

## MEASURING PROFITS IN MULTINATIONAL ENTERPRISE

### 3.2 Managerial Competence and Corporate Culture

Competitive

H. Peter Gray\*

- Professor emeritus of economics and finance, Rutgers University, New Brunswick NJ 08903, USA.
- He is obliged to Leonard Goodman, Jean M. Gray and Paul Miranti for comments on an earlier draft.

#### ABSTRACT

The profits of MNEs are, at best, peripheral to the commanding paradigm of international business. This is unfortunate because accounting profits are a fallible measure of MNE profits because they ignore additions to MNEs's portfolios of knowledge capital. The greater the reliance of profits on knowledge capital, the bigger the potential inaccuracy between accounting profits and a measure of performance becomes. It is possible that the greater volatility of profits from knowledge capital will impart greater uncertainty to the operations of MNEs: concerns about uncertainty may encourage MNEs to bully governments to reduce profits levied on the business sector -- possibly to the detriment of social programs.

Key words: immature assets; R&D; expensing investment.

## MEASURING PROFITS IN MULTINATIONAL ENTERPRISE

This paper offers an exploratory inquiry into the measurement of the profits of multinational enterprises (MNEs). The profits of MNEs have not been incorporated in the major paradigm of international production and foreign direct investment (FDI) (Dunning, 1977) (Dunning, 1993) beyond some implicit recognition of maximization in a standard neoclassical context.<sup>1</sup> There is an implicit recognition of the role of capital budgeting in the Hymer postulate, i.e. when undertaking a new investment (Gray, 1996). Multinational enterprises in technology-intensive sectors need constantly to reassess the quality of their total asset portfolio. Given that profits are the yardstick by which economic performance is often judged, the failure to address the issue of profits and the reliability of profit measures could be a serious *lacuna* in the theory of international business (IB).<sup>2</sup>

It is important to recognize that MNEs are, with rare exceptions, producers of Schumpeter-goods (S-goods): these goods require proprietary knowhow (firm-specific knowledge capital) to be used in the design, development, manufacture, and marketing-and-distribution of the final output (Gray, 1999, Ch. 2). (Aharoni, 1993) and (Chandler, 1977) describe S-firms as operating in imperfectly-competitive markets and being capable of earning quasi-rents through the generation and exploitation of proprietary assets.<sup>3</sup> Proprietary technology in both design and manufacture is an important component of knowledge capital, which must also include the skills of the firm's workforce in developing and

producing the firm's product lines as well as in exploiting their advantages (including marketing-and-distribution).<sup>4</sup> Because proprietary knowledge capital is a "created asset" that can be transferred internationally relatively easily, most S-firms are multinational.<sup>5</sup>

Define a Marshallian firm (M-firm) as producing a standardized good with generic factors of production and as being a price-taker in highly-competitive markets.<sup>6</sup> For M-firms, proprietary knowledge capital is an unimportant determinant of profitability (if it has any influence at all) and can legitimately be neglected. Profits may, therefore, be measured with acceptable accuracy by historical accounting profits (revenues minus allowable costs).<sup>7</sup> While a pure Marshallian firm may not exist, if only because of differences in X-efficiency, the concept provides a good reference norm.

In contrast, the profits of an S-firm depend, *inter alia*, on the firm's portfolio of knowledge capital relative to that of its competitors.<sup>8</sup> Gains or losses in the value of proprietary knowledge capital make the measurement of profits of S-firms more difficult to the point that accounting profits could be a misleading measure. If present and future profitability is the motivation of S-firm executives and the measure of corporate success, it is important that the role of profits be explicitly recognized and defined correctly.<sup>9</sup> This paper examines: what constitutes the best measurement of MNE profits and how reliable would that measure be? (Section I); Section II looks at possible

causes of greater volatility in the profits of S-firms. The final section (Section III) briefly addresses the broader implications of the greater difficulties of accurate measurement of the profits of MNEs and S-firms.

