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ANALYTICAL ASPECTS OF TWO CURRENT ECONOMIC POLICIES

by Gerardo P. Sicat, 1935-

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Two recent policies that will affect the Philippine economy and industry, in particular, are the restrictive policy to entry of foreign firms and the new minimum wage law. In the following, I shall try to bring to bear some of the conclusions that may be derived with the use of standard tools of analysis used in economics.[1] In impact, the case of restrictive entry in the cement industry is only illustrative of a general drift in nationalistic economic policies as they affect foreign economic participation. The minimum wage law has economy wide implications, but its effect on Philippine industry is quite obvious.

1. The Cement Industry and Restrictions to Entry

In November, 1964 the National Economic Council made a decision to reject the applications of two foreign companies to establish cement plants in the Philippines notwithstanding the fact that a number of Filipino firms are being allowed to set up

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[1]My intellectual debt to Professor Robert L. Bishop's still unpublished manuscript on Economic Theory will be obvious to many a graduate of M.I.T. who has worked through the same manuscript.

new plants to expand industry capacity in the future. The rationale of this national policy is to exclude foreign companies in industries which Filipinos have pioneered in. But this rejection is equivalent to a policy of restriction of entry in the industry; I shall explain this later.[2]

Suppose that an industry is composed of several firms,[3] not one of which is substantially large enough to eliminate the others. All firms have access to the same technology and their cost functions are sufficiently identical.[4] The average cost function per plant is typically u-shaped. The demand curve facing the firm is downward sloping, since each firm is large enough to have an influence on the price. For simplicity, all firms face a linear demand. Cement is more or less a homogeneous commodity; therefore one can speak unambiguously about a cement market.

The institutional setting of the industry can be made to fall under a class of industries classified under imperfect competition (in recent literature). It is therefore obvious that in this case supply and demand techniques are not useful in analyzing industry or firm behavior. Chamberlin's notion of group equilibrium can be utilized to dramatize a typical firm's position.[5] This does not

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[2]See p. 8 , below.

[3]There were 6 cement firms in the Philippines in 1964.

[4]We shall assume that the cost function remains unchanged in the sense of factor prices. With a little modification, this can be incorporated in the analysis here.

[5]See E.H. Chamberlin, The Theory of Monopolistic Competition, 7th Ed. (Cambridge, Harvard University Press, 1958).

necessarily compromise us to accept the notion of long-run group equilibrium of a market situation under monopolistic competition, for as we have pointed out cement is a homogeneous commodity and entry is restricted. This is not in consonance with Chamberlin's assumptions about product heterogeneity and free entry.[6] Chamberlin's long-run equilibrium will lead to a no-profit equilibrium at excess capacity.[7] Because of restrictions to entry, excess capacity need not be a typical result and equilibrium can be established at positive profits. If we assume further that the extent of competition among the firms is not strong enough to describe the industry as a competitive oligopoly then the rules for equilibrium would follow the profit maximization principle, with marginal costs and marginal revenue being equated. The uncertainty is in the movement of demand for a firm in the market, or, alternatively in the shifts in marginal revenue schedules.

The typical diagram for a firm in group equilibrium with others in the cement industry is given by Figure 1.1. The price and corresponding cost items are measured in the vertical axis and units of cement in the horizontal axis. The demand curve for the typical firm is shown by D_oD_o. Profit maximization by the firm (determined by an equality of marginal cost and marginal revenue) leads to an output x_o and a corresponding price p_o. Profits of the firm are

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[6] Ibid.

[7] Ibid, pp. 104-10. Note that this eliminates the need for the small d curve in Chamberlin's framework, although in a sense this can still be utilized to depict possible price-cutting by the firms already existing in the industry.

