.

The Present Value of Expected Returns to Investment in College Education

Tables 6 and 7 give the estimated present value of returns to investment in college education by field of specialization. Arbitrary discount rates were used - 9%, 15% and 20%. Estimation of the present value of expected returns to education is given in Appendix A.

Nine per cent is close to the long-term bank rate for loans made to priority projects. The market bank rate to both long-term and short-term loans is about 12%. Because of the peculiar character of investment in human capital, the market rate may be considered higher than 12%. Stigler /3 / argues that even if financial institutions exist to service loans for human investment, the relevant rate is likely to be higher. The size of loan is relatively small; the cost of collection and of getting good objective information on the creditability of each small borrower is higher. There ~~is the~~ risk, ~~element of~~ unemployment, mortality or sickness which ~~will raise~~ the cost. ~~At the same time~~, the value of education is embodied in the person ~~which~~ cannot be sold to pay for the debt. ~~That~~ makes lending for educational purposes unattractive.

Theoretically it may be reasonable to use higher rates of discount than the current market rate. However, when conditions in the capital market are considered, the relevant rate may be lower. As we have discussed in Part I, the alternative investment placement of families who send their children to school may be lower than the over-all market rate for long-term investment. In the countryside and smaller towns ordinary investment may be as risky as ~~in~~ investment in man. The likely investment alternatives that village people may undertake with their small savings are ~~in~~ improvement in agriculture, in fishing gears, in small retail stores, and on money lending and hoarding. Agricultural and fishing activities are highly subject to adverse natural forces, and to problems of transportation and marketing. It is true that the rate of interest on money lending is very high, reaching up to 100% or more. However, the risk of default is correspondingly high. Under the imperfect conditions of our financial market, the lowest rate of 9% may be the reasonable rate to use in discounting expected income.

Tables 6 and 7 show that investment in college education for various scientific and technical fields and in education is profitable on the average. Table 9 gives the average gross present value of expected income and Table 11 indi-

cates the average present value of income net of the probability of unemployment and of the total private cost of college education. We find that in spite of the high unemployment rates in different fields of specialization, the average net present value is positive.

We also notice from Tables 9 and 11 that the average returns to investment in various specializations differ very much. In the first part of this paper it was stated that when students choose whether or not to pursue college education, they also must decide a field of specialization, the school and how hard they study. The data indicate that if students respond to the average present value by level and by field the labor market would continue to experience unemployment. The average gross present value discounted up to 20% is higher than that of high school graduates. The present value, net of total cost of education and unemployment rate for college degrees is positive at 9% discount rate. Therefore if the rate of interest in higher education is higher than 9%, it is not worthwhile, on the average, to invest in education at this level. However, this is from the aggregate viewpoint. Some fields of specialization in college like science and engineering give a positive net present value even at 20% discount rate. College education for all fields

is attractive if the rate of interest is 9%; only a few will be profitable if the rate of interest is higher than 9%.

The behaviour of students may be rationalized by the positive average net returns to college education. We find that there is some positive relationship between the number of degrees to the present value and unemployment rates in each field within the groups. Students respond as expected to the average values of the relevant variables in the market - income and employment probability. But if we look at individual students, especially those who perform very badly in school or who choose the school of poorest quality, investment in his education may not be considered a rational decision. His investment has probably a zero present value.

The relative constancy of the high unemployment rates and the persistence of poor quality of education imply a lack of adjustment in the education market as explained in Part I. We have argued that if students knew all their alternatives they would behave in such a way that adjustment in the markets would be observed. There would be a tendency for students to choose better schools and to develop their full potential in school. For instance, the University of the Philippines has not experienced a strong pressure to expand

its facilities. The performance of its students are below their potential. If students realize that the employability of those at the bottom 10 or 20% of their class is practically zero, or that it would involve a relatively longer time to find their first job, or that the positions that may be open to them are relatively unattractive, they will probably perform better in school or drop out altogether. In the latter case, there would be a smaller increment to graduates than what we are getting now. At the same time there would be an upgrading of graduates. Students would move into better quality schools. This would force poor-quality ones to raise their standards or to close down.

The Philippine market for educated labor might be characterized by a seeming inconsistency. There is an excess and a shortage at the same time of educated labor. There is an excess supply of degree holders in all fields. However, there might be a shortage of supply of graduates of good quality. One clear example of this condition is in the business secretarial graduates. This field has one of the highest unemployment rates but firms and government agencies experience difficulty in finding qualified graduates. Reputedly good schools are able to place a much higher percentage of their graduates in jobs - examples are Ateneo, U.P., De La

Salle College, St. Theresa's College, Philippine Normal College. One consulting firm hires a disproportionately large number from ~~those~~ schools. Other firms probably do the same. ~~One other factor taht~~ prevents market adjustment is the reliance on personal contact or influence in finding a job. This is specially true of government jobs that are subject to political backings. If students and their families rely more on this factor than on economic variables, there will not be as strong an incentive for a careful and rational choice. Reliance on personal or political contact might be illusory to a lot of people. Usually personal contact gives one the advantage of being introduced to employers. But actual hiring still depends on one's qualifications, more than on anything else.

The imperfection in the capital market will prevent the adjustment towards equality in present values in alternative fields and even towards full-employment equilibrium in the labor market. In the United States, the average family income is ten times higher than in the Philippines yet, stipends prove to be an important determinant of degrees. We can expect that cost factor will matter more in the Philippines where family income is so much lower. It is very likely therefore that the cost of education will influence choice very ~~strongly~~.