#### *I. Defining and Measuring MNE Profits.*

The measurement of profits of multinational enterprise (MNE) has not yet been the focus of intensive research by IB scholars. The investment of net cash flows to enhance the portfolio of knowledge capital is usually "expensed" (i.e. immune from any corporate profits tax).<sup>10</sup> Failure to identify the creation of an asset in the form of a potentially profit-generating accretion to the firm's portfolio of knowledge capital would lead accounting profits to give an understatement of the increase in the firm's value: the value of the immature asset would comprise the expected net present value of the knowledge asset. It is probable that investment in intangible knowledge capital will be financed, at least in part, by quasi-rents earned by existing prop[rietary] knowledge capital. The generation of quasi-rents requires a "mark-up" (non-neoclassical) system of pricing products: the basis for such a system is given in Appendix A.<sup>11</sup>

Required publication of well-defined accounting profits<sup>12</sup> was developed originally to allow arm's-length investors to have more reliable information on the activities and successes of imperfectly-competitive M-firms (more properly, C-firms -- see fn. 6 above), whose bonds and equity were traded in secondary markets (Baskin and Miranti, 1997, Ch. 4). The measurement of profits

must, for MNEs, be broadened. Because many investments in knowledge capital have a payoff only after a (possibly substantial) lag, the goal of the firm must be taken to maximize shareholder value over time, i.e. the present value of [expected] future profit streams.<sup>13</sup> Investment decisions must encompass not only the generation of revenues now and in the immediate future but also those (expensed) immature investments which will generate future knowledge and future profits.<sup>14</sup> The best conceptual basis for measuring the profits of S-firms is the "*finance measure*" of profits which will incorporate changes in the value of the firm's portfolio of knowledge capital. Since knowledge capital is multi-dimensional and since most MNEs are multiproduct firms, the investment decision is *pro tanto* more complex requiring the allocation of funds (from free cash flow and from the sale of liabilities) among a variety of types and locations of capital among a number of goods (or divisions).

Because much of the difference between the two measures of profit can be attributed to operational difficulties, the concept of "accounting profits" constitutes a useful first reference norm.<sup>15</sup> The operating difficulties derive from the need for an agreed-upon and acceptable base for measuring costs and revenues for purposes of providing an unbiased source of information and as a base for taxation. *Ex post* accounting profits is a working compromise which does not recognize the implicit value of good strategies and proprietary immature assets.<sup>16</sup> Even so simple a concept as accounting profits is not immune to covert differences

in pro-business activity by governments as depreciation allowances on physical capital can be unrealistically generous to firms: this is more likely to occur when an industry is under pressure from foreign competition. Presumably the fact that accounting measures ante-dated profits taxes and the possibility of dispute over the appropriate cost of capital, prevented accounting profits from allowing the cost of capital to be entered as a cost in what was essentially a pragmatic compromise.<sup>17</sup>

A general, albeit abstract, definition of after-tax profits ( $\Pi$ ), which can be made compatible with both measures, is: the net present value of the expected after-tax net revenues generated by the firm's assets ( $PVNRA$ ) of a firm at the end of the period ( $T$ ) plus dividends ( $D$ ) paid out in the period minus the net present value of the net revenues of the assets at the beginning of the period ( $t$ ).<sup>18</sup>

Notationally:<sup>19</sup>

$$(1) \quad \Pi = PVNRA_T + D - PVNRA_t.$$

Measurement of profits and firm performance according to this definition relies largely on the accuracy of the measurement of the present value of future net revenues of both the productive and "immature" assets of the firm. This definition can be used to identify the differences between the performance measures.