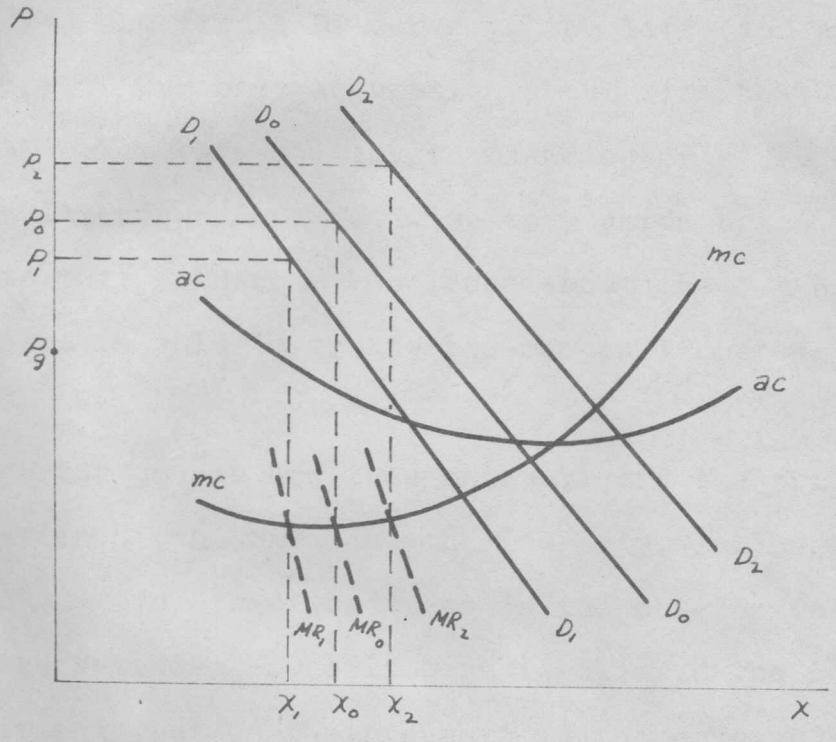

Figure 1.1

equal to the difference between equilibrium price and per unit average cost multiplied by the equilibrium output, or $(\underline{p}_o - \underline{c}_o)\underline{x}_o$. (We use the symbols, $\underline{p}$ and $\underline{x}$ as measurements from the origin.)

The demand facing the firm shifts to the right or to the left depending upon whether there is an increase or a decrease in demand. On the assumption that total industry demand is the same, entry shifts the firm's DD curve to the left, and exit shifts it to the right. Our only assumption about firm behavior in the industry is that they all try to maximize profits, but that they are in an interdependent position as regards price-output decisions. This means that with some knowledge about the demand schedule facing it, the firm is able to equate its marginal cost with its marginal revenue.

In order to see how free entry alters the price-output configuration of the firm and the industry, let us assume that entry were allowed. In other words, as in the case of the cement industry, suppose the National Economic Council allowed the foreign applicant cement firms to put up their plants in the country. Assuming that total industry demand schedule is still as before, entry shifts the demand schedule of the firm to the left from D_oD_o to D_1D_1. What are the consequences of this shift in demand? The new profit maximizing position of the firm leads to an output of $\underline{x}_1$ at price $\underline{p}_1$.[8] Since normally in the relevant range the marginal cost curve is positively sloped, the usual outcome will be that new equilibrium

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[8]The shapes of the marginal revenue and marginal curves in Figure 1.1 assure fulfillment of the second-order condition for maximum.

leads to a lower price of the output, that is, p_o is greater than the new price p_1. The firm's output contracts from x_o to x_1, but this is expected since now there are more firms supplying the output of the industry, with demand remaining the same. However, since the demand for cement in the industry is negatively sloped, a reduction in price leads to higher total industry output. The net result of the analysis shows that users can now purchase cement at lower prices and are therefore able to purchase more units and that abnormal individual firm profits are reduced. Entry and more competition generally brings down the price and increases total available physical output, so that any restrictions to entry can only lead to higher prices and less output.

The implications of restricted entry can be appreciated more if assumptions about industry demand are changed. Suppose that the demand for cement increases (possibly because of a construction boom or of the decision by the government not to import cement as was done heretofore). On the assumption that entry has been prevented by government policy in the first place, this means that the firm's demand schedule shifts from D_oD_o to D_2D_2, i.e., to the right. All firms reach their equilibrium positions at price p_2 and output x_2, which are in both instances higher than the original price-output equilibrium given by p_o and x_o. With all firms expanding output, the total industry output increases and is sold at a higher price. If entry were allowed in the first place the extent of price increase

(relative to p_o, that is) in this case will depend on the amount of entry permitted and on the size of the increase in demand for cement.