Table 12 which was computed from the ILO Report, indicates that 66.3% of students with higher education were financed by their families, 46.7% wholly, and 19.6% partially. In addition, 10.4% were assisted by relatives. Only about 20% earned from part-time employment to pay for part of their college education. In the case where the family is the main source of financing education, the average income earned by the family limits the education alternatives open to a student. The absolute cost of various types of education will determine what type of education each family can or cannot afford, whether it will be in the Manila area or in the locality; in scientific and technical fields versus in the non-scientific or non-technical fields; in respectably good schools or in those that charge lower fees.

Table 15 gives the geographic distribution of enrollment. We find that the ratio of college enrollment to the population by provinces varies tremendously. Casual observation of provincial schools indicates that facilities for the various disciplines are not equally distributed either. Most of the engineering, medical and scientific fields are offered in the Manila area. This disproportionate distribution of schools by field of specialization would make the relative cost to the students of technical and scientific fields higher. Therefore,

more students can afford to enroll in fields offered by schools operating in the locality.

On the other hand if the cost of providing scientific and technical fields is higher than in non-scientific-technical fields, and schools charge the same price or tuition fees, schools will tend to offer non-scientific fields. ~~We need some empirical study of cost to support this statement but probably this is not a bad guess.~~ In such a case, there will always be a relatively small number of students going into costly fields even if income in these fields are relatively higher However, the reader ~~would~~ note that the statement is subject to empirical evidence by which future research may confirm.

There is not enough time lag allowed between the perception of income disequilibrium or differences among alternative fields and the time that a degree can be completed. The earliest we can expect number of degrees to correspond to present value in 1965 is in 1969, unless the relative levels of present values in 1965 are the same as those existing a few years before. If we can assume this, we may expect some adjustment in the supply of degrees in 1969 in the form of faster increases in the fields with higher present values in 1965, and the slow increments or even a reduction in fields with rela-

tively low income.

In the Engineering market there seems to be a significant adjustment of degrees in each field to demand as reflected in relative present value and number employed aged 20-34. The number employed of those aged 20-34 is used as some indicator of the relative number demanded of thevarious fields becuase everything else equal (present value, cost) the greater the employment of younger age labor, the higher the increase in demand.

As a whole we can say that there is a relationship though weak, between income and unemployment on the one hand, and the number of degrees on the other. An initial disequilibrium situation where the present value and unemployment rate vary very much between fields called for an adjustment in labor and capital market in the form of relative changes of growth of degrees in each field or group of fields. Though at first glance the relationship between degrees and present values is weak, the market shows a response to the difference in present value by a movement away from professions that in the past had a relatively low income. The fast growth in teacher education may be accounted for by the relatively high growth in employment as indicated in the reduction in the incremental

unemployment rate of teachers.

When complete data on income and unemployment become available, it will be possible to make a more conclusive statement about the exact relationship between our variables and to evaluate the speed of adjustment, and the significance of each determinant in terms of degrees of market imperfections. As it is we can only scratch the surface and see from the meager data we have whether the variables are correlated and whether there is a market adjustment toward optimal education choice. We are not able to define their exact relationship and time lags of adjustment. The data show adjustment among fields, but not an adjustment towards full-employment equilibrium.

PART III

Conclusion

Some important features of the Philippine market for educated labor were discussed in this paper. Our market is characterized by a very fast growing supply of college graduates as shown in Table 1. We also see in Table 17 that a very large proportion of the gross domestic investment is allocated to education though the proportion is declining through time from 30 per cent in 1956 to 27 per cent in 1964. At the same time the proportion of degrees granted in each field or group of fields has not remained constant. From the aggregate viewpoint students seem to have made their choice of field according to economic criterion of maximizing the returns or minimizing the probability of unemployment - given the limited alternatives they have considered - level and fields of specialization. The alternatives of the majority of students have been very much constrained by problems of financing good quality education and lack of information of the market. This explains in part the large number that pursue fields that are not costly to provide. These fields are offered by more schools which are geographically distributed more equally. The distance to a school reduces the out-of-pockets cost that students bear.

We have also shown that in spite of the high unemployment rate the average private return (net present value) to investment in college education is positive, especially, for the scientific and technical fields of specialization. However, if the rate of interest for investment in education were higher than nine per cent, not all fields in college would be worthwhile investing in. We have seen in Table 5 that the net present value of investment for college as a whole is smaller than that for high school students if said investments are made at 15% and 20% rates of interest. If the realistic rate is 9%, we can say that on the average college investment is worthwhile in any field. This would rationalize the strong desire of Filipinos for college education.

However, the fact that a significant proportion of college graduates are unemployed indicates that the aggregate or social marginal returns to the investment is negative. From society's point of view, there is a misallocation of resources in education. Some of the investment funds made in the unemployed college graduates could havebeen channeled to investment in ordinary capital. These extra investment resources could also be used in improving the quality of education of the most talented students or those well motivated instead of spreading the amount too thinly over a large college enrollment. Some improvements

in quality as we have discussed do not involve monetary cost but extra effort of teachers and students. An improvement in the quality of education is likely to result in higher productivity of the educated labor force, and in the long-run in improvement in technique used by industry and other sectors. At the same time shortages for qualified people will be solved by a general improvement in quality in education.