When equation (1) is computed with the value of  $PVNRA$  defined by the balance-sheet value of stockholders' equity, the measure is historical and constitutes "accounting profits". This measure constitutes a known, albeit conservative accounting practice. The

ex-post character of the accounting measure of profit effectively values immature and finite-lived (patented) knowledge assets at zero and implies nothing about future profits: it prevents incorporation of the effects of the more dynamic and uncertain conditions in which S-firms operate. However, if the competition among firms is intense and if speed-to-market of new products or new versions of old products can generate large swings in net revenues,<sup>20</sup> the task of revenue estimation for firms producing S-goods may be so difficult as to warrant overt recognition of its inevitably volatile component.

The profit measure of an S-firm is improved if the estimate of the prospective net revenues of the firm allows for an objective evaluation of future changes in the outlook of the industry and for the potential revenues from assets which may not yet be generating a current or their full return. Clearly, the practical problems of valuing *PVNRA* as the discounted flows of expected future net revenue streams, would be tremendous and would impose an insupportable judgmental burden on public accountants in creating a base for the taxation of profits.<sup>21</sup>

For analytic purposes, it is useful to define the financial measure of profit as comprising the (per-period change in the) net present value of the expected net revenues to be generated by all of the firm's assets discounted at the same rate of discount for both  $T$  and  $t$ .<sup>22</sup> At the conceptual/analytic level, the financial criterion with its emphasis on a Fisherian valuation of assets (equation 1) involves a longer though imprecise time horizon (the

length of life of the longest surviving asset). It is reliance on discounting expected future revenue flows which allows the marriage of a long-term horizon with a short-period measure of performance. The finance measure of profits necessarily encompasses the potential returns to building up ownership-specific assets. Because of its more complex domain and longer time horizon, it is the only measure capable of incorporating assessments of managerial strategy and the quality of capital budgeting decisions into a current measure of firm performance. For all of its operational problems, the finance measure of profits has a substantial relative conceptual advantage in assessing firms which produce S-goods.

Profit is often used as a measure of executive performance (although there are obvious problems in estimating counterfactual profit -- even for M-firms). Given the complexities of computation of *PVNRA*, the finance measure is not reliable. A measure of market capitalization is also fallible because of the possible attempts of agents to exaggerate their accomplishments in their own short-run self-interest (Hamel, 1997) and Ehrbar and Hamel (1997).<sup>23</sup>

## *II. The Relative Volatility of S-Firm/MNE Profits.*

Consideration of the alternative methods of measuring profit suggests that *the larger the revenues generated by components of the portfolio of proprietary knowledge capital (in its widest sense), the less adequate are historical accounting measures.* By the same token, the greater the relative contribution to profit of

quasi-rents from immature and vulnerable proprietary knowledge capital, the greater are the operational difficulties of computing the finance measure of profit.

It is seductive to approach the concept of the value of an S-firm's knowledge capital as emanating from the investments and efficiency of the S-firm (i.e. from within the firm). While a firm's effectiveness in the development of knowledge-capital must be recognized, it would be incorrect to examine only those changes in the value of the portfolio which derive from the firm's internal efforts. The *PVNRA* of proprietary assets can lose value because of improvements in the knowledge-capital portfolios of competitors or, as patents expire, from the mere passage of time.<sup>24</sup> Exogenous shocks can come from competitors' accomplishments or from changes in regulations and conditions in the home or foreign markets.

External factors, which emanate from competitors and which affect the value of the S-firm's portfolio of knowledge assets, will be "intra-industry". A new discovery or patent by a competitor is capable of reducing the net present value of an existing patent and, through that, the value of the knowledge-capital portfolio. The greater the likelihood of the erosion of a patent's value (or the equivalent for other forms of knowledge capital), the more volatile will the financial measure of an S-firm's profits be. The volatility of an S-firm's profits (in terms of the financial measure) can be seen to be positively affected by: the intensity of competition in the development of

knowledge capital, especially proprietary technology, in the industry; the contribution of quasi-rents from knowledge capital relative to total profits; the ability of firms in the industry to expand cost-effective production sites; and the variability of the success in asset creation by the firm in question and by its direct competitors. Note that when the source of profit volatility derives from intra-industry competition, the volatility of industry profits will be less than that of the profits of component firms.<sup>25</sup>

As noted, expenditures on investment in knowledge capital are ordinarily immune from taxation. This is equivalent to allowing instantaneous depreciation of the capital generated and such a policy has been seen as a component of macroorganizational policy.