Thus under certain assumptions, restricted entry in the cement industry, as in any other industry, leads to higher price. So long as some Filipino firms are allowed to enter the industry, the extent of the price increase described above may be contained.

But there are other institutional constraints that tend to prevent price increases. A price control policy for cement, supported by cement imports, has helped prevent further price increases due to higher aggregate demand. The so-called cement shortage has forced the country to import cement so as "to fill up" the additional market demand and thereby also depress cement prices to reasonable levels. The cement imports have substituted for more entry, but actual cement prices have not really been prevented from rising.[9] Entry is a reasonable guarantee that the use of scarce foreign exchange for cement importation can be reduced.

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[9]An attempt to control cement prices has to be supported by cement imports. Thus, to maintain price at p_g such that this is less than p_o but at least equal to the lowest average cost (i.e., $p_o > p_g \geq \underline{ac}$) would necessitate a lot of cement imports. But such a policy can lead to more output offered for sale by each firm. Figure 1.1 may be revised (but not shown here) to take note of this by drawing a horizontal line starting from p_g on the vertical axis. If this is completely enforced upon all the firms, the profit maximizing rule would be to produce

What remains now is to elaborate on why the prevention of foreign entry serves as an effective instrument for controlling entry. The claim is that Filipino cement plants are welcome in the cement industry. Leaving aside the nationalistic argument that Filipinos should be favored over foreigners (for who can quarrel with sentiments?), this claim can be answered with a little aid from economic analysis. Since the foreign firms were coming in as investors, the capital resources to be used are independent of the amount of capital resources that Filipinos can mobilize domestically. For new firms to enter the cement industry, additional Filipino capital has to be raised from scarce domestic resources; probably the new firm will apply for reparations allocation and borrow from the resources of the Development Bank of the Philippines. To the extent that these resources have many competing uses, they prevent more entry by new firms. On the other hand, foreign capital resources, including its complement of technical personnel, could augment the country's scarce resources for producing more goods, and thereby free those resources for other activities (either for another Filipino cement firm or some other industry undertaking).

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as much as would be demanded at p_g. This is equivalent to the horizontal distance from p_g to the DD schedule. Thus, more cement would be available than what the firms and the industry in equilibrium (without price control) would be offering for sale. The presence of "black" market prices for cement during a time when the government was importing cement through NAMARCO is convincing evidence that Figure 1.1 unrevised is a sufficient diagrammatic devise for explaining price-output decisions in the firm and industry. The last situation referred to, however, has been complicated partly by a cost-shift due to the decontrol policy on foreign exchange in the early 60's.

As to the argument that the local cement firms can supply the domestic requirements, a further argument may be said. To add the foreign firms and thereby to expose the domestic firms to more competition might be healthy for the industry as a whole. Moreover, such internal competition can lead to cost reduction and may lead to a test of the industry's competitive position vis-à-vis the rest of the world. This can brighten the prospects of cement exports and may help to diversify the country's export composition.

2. A Higher Minimum Wage Law in an Economy with Infinitely Elastic Labor Supply

The minimum wage law in the Philippines was increased recently.[10] The following analyzes a situation in which a minimum wage is imposed in an economy with surplus labor. As an evidence that the Philippines fits this description, there is available a large pool of unemployed laborers that can be hired at the earlier minimum wage rate. Moreover, real wage rates in industry have not changed substantially in the postwar period.[11]

Suppose that the supply of labor is completely elastic over the relevant range that some demand for its exists. For the whole