The paper emphasizes the importance of adequate information about the labor and education market in making rational education choice. A large part of the misallocation of resources and disappointing job experience of college graduates could have been prevented if students were better informed about alternative job opportunities of corresponding types of education. Moreover, the worst misallocation of resources is the waste of student minds in poor quality schools which have not attempted to develop the students' interest and potential. One may make a dramatic statement that money wasted can be recovered, but the waste of a young mind is the waste of a person.

Of course these statements about the alternative uses of the wasted investment in education are a priori and would re-

quire a more thorough research. The paper emphasizes the value of better information in decision-making of students. The Department of Education and other concerned government agencies may approach the problem by information campaign and/or stricter control over the educational institutions.

APPENDIX A

Estimation of the Present Value

The expected stream of income to be earned if one completes a college degree in say field i is assumed to be equal to what employed members in the corresponding profession currently earn at succeeding ages. A new college graduate may expect to earn the average income received by members of the profession aged n years when the graduate reaches that age; the average income of the employed aged n years, when he reaches the age of n, and so on. Summing the average income of the members of the profession at each single age until the retirement age of 65 gives us the expected lifetime income of investment in college education for a given specialization. In order to evaluate income received at different time periods, we need to discount it by the relevant interest rate. This amounts to saying that if we make an investment of ₱100 now, where the amount is borrowed at 10%, by the end of the year we have to pay ₱100 $(1 + .10)$ or ₱110, by the end of the second year we have to pay ₱100 $(1 + .10)^2$ or ₱121 if we have not made any payment in the first year. Therefore if we expect to receive income at the end of the first year, the income must be at least ₱110 to cover both principal and interest; if income is received at the end of the second year, it must be at least ₱121 to break even. This method is equivalent to evaluating the profitability of the investment by discounting the future income by the interest rate. In the first case we compare the investment of ₱100 to $\frac{₱110}{(1+r)}$ in the first year, or ₱100 to $\frac{₱121}{(1+r)^2}$ in the second year which amounts to saying that the future income of ₱100 at the end of the first year must cover at least

₱100 (1+ r); or that the future income in the second year of ₱121 must cover ₱100 (1 + r) owed in the first year multiplied by (1+ r), for the second year of ₱100 (1 + r).[2]

Expected income in profession i at each age is usually estimated to be equal to the income at the corresponding age of those currently working in the profession. The basis of the estimate is income at full-employment. To take into account the unemployment rate, we assume that the average probability of being fully employed is one minus the unemployment rate in profession i, u_i, or $(1 - u_i)$. Therefore, if the gross present value estimated from the annual income of the age cohort of the profession is GPV, the net present value, NPV is computed as follows:

$$NPV_i = GPV_i(1 - u_i)$$

LIST OF TABLES

Table 1

Enrollment Index for all School Levels - Philippines, 1956-1965

School Year	Secondary	Collegiate	Annual Rate of Growth in Percentage	
			Secondary	Collegiate
1956-57	100.00	100.00		
57-58	100.99	106.53	.99	6.53
58-59	107.19	113.49	6.14	6.52
59-60	111.53	117.01	4.05	3.10
60-61	113.69	125.34	2.09	7.12
61-62	122.12	139.61	7.42	11.38
62-63	140.53	157.65	15.07	12.97
63-64	161.70	171.96	15.06	9.03
64-65	175.89	190.99	8.77	11.07
Average growth rate			7.46	8.47

Source: Table 2, p. 8. "Sources and Uses of Income in Five Philippine Private Universities, 1956-1965" by Priscila M. Eugenio

	1963	1964	1965	1966
I. Natural Sciences (				
- Number	1,752	1,863	2,364	1,620
- % of Grand Total	3.22	2.95	2.72	2.16
II. Medical Science (A				
- Number	5,018	5,183	5,471	3,812
- % of Grand Total	9.22	8.21	6.30	5.08
A. Medicine				
- Number	1,881	1,902	1,834	1,420
- % of Medical Sci	37.48	36.70	33.52	37.25
B. Dentistry				
- Number	522	415	375	375
- % of Medical Sci	10.40	8.00	6.85	9.84
C. Nursing				
- Number	1,642	1,924	2,102	852
- % of Medical Sci	32.72	37.12	38.42	22.35
D. Optometry				
- Number	210	205	193	84
- % of Medical Sci	4.18	3.96	3.53	2.20
E. Pharmacy				
- Number	667	499	515	459
- % of Medical Sci	13.29	9.63	9.41	12.04
III. Engineering				
- Number	3,792	3,229	4,462	9,932
- % of Grand Total	6.97	5.12	5.14	13.23
IV. Social Sciences				
- Number	5,362	5,270	5,086	6,877
- % of Grand Total	9.85	8.35	5.85	9.16
V. Business				
- Number	17,932	23,112	34,193	12,585
- % of Grand Total	32.94	36.61	39.36	16.77
VI. Education				
- Number	17,821	22,906	33,911	38,552
- % of Grand Total	32.74	36.29	39.04	51.36
VII. Law				
- Number	2,325	1,371	1,105	1,306
- % of Grand Total	4.27	2.17	1.27	1.74
VIII. Architecture				
- Number	430	189	279	373
- % of Grand Total	.79	.30	.32	.50
IX. Grand Total				
- Number	54,432	63,123	86,871	75,057
- Annual Growth Ra	20%	16%	38%	-14%

