Faculty Working Papers

A Normative Approach to Profit and Sales Maximization

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I. INTRODUCTION

The profit-maximizing goal is demanded by sheer economic survival of the firm in a hypothetical world of pure competition. With the recognition that pure competition is not the general rule of the market, the concern with other goals becomes possible. Beyond the minimal need for survival, a certain margin or "slack" can be afforded by the firm to satisfy desires other than, or in addition to, that of profits. Alternative theories of the firm based on various simple or complex objective functions have therefore been developed in the literature.[1]

In many new approaches to the theory of the firm, the traditional assumption of the "entrepreneur" has been found to be deficient considering the internal organization of the modern firm. When two or more persons with interests in the firm are taken into consideration, the question of possible diversity of goals must be resolved. Different goals of the firm bear different normative implications for the different groups of people related to the firm, including consumers who belong to the firm's clientele and employees who supply the human element in the process of production. The consideration of alternative goals therefore involve the question of distribution which is at the heart of political economy.

This paper offers a comparison of the normative implications of two alternative goals of the firm: profit maximization (PM) and sales-revenue maximization (SRM).[2]

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[1] For a quick review of alternative approaches to the theories of the firm, see, for instance, P. Yeung [3].

[2] William J. Baumol [1].

By relaxing the restrictive market conditions of pure competition, the comparison will be made in terms of the following criteria: (i) stockholders' equity, (ii) consumers' welfare, (iii) the level of employment, and (iv) the stability of employment.

A simple model of the firm to be used for our analysis will first be described (section II). Then the comparative effects of PM and SRM at the firm level will be discussed (section III). Lastly, some further implications will be considered (section IV).

II. THE MODEL[3]

Suppose the firm produces commodity X by means of two inputs, A and B. Let the production function $X = f(A, B)$ possess the usual properties: twice differentiable, positive but diminishing marginal productivities, constant returns to scale, and constant elasticity of substitution (σ).

Suppose A represents labor, and that the wage rate (p_a) is exogenously determined, say, by unionism. Assume that the price-elasticity of supply (e) of the other factor is a non-negative constant, and that the demand function facing the firm is downward-sloping given by $X.p^n = h$, $0<n<\infty$, where p represents price, h and n are parameters, n being the (finite) price-elasticity of demand.

Some of the properties of this model, which will be of special interest to us in this paper, should be noted. First, within the non-trivial range for the firm operating under either PM or SRM, it has been found that $1<n<\infty$. This implies that sales R ($= X.p$) is a monotonically increasing function of X, and that, except in the trivial case where the profit constraint π_0 under SRM coincides with the maximum profit level under PM, R and X are higher and p is lower under SRM than under PM.[4]

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[3] This model has been used in a different but related context in P. Yeung [4].

[4] Ibid.

Second, the elasticity of derived demand under PM is found to be[5]

$$\lambda \equiv -\frac{\partial A}{\partial p_a}\cdot\frac{p_a}{A} = \frac{\sigma(n+e) + ek(n-\sigma)}{n+e - k(n-\sigma)}$$

and under SRM it is found to be

$$\lambda' \equiv -\frac{\partial A}{\partial p_a}\cdot\frac{p_a}{A} = \frac{n\pi_o\{\sigma(1+e) + ek(1-\sigma)\} - R\{\sigma(n+e) + ek(n-\sigma)\}}{n\pi_o\{1+e - k(1-\sigma)\} - R\{n+e - k(n-\sigma)\}}$$

where $k \equiv \frac{A\cdot f_A}{X}$ represents the share of labor in the production of X.

Third, two "rules" of derived demand under SRM can be deduced from the model. They are as follows: "Under sales-revenue maximization (where the demand for the firm's product is elastic and other normal conditions obtain), (i) the elasticity of derived demand for a factor of production is likely to be smaller, the greater is the volume of sales of the product, and (ii) the elasticity of derived demand for a factor of production is likely to be greater, the greater is the target level of profits."[6]

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[5] Ibid.

[6] Ibid.

III. COMPARATIVE EFFECTS OF PM AND SRM

The effects of embracing the alternative goals of profit-maximization and constrained sales-revenue maximization by the firm can now be analysed. This will be undertaken in terms of their partial effects on (i) stockholders' equity, (ii) consumers' welfare, (iii) the level of employment, and (iv) the stability of employment. These will be considered in turn.

(i) Effect on stockholders' equity

To make the comparison between PM and SRM non-trivial, it should be assumed, as in Figure 1, that the maximum profits under PM is greater than the constrained level of profits π_o under SRM. At the same time, it should be observed that sales (R) is greater under SRM than under PM.