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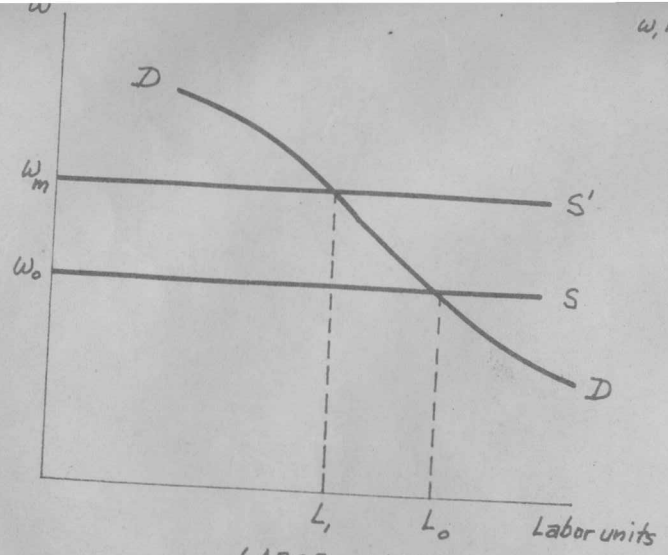
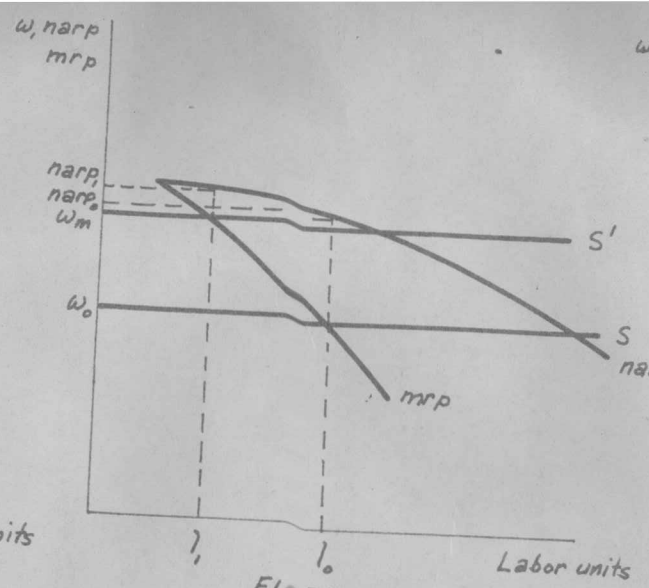
[10]The bill was signed into law on April 21, 1965. The minimum wage is increased by law from ₱4 to ₱6.

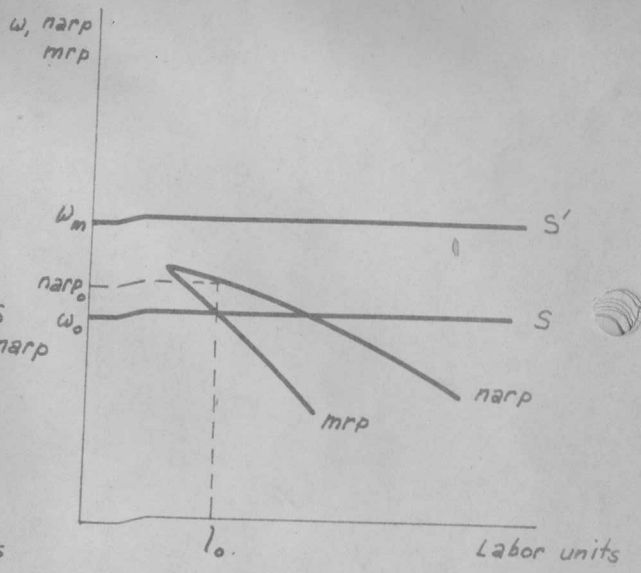
[11]The evidence can be understood by a careful examination of the following: Central Bank, Economic Indicators, vol. 15 (no. 2 December, 1964), part VII and Philippine Statistical Survey of Household Bulletin, Series No. 13, "Labor Force and Disability Data," October 1962. Stephen A. Resnick, of Yale University Growth Center and concurrently with the University of the Philippines, is working out a study of the Philippine economy based on a Lewis and Ranis-Fei model of a labor surplus economy.