Table 3

Upward Trend in the Proportion of High School Graduates Attending College

School Year	High School Graduate	First Year Collegiate Enrollment	Ratio of (3) to (2) %
1955-56	103,263		
56-57	103,328	92,674	89.74
57-58	102,995	92,613	89.63
58-59	113,923	96,123	93.32
59-60	114,967	98,796	86.72
60-61	109,614	99,895	86.89
61-62	120,942	106,825	97.45
62-63	124,678	123,774	102.34
63-64	136,682	144,781	116.12
64-65	151,156	154,482	113.02
65-66		156,907	103.80

Source: Priscilla Eugenio, "Sources and Uses of Income of Five Philippine Private Universities, 1956-65" Unpublished Master's thesis, University of the Philippines, Diliman, Quezon City

Table 4

Number and Percent Distribution of Bachelors' Graduates in the Sciences by Field of Specialization
1949-50 - 1965-66

Year	All Scientific Fields	Mathematics	Biological Sciences	Earth Sciences	Physics and Astronomy	Chemistry	Agriculture
1949-50	217					96	121
51	312					131	181
52	349					172	177
53	365					58	307
54	477					82	295
55	478					88	390
56	875	1	3			162	709
57	966		5	8		150	803
58	857			2		194	661
59	1,231			9		213	1,009
60	1,381			5	2	239	1,135
61	1,287	4	25	9		319	930
62	1,662	2	48	11	5	561	1,035
63	1,752		59		138	568	987
64	1,863	8	182	4	10	570	1,089
65	2,364	14	121	5	10	815	1,399
66	1,620	8	66	14	8	571	953
Percentage Distribution							
1950						44.2	55.8
51						42.0	58.0
52						49.3	50.7
53						15.9	84.1
54						21.8	78.3
55						18.4	81.6
56		.11	.34			18.5	81.0
57			.52	.86		15.5	83.1
58				.23		22.6	77.1
59				.73		17.3	82.0
60				.36	.14	17.3	82.2
61		.31	1.94	.70		24.8	72.3
62		.12	2.89	.66	.30	33.8	62.3
63			3.37		7.88	32.4	56.3
64		.43	9.77	.21	.54	30.6	58.5
65		.59	5.11	.21	.42	34.5	59.2
66		.49	4.07	.86	.49	35.3	58.8

Source: NSDB unpublished statistics

Table 5

Number of Bachelor's Degrees in Engineering and Their Percentage Distribution by Field

Year	Total	Chemical	Civil	Electrical	Mechanical	Others
1950	1,165	46	518	144	379	78
1951	1,338	65	542	150	497	84
1952	1,358	119	573	161	427	78
1953	1,676	88	600	238	669	81
1954	1,576	106	608	219	585	58
1955	1,911	155	730	278	686	62
1956	4,119	295	1,342	641	1,606	235
1957	1,798	118	640	242	646	152
1958	1,651	134	380	273	721	143
1959	1,867	220	543	236	716	152
1960	2,058	260	562	254	730	252
1961	2,707	345	678	354	975	355
1962	3,643	385	751	277	1,949	281
1963	2,841	782	740	301	710	318
1964	2,429	603	699	239	684	204
1965	3,873	739	937	443	1,421	333
1966	3,622	711	876	473	1,327	235
Percentage Distribution						
1950		4.0	44.5	12.4	32.5	6.7
1951		4.8	40.5	11.2	37.1	6.3
1952		8.8	42.2	11.8	31.4	5.7
1953		5.2	35.8	14.2	39.9	4.8
1954		6.7	38.6	13.9	37.1	3.7
1955		8.1	38.2	14.5	35.9	3.2
1956		7.2	32.6	15.6	39.0	5.7
1957		6.6	35.6	13.4	35.9	8.5
1958		8.1	23.0	16.5	43.7	8.7
1959		11.8	29.1	12.6	38.4	8.1
1960		12.6	27.3	12.3	35.5	12.2
1961		12.9	25.4	13.2	35.2	13.3
1962		10.6	20.6	7.6	53.5	7.7
1963		27.4	26.0	10.6	24.9	11.1
1964		24.8	28.8	9.8	28.2	8.4
1965		19.1	24.2	11.4	36.7	8.6
1966		19.4	23.2	13.0	35.2	9.3

Source: Same as Table 4

Table 6

Gross Present Value of Income in Various Professions, 1965

(In hundreds of pesos)

Fields	r = 9%			r = 15%			r = 20%		
	National Gov't.	Private Industry	Educational Institutions	National Gov't.	Private Industry	Educational Institutions	National Gov't.	Private Industry	Educational Institutions
Agriculture	370.18	480.16	659.25	208.04	254.07	361.70	150.64	175.01	258.42
Chemistry	487.30	664.46	646.67	259.30	343.09	352.54	184.80	230.23	250.54
Mathematics	691.46	-	601.05	381.10	-	328.05	277.24	-	234.73
Physics	331.29	375.47	754.18	199.92	221.78	434.09	150.35	161.15	317.98
Biology	421.02	-	673.15	233.74	-	373.86	167.77	-	266.24
Chemical Engineering	500.20	568.61	730.93	292.19	319.14	370.41	218.50	227.91	253.23
Civil Engineering	497.41	569.56	586.04	278.83	274.83	293.85	201.52	183.15	200.59
Electrical Engineering	417.98	516.95	688.64	228.50	277.49	421.98	163.02	193.39	324.26
Mechanical Engineering	442.17	517.87	751.83	228.86	282.06	391.87	158.20	198.08	272.62
Others (Engineering)	402.02	571.02	-	213.80	291.55	-	152.82	201.20	-

Source: Unpublished data on income from NSDB Scientific and Technical Manpower Survey and Table 10 for the weights.