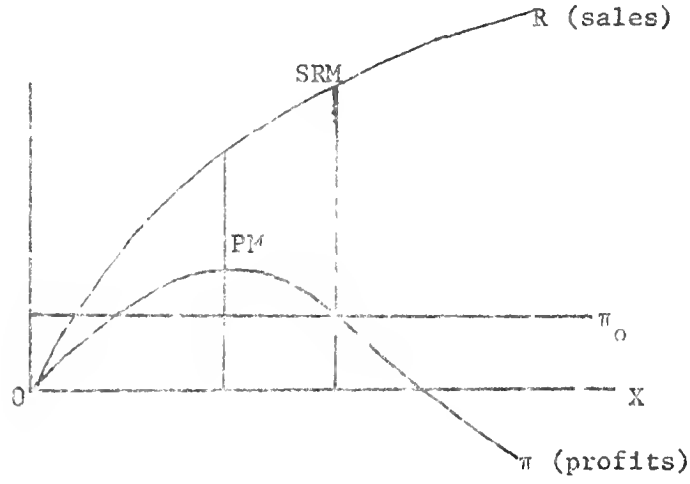

Figure 1

A trade-off is thus possible between sales (R) and profits (π), depending on the utilities which the management or the stockholders of the firm attach to these goals, because they may be interpreted as signifying market power (market share) or the long-term vs. the short-term financial strength of the firm, and so on.[7] Of course profits (PM) would be preferred from the strictly short-term standpoint in terms of returns to stockholders' equity only.

(ii) Effect on consumers' welfare

It was noted in section II that sales (R) and output (X) are higher and price (p) is lower under SRM than under PM. The lower price under

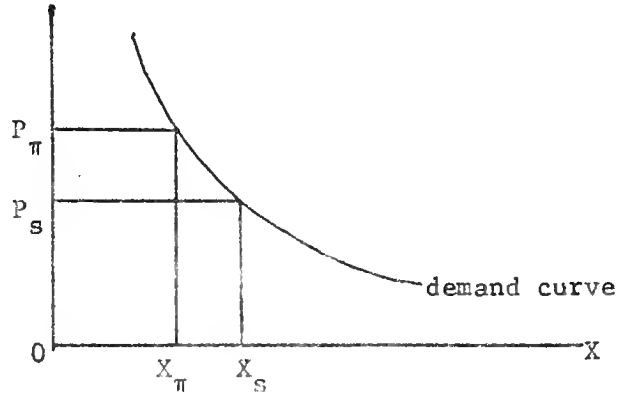

Figure 2

SRM (p_s in Figure 2) means that consumers' surplus is increased by SRM over its PM level. SRM therefore favors the consumer.

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[7] See, for example, Fritz Machlup [2, esp. pp. 21, 23].

(iii) Effect on the level of employment

Since the level of output is higher under SRM (X_s in Figure 2), than under PM (X_π), the level of employment of factor A (labor) is also higher under SRM than under PM. This would tend to be more so if the non-negative price-elasticity of supply of B, the other factor, is small.

(iv) Effect on the stability of employment

From the second of the new "rules" of derived demand noted in section II, the elasticity of derived demand must be smaller under SRM than under PM, since profits (π) are lower in the former case. This implies that the employment of labor by the firm under conditions of union pressure to increase wages would tend to be more stable under SRM than under PM.

However, in dealing with the question of employment of workers, the demand for the firm's product should also be considered. From the formulae for the two elasticities of derived demand, λ and λ' under PM and SRM respectively (see section II), it should be observed that λ is independent of X or p, while λ' depends on R (= X.p). Thus any change in demand for X would affect λ' under SRM, but not λ under PM, provided the other parameters in the formulae remain unchanged. Under these conditions, a shift in R means a change in the parameter h when n is given in the demand function. Other things being equal, h and R are positively related. When the demand for X increases ($dh>0$), λ' decreases according to the first of the two "rules" of derived demand. On the other hand, when the demand for X decreases ($dh<0$), λ' increases. Consequently, in a period of stagflation when demand for the output

decreases accompanied by mounting pressures on wages, the effect on lay-off of workers becomes increasingly severe.[8] This can, however, be partially offset by lowering the target level of profits (π_o).

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[8]However, the second of the "rules" of derived demand still intimates that $\lambda > \lambda'$.

IV. FURTHER IMPLICATIONS

In comparing the effects of profit maximization and sales-revenue maximization, our analysis has revealed that under normal conditions a change from PM to SRM would help to increase the level of not only sales, but also production and employment, while it would help to lower the price level and to raise consumers' surplus. These effects are of course partial effects, since the analysis is undertaken at the micro-level. However by simple extension, the above findings may be interpreted as constituting a prima-facie case that the same effects are likely to carry over to the macro-level, provided of course that additional people in the labor force are willing to be employed, and that the friction in getting them absorbed can be overcome.

As the SRM goal is being adopted in place of PM, consumption expenditure would tend to increase in two ways. First, it is due to the increase in sales of the new SRM firms. Second, by assuming that stockholders in general consist of the richer people of society, a change from PM to SRM would tend to distribute income from this group to the poorer labor force. This would tend to raise the overall marginal propensity to consume, which has the effect of raising national income and thus consumption expenditure via the multiplier effect.

While SRM at the firm level helps to lower prices, it should also be helpful in curbing or slowing inflation at the macro-level. Although the overall long-run effects of SRM (vs. PM) cannot be ascertained without complete information about the income and price elasticities of demand for final goods and services, it can be seen that its short-run

effects tend to help the economy especially during periods of stagflation by resolving in part the Phillips dilemma.

Finally, in terms of distributional effects, SRM (vs. PM) tends to favor consumerism and benefit the poorer working force over the richer owners of productive resources.

There is therefore much to recommend SRM over PM. Of course, such a recommendation is predicated on the assumption that it is addressed to public-minded firms or industries which can afford a margin beyond the most fundamental need for economic survival.

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