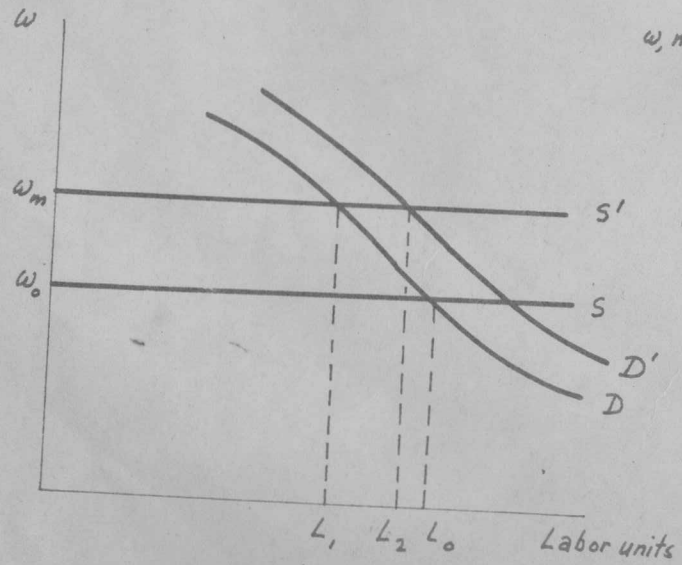
LABOR MARKET
Fig. 2.1.a.



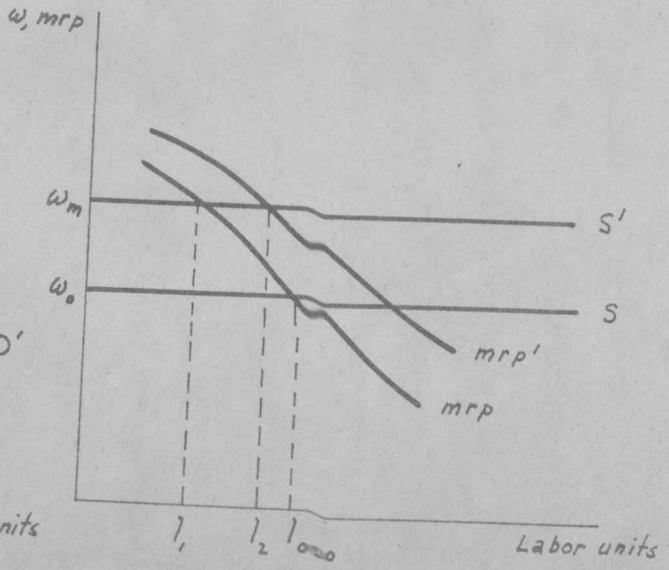
FIRM
Fig. 2.1.b.



ANOTHER FIRM
Fig. 2.1.c.



LABOR MARKET
Fig. 2.2.a.



FIRM
Fig. 2.2.b.

economy, the demand for and supply of labor is given in Figure 2.1.a. At wage rate, $\underline{w}_o$, any amount of labor can be hired. Supply and demand for labor in the economy shows that at $\underline{w}_o$, L_o units of labor are employed. Figures 2.1.b and 2.1.c are corresponding diagrams for two different firms, or productive units, in the economy. The (monetary) units on the vertical axis are the same as in Figure 2.1.a, but the labor units on the horizontal axis are different. Since the firm is only one of the many thousands in the economy, the labor units it can hire must be very small relative to the whole. In order not to be confuse these units, the horizontal axis is measured by $\underline{L}$ for the whole labor market and by $\underline{l}$ for the firm. Labor units may be thought of in any unit -- man-hours or man-years -- so long as one is consistent.

From the theory of the firm, we are able to transform profit maximization in terms of an input.[12] In Figure 2.1.b, this is in

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[12]Suppose that a production function in two factors is given by $x = x(L, K)$ where x is output, L and K are labor and capital. The firm's profit, Π is the difference between total revenue, R, and costs, C. In symbols, this is given by

$$\Pi = R - C.$$

Total revenue can be expressed in terms of the production function. For simplicity, we may specify total costs to be composed of a fixed outlay on capital, C_f, and a variable cost (the labor input), with the wage rate, $\underline{w}$, determined by the market for labor. (In this and the succeeding footnote, we shall use a formulation of the cost function which is short-run in nature. With some complication, a long-run cost function may be used.) Then we get the following:

$$\Pi = R\,[x(L, K)] - C_f - wL$$

terms of the labor input. The mrp schedule is the marginal revenue product of labor and narp is the net average revenue product of labor.[13] Since, in general, a firm will not hire any labor unit if its marginal revenue product is less than the wage paid to it, the mrp corresponds to the firm's demand for labor. The narp shows how much is the net average product earned by a unit of labor hired. (The word net excludes non-labor costs). In a two-factor world in which the second inputs are fixed to the firm, and therefore constitute fixed costs, such fixed costs are already eliminated from narp.