Note: The weighted averages for fields where data are not complete are based on the available data.

Table 7

Net Present Value of Income, of Investment in Various Professions, Adjusted for UNE Rate

(In hundreds of Pesos)

Fields	r = 9%				r = 15%				r = 20%			
	National Gov't.	Private Industry	Educ'l. Institutions	Weighted Average	National Gov't.	Private Industry	Educ'l. Institutions	Weighted Average	National Gov't.	Private Industry	Educ'l. Institutions	Weighted Average
griculture	226.48	314.47	457.74	252.19	96.77	133.60	219.70	110.12	50.85	70.35	137.08	60.88
hemistry	320.18	461.91	447.68	380.05	137.78	204.81	212.37	166.64	78.18	114.52	130.77	94.28
athematics	483.51	-	411.18	422.81	235.22	-	192.78	199.60	152.13	-	118.12	123.59
hysics	195.37	230.72	533.68	277.40	90.27	107.76	277.61	135.24	54.84	59.26	184.72	84.36
iology	267.16	-	468.86	403.47	117.33	-	229.43	193.09	64.76	-	143.33	117.86
hemical Engr'g.	344.50	401.15	535.55	387.96	172.27	194.59	237.04	188.80	111.26	119.05	140.01	117.38
ivil Engineering	342.20	401.94	415.58	355.61	161.21	157.90	173.67	161.81	97.20	81.99	96.43	95.24
lectrical Engr'g.	276.43	358.37	500.53	340.39	113.14	160.10	279.74	153.16	65.32	90.47	198.83	90.65
echanical Engr'g.	296.46	359.14	552.86	354.23	119.84	232.84	254.81	206.98	61.33	94.35	156.07	89.67
thers (Engr'g.)	263.21	403.14	-	-	107.37	171.74	-	-	56.87	96.93	-	-

Source: Tables 4, 6, and 9-a where Net Present Value is Gross Present Value (1 - unemployment rate) - Private Direct Cost of College Education (Foregone income + Direct Cost)

Note: The weighted averages for fields where data are not complete are based on the available data.

Table 8

Gross and Net Present Value of Level of Education and for Teachers by Level of Students Taught

(In hundreds of Pesos)

	r = 9%		r = 15%		r = 20%	
	Gross Present Value	Net Present Value	Gross Present Value	Net Present Value	Gross Present Value	Net Present Value
Illiterates	69.15		39.04		28.39	
Primary	63.13		27.04		15.74	
Intermediate	108.20		51.97		34.29	
Elementary	172.10		79.00		50.03	
General Secondary	318.40	121.29	197.60	110.05	146.90	28.78
General College	343.16	193.10	196.87	76.07	131.67	23.92
Teachers						
Primary	270.06	138.95	157.40	47.02	115.27	12.64
Intermediate	261.55	132.00	152.31	42.86	111.41	9.49
Secondary	268.24	137.46	157.51	47.11	115.75	13.03

Source: 1. Gross Present Value by Level, T. 19 in de Voretz "Investment in Philippine Education"

2. Income of Teachers, T. 66, p. 87, Bureau of Public Schools, 1964 Statistical Bulletin.

Table 9

Employment Status of Persons With Higher Education,
by Kind of First Degree Obtained, 1961

Kind of First Degree	Total Number (in thousands)	Percent	Employed	Unemployed	Not in labor force	Rate of Unemployment	Employed	
							Full-time	Part-time
Total, all degrees	193	100.0	73.4	18.2	8.4	19.9%	65.1	8.4
Liberal Arts	9	100.0	45.0	25.0	30.0	35.7%	35.0	10.0
Commerce & Business Adm.	41	100.0	78.4	13.4	8.2	14.6%	72.2	6.2
Education (B.S.E. or ETC)	81	100.0	77.4	17.4	5.3	18.4%	70.0	7.4
Engineering	13	100.0	77.5	16.1	6.5	17.2%	71.0	6.5
Law	8	100.0	68.4	15.8	15.8	18.8%	57.9	10.5
Agriculture & Veterinary Medicine	4	100.0	70.0	30.0	-	30.0%	40.0	30.0
Med., Dentistry, Pharm., Optometry	15	100.0	77.0	5.7	17.1	6.9%	65.7	11.4
Nursing and Midwifery	6	100.0	69.2	30.8	-	30.8%	53.8	15.4
Collegiate Secretarial Course	9	100.0	45.0	-	10.0	50.0%	45.0	-
Collegiate Technical Course	6	100.0	66.7	26.7	6.7	28.6%	46.7	20.0
Others	2	100.0	60.0	40.0	-	40.0%	-	-

Source: T. 84, p. 68
Office of Manpower Services
Department of Labor, Summary Report on Inquiry Into Employment and Unemployment Among those with High School or Higher Education.