Allowing instantaneous depreciation of investments in knowledge capital could be an efficient accounting practice. It would be extremely difficult to compute the short-run value of any knowledge capital generated and, especially, to distinguish between training the firm's employees to keep up-to-date with new equipment or products and increasing their human capital -- the costs are likely to exceed the benefits of any additional accuracy. The government will levy profits on any quasi-rents earned by the S-firm at a later date when they are known. Further, in many industries, the rate of depreciation of knowledge capital brought about by competitors' action (intra-industry shocks) is unknowable and an asset of ostensible value can suddenly become worthless.

The loss of value of the knowledge-capital portfolio because of intra-industry shocks is very reminiscent of Keynes's (1936, Ch. 6) discussion of supplementary costs (any decrease in the value of an asset brought about by obsolescence -- as distinct from use).<sup>26</sup>

Extra-industry sources of volatility are the severity and market importance of business cycles in countries in which the firm produces and sells its products; changes in macroorganizational policies (Dunning, 1992) and, in some S-industries, changes from the restrictiveness of regulations governing industry activity. There is an obvious macrofinancial dimension to extra-industry sources of profit volatility for MNEs.

Enterprises with affiliates in many countries are exposed to financial crises and currency devaluations/depreciations. While the prospect of major financial instability seems more likely to occur in newly-industrializing countries, the substantial decline in the value of the euro in its first eighteen months of existence will have imparted some volatility to profits repatriated from affiliates in industrialized countries as well. Efficiency-seeking and resource-seeking direct investments may be located in countries in which price-level stability and foreign-exchange reserves are insufficient to maintain stable foreign-exchange rates. Real assets are effectively denominated in the currency of the host country: therefore the value of the portfolio of foreign real assets are subject to sudden changes in value. This will provide yet another source of profit volatility.<sup>27</sup>

### *III. The Implications of Inaccuracies in Profit Measurement.*

For modern economies, which require considerable physical support from government in the form of public goods, taxation of historical net revenues is inevitable. In international comparisons of the degree of support from macroorganizational policy, the "net tax burden" imposed on the productive sector is a useful concept (Gray, 1999, Ch. 2). The net tax burden is the amount of funds channeled from the productive sector to the government or household sectors for national or social purposes: it is equal to the total taxes paid by business less the cost of public goods (broadly defined) provided to the productive sector.

S-industries will, to the extent that investments in knowledge capital are depreciated immediately pay smaller net tax burdens than M-industries because they will be furnished with greater support and will enjoy larger tax deferments. This divergence is likely to grow as knowledge capital provides an ever larger source of net revenues to S-firms and MNEs.

The growth in the relative importance of knowledge-capital to physical-capital will be accelerated by the growth of alliances among S-firms and MNEs. Dunning (1995) identifies four developments which underlie this growth:<sup>28</sup>

increases in the importance of fixed costs of operation;

the need for a much wider range of technological expertise deriving from the fact that new products or production methods are likely to require the meshing of hitherto separate areas of technology;

developing the firm's own core competencies and gaining access to practices in which the partner firm may have

greater efficiency;

the speeding up of the product cycle and the consequent need for greater emphasis on speed to market.

Each of these wide-ranging developments encourages alliances and is, in context, an argument supporting the expectation of increases in the ratios of the value of and expenditures on knowledge capital to physical capital.