It is clear that the firm will hire only L_o of labor at w_o. The firm's profit is given by $(narp_o - w_o)L_o$. So long as $narp_o$

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where w is the wage rate. To maximize profits, we differentiate Π with respect to L, and setting to zero we have

$$\frac{\partial \Pi}{\partial L} = \frac{\partial R}{\partial x} \frac{\partial x}{\partial L} - w = 0.$$

Equivalently, the marginal revenue of product of labor $\left(= \frac{\partial R}{\partial x} \frac{\partial x}{\partial L}\right)$ is equal to the wage rate, or

$$mrp = w.$$

This is the well known result which makes mrp schedule equivalent of the demand for labor.

[13] Total profits, as the previous footnote shows, is $\Pi = R - C_f - wL$. Then net average profit per labor hired is given by

$$\frac{\Pi}{L} = \frac{R - C_f}{L} - w,$$

where $(R - C_f)/L$ is narp and w wage. So long as narp > w, average profit per labor employed is positive. So long as fixed costs are not recovered, any firm with narp < w is better off to leave the industry. This is developed in detail by Bishop, op. cit., Book IV.

is greater than $\underline{w}_o$, it is profitable for the firm to operate. But it hires only as much labor where $\underline{mrp}_o = \underline{w}_o$, as already shown.

Now suppose a minimum wage, $\underline{w}_m$, higher than $\underline{w}_o$, is legislated. If the law is enforced completely, the implications of employment for the firm and for the economy are straightforward as shown by the same set of Figures 2.1.a to 2.1.c. It is now seen why there are two illustrations for firms. The first (2.1.b) shows how a still profitable firm gets affected by higher labor costs. The second (2.1.c) shows how a once profitable firm is made to leave the market.

Based on statical assumptions about demand for labor, total employment decreases with a minimum wage higher than $\underline{w}_o$. Total employment in the economy is reduced from $\underline{L}_o$ to $\underline{L}_m$. In Figure 2.2.b, the firm's employment shrinks from $\underline{l}_o$ to $\underline{l}_m$, while in Figure 2.2.c, the firm has to leave the market because the minimum wage is too high for profitable operation. Thus, the shrinkage of employment from $\underline{L}_o$ to $\underline{L}_m$ is the result of reduced employment by some firms and the exit of others. Figure 2.2.c may also depict the case of a firm that could have gained entry in a given economic undertaking but whose entry is prevented because of higher labor costs.[14]

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[14]This is equivalent to $\underline{narp} < \underline{w}$. In the case of the first firm already in business, the short-run rule will be that the firm does not incur losses greater than its total fixed costs. This is equivalent to the rule that the average revenue product of labor ($\underline{arp}$ = R/L in contrast to $\underline{narp}$) is at least greater than the wage rate, i.e., $\underline{arp} \geq \underline{w}$. A firm that is still contemplating to enter an activity would find it impossible to enter the market, given some prior knowledge that it will be in this position.

It is quite likely that such decreases in employment may not be observed because there are some sectors experiencing expansion as a result either of increased demand or of technological innovations; or there may be new industries being established which compensate for the firms which are closing down. These things already depart from the framework of the assumptions used here.

But there is an interesting strand of the argument for an increased minimum wage which deserves attention here. The reasoning is based on a feedback mechanism of increased wages on demand. With laborers receiving higher take-home pay, they are able to increase aggregate demand for goods, their marginal propensity to consume being high. In terms of the analysis here, some firms, e.g., those that may be typically depicted by Figure 2.2.b, may experience an increase in demand for their output. Since the demand for labor is a derived demand, the increase in output demand in a firm, ceteris paribus, also shifts the marginal revenue product of labor in the same direction -- to the right. Therefore, the demand for labor in the whole economy is also increased. If the feedback mechanism is strong enough it can offset completely the reduction in employment in the firm and in the economy. At most this result can be asserted, but it is hard to prove.