Table 10

Employment Distribution of Scientists and Engineers, by Field of Main Activity and by Sector, 1965

Field of Main Activity	Private Industry	National Government	Educational Institution
Engineering	63.3	39.0	10.3
Mathematics	1.8	1.5	7.9
Agricultural Science	3.3	26.5	2.4
Biological Science	0.2	4.7	9.4
Medical Science	6.8	15.0	11.2
Earth Science	0.5	2.6	0.5
Physics & Astronomy	1.2	-	3.1
Chemistry	12.0	5.9	8.1
Social Sciences	0.4	4.2	12.9
Other Scientific Fields	5.6	0.1	34.0
Total	100.00	100.00	100.00

Source: Surveys of Scientific and Technological Manpower in the Philippines: Private Industry, National Government Sector, and Educational Institutions (1965-66) NSDB

Table 11

Persons with High School Education by Employment Status
by Type of High School Attended and Sex; May, 1961

Type of High School Attended and Sex	Number (thousands)	Percent	Working Full-time	Working Part-time	Out of work Looking	Out of work Not looking	Unemployment rate
Both Sexes	681	100.0	22.5	13.8	30.2	33.5	.45
General	285	100.0	22.9	13.7	31.0	32.3	.46
Academic	348	100.0	21.1	12.9	29.5	36.4	.46
Vocational (arts & trades)	33	100.0	32.1	19.2	30.8	17.9	.38
Technical	3	100.0	-	16.7	16.7	66.7	.50
Agricultural	11	100.0	34.6	26.9	34.6	3.8	.36
Other type	1	100.0	-	-	-	100.0	-
Male	366	100.0	30.0	16.6	28.8	24.6	.38
General	152	100.0	30.0	15.7	30.5	23.5	.40
Academic	176	100.0	28.8	16.9	26.9	27.4	.37
Vocational (arts & trades)	27	100.0	38.1	15.9	30.2	15.9	.36
Technical	3	100.0	-	16.7	16.7	66.7	.50
Agricultural	9	100.0	33.3	28.6	38.1	-	-
Other type	-	-	-	-	-	-	-
Female	315	100.0	13.9	10.5	31.8	43.7	.56
General	133	100.0	14.6	11.5	31.5	42.4	.55
Academic	173	100.0	13.3	8.9	32.3	45.6	.59
Vocational (arts & trades)	6	100.0	6.7	33.3	33.3	26.7	.45
Technical	-	-	-	-	-	-	-
Agricultural	2	100.0	40.0	20.0	20.0	20.0	.25
Other types	-	-	-	-	-	-	-

Source: ILO-Philippine Office of Manpower Service, Op. cit. Table 32, p. 37

Table 12

Percentage Distribution of Source of Finance for Higher Education

	%	%
Parents		66.3
Wholly	46.7	
Partially	19.6	
Other Relatives		10.4
Wholly	1.9	
Partially	8.5	
Earning during term		9.7
Wholly	1.1	
Partially	8.5	
Earning during vacation		9.7
Wholly	-	
Partially	9.7	
Saving before entering college		2.7
Wholly	-	
Partially	2.7	
Other means		1.1
Wholly	-	
Partially	1.1	
T o t a l	100.0	100.0

Source: T. 128, p. 91, ILO - Philippine Office of Manpower Services, ibid.

Table 13

Direct Expenditures on Philippine Education
1965 - 1966 (in current prices) a/

Year	Direct Expenditure on Education	Share in GNP	Share in GDI	Public Expenditures Share in Government Expenditures
1956	341,106,905	.037	.39	.30
1957	370,645,913	.036	.35	.31
1958	385,290,902	.035	.49	.33
1959	400,934,562	.034	.40	.32
1960	457,556,506	.037	.38	.32
1961	545,120,211	.040	.30	.34
1962	622,863,065	.041	.32	.33
1963	723,761,601	.041	.31	.32
1964	856,190,845	.044	.27	.34
1965	963,416,681	.045	n.a.	.34

a/ Source: de Voretz, D.V.: "Investment in Philippine Educational Resources, 1966-74," unpublished Ph.D. dissertation, University of Wisconsin, 1968.

Table 14

Yearly Per Student Direct Costs of Public and Private Philippine Education for 1966 by Education Level

(In 1966 pesos)

Educational Level	Tuition and Books	Public Education (Operating and Capital Costs)	Total (Public)	Private Education (Total, Direct)
Primary	0	113	113	100
Intermediate	0	113	113	100
General Secondary	43	292	335	134
Vocational	45	397	442	381
College Normal	60	295	355	288
Other College	338	973	1,311	294

Source: Philippines, Director of Public Schools, Annual Report (Manila, Annually) Passim for column 1. Philippines Bureau of Public School, Research and Guidance Division 1965 Statistical Bulletin (Manila, 1966), pp 79-82 for column 2; Phil., Bureau of Private Schools, 1966 Statistical Bulletin (Manila, 1967), pp. 19-27 and V. Sinco, loc. cit, pp. 81-97 for column. 4 and from de Voretz, ibid.

Table 15

Geographical Distribution of Universities and Other Establishments for Higher Education - 1960

Region[1]	Population (in thousands)	Universities	Other establishments for higher education				
			Technology	Medical	Agricultural	Social Sciences and Humanities	Total
Total	27,088	25	65	30	8	288	416
I	2,120	15	17	14	-	33	79
II	1,470	-	4	-	1	23	28
III	1,036	-	1	-	-	9	10
IV	3,691	-	12	2	1	36	51
V	3,251	-	7	7	-	54	68
VI	2,363	1	3	-	2	16	22
VII	3,210	4	9	3	-	29	45
VIII	4,564	4	9	-	2	32	47
IX	3,273	-	3	3	1	27	34
X	2,111	1	-	1	1	29	32

[1] Bureau of the Census and Statistics, Philippine Statistical Survey of Households defined regions:

I. City of Manila, Quezon City, Pasay City, Caloocan City and Municipalities of Makati, Mandaluyong, Parañaque and San Juan
II. Abra, Ilocos Norte, Ilocos Sur, La Union and Mountain Province
III. Batanes, Cagayan, Isabela and Nueva Vizcaya
IV. Bataan, Bulacan, Nueva Ecija, Pampanga, Pangasinan, Tarlac and Zambales
V. Batangas, Cavite, Laguna, Marinduque, Occ. Mindoro, Or. Mindoro, Palawan, Quezon and Rizal (except those in Rizal I)
VI. Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate, and Sorsogon
VII. Aklan, Antique, Capiz, Iloilo, Negros Occ., Negros Or., and Romblon
VIII. Bohol, Cebu, Leyte, Samar and Southern Leyte
IX. Cotabato, Davao, Sulu, Zamboanga del Norte and Zamboanga del Sur
X. Agusan, Bukidnon, Lanao del Norte, Lanao del Sur, Misamis Occ., Misamis Or., Surigao del Norte, and Surigao del Sur.

Sources of Data: (a) Bureau of Private Schools, List of Authorized Private Schools and Courses, 1959-1960
(b) Board of National Education, School Statistics, 1959-60
(c) Bureau of Public Schools, Statistical Bulletin, 1960
(d) Bureau of the Census and Statistics, Census of the Philippines, 1960

Table 16

Number of Public and Private School Teachers Classified by Level of Students Taught: 1955 - 1965

Year	Primary		Intermediate		Secondary		Collegiate	
	Public	Private	Public	Private	Public	Private	Public	Private
1954 - 1955	57,402	2,019	27,775	973	8,483	9,485	354	6,032
1955 - 1956	59,711	2,291	28,526	1,432	8,566	11,682	429	7,820
1956 - 1957	62,239	2,476	29,079	1,508	8,864	11,646	443	8,996
1957 - 1958	64,848	2,530	30,300	1,615	9,013	11,788	501	9,600
1958 - 1959	70,503	3,234	31,931	1,610	9,292	12,333	435	8,968
1959 - 1960	72,157	3,334	33,479	1,655	9,682	12,815	469	9,121
1960 - 1961	79,141	3,566	32,165	2,202	10,334	13,384	528	9,470
1961 - 1962	84,815	3,838	35,973	2,363	10,950	14,572	567	11,064
1962 - 1963	97,698	4,229	41,430	2,118	3,985	16,384	245	13,670
1963 - 1964	102,213	4,437	46,474	2,347	9,773	16,698	214	18,591
1964 - 1965	109,847	4,607	51,017	2,661	11,638	17,663	249	19,608

Source: Yearbook of Philippine Statistics, 1966
Philippine Bureau of Public Schools Statistical Bulletin (1955-65)
Private Schools Statistics (1958-1959)

Table 17

Estimated Demand for Scientists & Engineers: 1966-70

Field of Specialization	1966	1967	1968	1969	1970
Science	14,167	15,089	16,005	16,989	18,048
Technology	45,509	48,475	41,418	54,579	57,979
Medical Science	6,848	7,294	7,737	8,213	8,725
Agricultural Science	4,816	5,130	5,442	5,776	6,136
Social Science	9,609	10,235	10,856	11,524	12,241
	80,949	86,223	91,458	97,081	103,129

Estimated Supply of Scientists & Engineers: 1966-70

Field of Specialization	1966	1967	1968	1969	1970
Science	32,520	34,448	36,526	38,756	41,136
Technology	63,512	65,551	75,790	82,226	88,861
Medical Science	15,109	21,298	27,424	33,488	39,489
Agricultural Science	8,091	9,418	10,769	12,146	13,547
Social Science	22,637	28,618	34,835	41,287	47,976
	141,869	159,233	185,344	207,903	231,009

Estimated Surplus of Scientists & Engineers: 1966-70

Field of Specialization	1966	1967	1968	1969	1970
Science	18,353	19,359	20,521	21,767	23,088
Technology	18,003	17,076	24,372	27,647	30,882
Medical Science	8,261	14,004	19,687	25,275	30,764
Agricultural Science	3,275	4,288	5,327	6,370	7,411
Social Science	13,028	18,383	23,979	29,763	35,735
	60,920	73,010	93,886	110,822	127,880

Source: dela Cruz, Milagros: "An Evaluation of the Utilization of Scientific and Technological Manpower." Unpublished paper.

Table 18

Employment by Field of Specialization and by Age-Group

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 & Over
Scientific Fields:	1,459	3,234	2,355	1,762	1,199	776	450	432	328	52
Agricultural Sciences	296	1,376	1,040	402	161	204	133	151	105	6
Biological Sciences	239	490	281	447	201	132	71	38	108	10
Chemistry	230	556	408	144	312	100	102	95	60	21
Earth Sciences	152	202	217	153	198	66	8	40	15	-
Mathematics	352	238	160	300	127	155	26	41	20	15
Physics	190	372	249	316	200	119	110	67	20	-
Engineering Fields:	732	2,334	1,948	1,856	1,187	703	597	269	269	92
Chemical	244	356	214	117	62	72	94	26	-	6
Electrical	130	627	477	398	353	133	64	46	54	50
Mechanical	247	930	826	860	312	219	149	73	67	-
Civil	111	421	431	481	460	279	290	124	148	36
Medical Fields:	31	192	414	704	354	134	159	136	187	41
Medicine	20	118	161	252	202	84	139	100	156	21
Optometry	6	3	15	195	-	-	-	1	-	-
Dentistry	-	31	65	70	56	40	-	20	-	-
Pharmacy	5	40	173	187	96	10	20	15	31	20
Other Fields:	589	1,206	1,120	1,139	782	921	484	233	301	158
Education	138	484	479	609	342	421	154	71	168	69
Business	251	457	149	144	97	70	104	17	20	-
Law	-	53	94	156	183	321	186	95	41	4
Social Sciences	200	212	398	230	160	109	40	50	72	85

Source: Survey of Scientific and Technological Manpower in the Philippines

Table 19

Percentage Distribution of Employed Scientific and Technical Manpower by Field and by Age-Group

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 & Over
Scientific Fields:	12.1	26.8	19.5	14.6	10.0	6.4	3.7	3.6	2.7	.4
Agricultural Sciences	7.6	35.5	26.8	10.4	4.2	5.3	3.4	3.9	2.7	.2
Biological Sciences	11.8	24.3	13.9	22.2	10.0	6.5	3.5	1.8	5.4	.5
Chemistry	11.3	27.4	20.1	7.1	15.4	4.9	5.0	4.7	3.0	1.0
Earth Sciences	14.5	19.2	20.6	14.6	18.8	6.3	.8	3.8	1.4	-
Mathematics	21.7	17.2	11.6	21.7	9.2	11.2	1.9	3.0	1.4	1.1
Physics	11.6	22.6	15.2	19.2	12.2	7.2	6.7	4.1	1.2	-
Engineering Fields:	7.3	23.3	19.5	18.6	11.9	7.0	6.0	2.7	2.7	.9
Chemical	20.5	29.9	18.0	9.8	5.2	6.4	7.9	2.2	-	.5
Electrical	5.6	26.9	20.4	17.1	15.1	5.7	2.7	2.0	2.3	2.1
Mechanical	6.7	25.2	22.4	23.4	8.5	5.9	4.0	2.0	1.8	-
Civil	4.0	15.3	15.5	17.3	16.5	10.0	10.4	4.4	5.3	1.3
Medical Fields:	1.3	8.2	17.6	29.9	15.0	5.7	6.8	5.7	7.9	1.7
Medicine	1.6	9.4	12.8	20.1	16.1	6.7	11.1	8.0	12.4	1.7
Optometry	2.7	1.4	6.8	88.6	-	-	-	.4	-	-
Dentistry	-	11.0	23.0	24.8	19.9	14.2	-	7.1	-	-
Pharmacy	.8	6.7	29.0	31.3	16.1	1.7	3.4	2.5	5.2	3.4
Other Fields:	8.5	17.3	16.2	16.4	11.3	13.2	7.0	3.4	4.3	2.3
Education	4.7	16.5	16.3	20.7	11.6	14.3	5.2	2.4	5.7	2.4
Business	19.2	34.9	11.4	11.0	7.4	5.3	7.9	1.3	1.5	-
Law	-	4.7	8.3	13.8	16.2	28.3	16.4	8.4	3.6	.4
Social Sciences	12.8	13.6	25.6	14.8	10.3	7.0	2.6	3.2	4.6	5.5

Source: Survey of Scientific and Technological Manpower in the Philippines

Table 20

Median Entrance Salary Range Offered by Industrial Establishments (Manila)

Field of Main Activity	High School Graduate	College Graduate	Post Graduate
Engineering	166.51	295.00	557.25
Mathematics	-	374.00	-
Agricultural Sciences	-	307.67	-
Biological Sciences	-	330.12	-
Medical Sciences	-	294.42	649.00
Earth Sciences	-	280.62	-
Physics and Astronomy	124.50	278.90	-
Chemistry	155.62	281.20	-
Social Sciences	-	311.25	-
Other Scientific Fields	198.50	298.50	-
Overall	162.72	297.06	500.00

Source: Survey of Scientific and Technological Manpower in the Philippines, 1965

Table 21

Number of Employed Persons by Major-Occupation Group (1956-1965)

Major Occupation Group	October 1956	October 1957	November 1958	October 1959	October 1960	October 1961	October 1962	October 1963	May 1964	October 1965
In the labor force	8,561	8,829	8,976	9,116	9,116	9,713	10,266	10,233	11,296	10,764
RE	89.96%	92.86%	92.79%	94.06%	93.67%	93.64%	93.54%	95.42%	93.59%	93.84%
Total Number Employed (In thousands)	7,702	8,199	8,329	8,575	8,539	9,095	9,603	9,764	10,572	10,101
Professional, technical and related workers	216	221	249	257	239	309	288	312	317	374
Proprietors, managers, administrators and officials	354	312	249	317	324	336	355	351	433	434
Clerical, office & related workers	184	172	175	197	213	273	250	283	285	354
Salesmen and related workers	454	484	508	506	444	537	576	644	740	677
Farmers, farm laborers, fishermen and related workers	4,529	4,960	5,255	5,274	5,208	5,502	5,886	5,750	6,153	5,677
Workers in mine, quarry and related occupations	31	24	25	26	26	18	29	20	32	10
Workers in operating transport occupation	146	156	158	172	188	181	192	253	243	273
Craftsmen, factory operatives and related workers	1,071	1,140	1,024	1,115	1,136	1,100	1,152	1,249	1,384	1,272
Manual workers & laborers, n.c.c.	169	156	117	146	162	163	163	195	264	152
Service and related workers	539	558	533	549	564	637	672	674	698	838
Occupation not reported	39	24	33	26	43	27	29	20	10	40

Source: PSSH Bulletin (Series No. 1-17)
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FOOTNOTES

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