A priori reasoning does seem to favor the case of insufficient feedback. Since wage earners belong to the lower income classes, any increase in demand will be mostly reflected in demand for food

due to Engel's law[15] and therefore much of the impact may be only on the agricultural and consumption goods sector. If agriculture is producing a surplus from the beginning, the additional demand for labor may not be significant enough to offset the primary effects of reduced employment. If the food sector is a bottleneck as in some underdeveloped countries with surplus labor (e.g., India or the Philippines), such feedback on demand have balance of payments repercussions. The alternative to this result is an increase in the price of food which neutralizes whatever gains are derived from increased wages.

A case of insufficient feedback can be dramatized by Figures 2.2.a and 2.2.b, for the whole labor market and for a firm. (We ignore the narp curve in the latter figure). The broken lines represent the instantaneous shift in demand for labor due to the feedback of demand from increased wages. It is quite clear from the diagram that the feedback is not able to recover the labor which gets unemployed in view of the higher minimum wage, $\underline{w}_m$, by the difference between previous equilibrium employment and the new one (i.e., $\underline{L}_o - \underline{L}_2$ for the economy and $\underline{l}_o - \underline{l}_2$ for the typical firm).

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[15]The amount of the additional income into the non-food sector is likely to be small at the lower income class levels when demand for food is not yet saturated.

It may also be added that the reason for the widespread lack of compliance with minimum wage legislation in underdeveloped countries with surplus labor is due to the fact that $\underline{w}_m$ is usually much greater than $\underline{w}_o$. Therefore, there is a wide leeway for employer and worker to manipulate wages between $\underline{w}_m$ and $\underline{w}_o$ on a mutual (even if implicit) basis. On this particular point, my colleague Professor R.W. Hooley suggests that the degree of compliance with any law is inversely proportional to the difference between the equilibrium value and the legally imposed value. Thus, the wider the distance between $\underline{w}_m$ and $\underline{w}_o$ the less is the degree of compliance.

Some related items come briefly to mind at this point.

a. Capital-labor substitution. To what extent will increased minimum wages affect labor and capital? Considering the inducements provided by law (basic industries act) and by public policy (low interest policy for long-term loans) to price capital below its true scarcity value, an increase in the minimum wage can cause a substitution of labor for capital. This is most especially true for those industries that are tied up by law to comply with the requirements, for instance, members of the Social Security System, and even government offices. The extent of this can only be stated affirmatively in a qualitative way.[16]

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[16]Estimates of the elasticity of substitution between labor and capital can be used to quantify this statement. Estimates of this can be gotten out of a CES production function, but with the lack of variability of wage rates in a country with infinite elasticity of labor supply, the estimates cannot be made successfully.

b. Paradox of equity legislation. Since the results shown in this paper are logically valid, then it appears that a paradox presents itself here. A legislation designed to uplift the poorer classes and therefore to give them more equity leads to greater inequity. The country is not able to take full advantage of its more abundant resource by pricing it far above its going market value. It may well be that far from improving income distribution, this may only worsen it.[17]

An attempt to estimate a CES production function, which I consider generally as a failure, can be found in G.P. Sicat, "Production Functions in Philippine Manufacturing," Philippine Economic Journal 2 (Second Semester, 1963). But even if we grant that Eisner's contention of a downward bias of CES elasticities is correct, some positive substitutability between capital and labor is bound to arise especially if the price of capital is pushed below and labor above their respective equilibrium values. See R. Eisner, "Comment" on R.M. Solow, "Capital, Labor and Income in Manufacturing," The Behavior of Income Shares, Studies in Income and Wealth, vol. 27 (National Bureau of Economic Research, Princeton University Press, 1964), pp. 135-7.

[17] I shall outline here more equitable measures which are fiscal in nature -- higher property taxes (to eliminate undue concentration in real estate) and selective taxes on exports such as logs and sugar. These two measures if passed into law, will have a more equitable redistribution effect than minimum wage legislation. But this is beautiful only in theory because, I am told, these measures are politically infeasible with Congress being composed of members that are bound to get hurt.