If a growing share of value-added is produced by firms whose profits are in danger of being more volatile than M-firms, the measure of profits becomes important. However, the sheer operational difficulties of the finance measure will require that S-firms' and MNEs' profits will continue to be recorded in the historical accounting measure. Whether the profit streams of S-firms, when reported in the historical measure, will be more or less volatile is not knowable *a priori*. The dimension of profits that is missing in the historical measure is the changes in the value of knowledge capital that derives from internal capital formation and from intra-industry or external shocks. Any such changes in the value of knowledge capital need not be reported because they are not a component of balance sheets.

There may be a substantial delay between a falling behind in the search for new knowledge capital and the ability of outsiders to identify the erosion of competitive strength. Milberg and Gray (1992) identify the need for a firm to be able to devote some critical minimum sum to increasing the value of its portfolio of knowledge capital. They foresee the possibility of an explosive

cycle: as a firm's accounting profits are eroded, the ability to invest in greater knowledge capital is curtailed and this curtailment -- some exogeneous shock aside -- will feed upon itself by reducing future accounting profits.

#### *IV. Conclusion.*

Models of S-firms that rely on the neoclassical assumption of zero profits in equilibrium can mislead. The capacity of S-firms to maintain their relative advantage in the portfolio of knowledge capital within their industry, is an important means by which governments can create macroorganizational policies (i.e. reduce firms "net tax burdens"). It is therefore possible for the existence of MNEs (with the international mobility of their assets) to force lower tax rates on the business sector of the economy and to inaugurate what many concerned with the welfare of the disadvantaged, might characterize as a race to the bottom. Given the increase in the relative importance of knowledge capital indicated by the growth of alliance capitalism, the danger of a race to the bottom may become more apparent and will increase the cost of globalization to "nationhood" (Gray, 1990).

Appendix A (Gray, 1999, pp.        ).

Mark-up pricing is especially useful in a model of production and sales of differentiated products in which differentiation takes on four dimensions: capacity, accoutrements, reliability and price. Mark-up pricing identifies both the several kinds of created ownership assets which underlie the existence of quasi-rents and the greater decision-making role and scope for efficiency enhancement of the Schumpeterian entrepreneur/professional manager in S-good industries.

Mark-ups (over average variable costs) allow for:

1. The average contribution to fixed cost over the projected sales volume. (This is the use of mark-up analysis which is compatible with Marshallian analysis of a competitive firm in equilibrium and includes a "fair" return on invested capital).
2. The return to be garnered on the assets which are proprietary to the firm (ownership advantages). This return can be subdivided into mark-up potential resulting from product technologies and the perceived reliability of the firm's products (i.e. design advantages and brand reputation) and any reduction in costs that derives from process technologies and other cost-saving ownership advantages (including above-average managerial efficiency).
3. A firm can impose a high mark-up by being the first to market a new product or a new version of an established product. The mark-up will be reduced as competitors introduce comparable products. This source of net revenues can be important in generating profits for the firm which is "first to market" (usually, but not

always, the industry leader).

4. Mark-up will be used to capture any structural rents which derive from oligopolistic or monopolistic market structure.

Mark-up, then, is one instrument of strategic policy at the level of an MNE or S-firm and is a much more practical analytic tool than marginal cost pricing so beloved of neoclassical economists. While the natural tendency is for firms to seek ways of generating higher mark-ups, implying larger quasi-rents, a lower mark-up could be used to shave the selling price in order to effect entry into a new market. This incurs the risk of being accused of dumping and always provided that sales in the new market cannot be shipped to another, high-price market.

## REFERENCES

- Aharoni, Yair. 1993. "From Adam Smith to Schumpeterian global firms" in Alan M. Rugman, and Alain Verbeke (eds.), *Global Competition: Beyond the Three Generics*. Greenwich, Conn.: JAI Press: 17-39.
- Baskin, Jonathon Barron, and Paul Miranti. 1997. *A History of Corporate Finance*, New York: Cambridge University Press.
- Chandler, Alfred D. (1992), Organizational capabilities and the economic history of the industrial enterprise, *The Journal of Economic Perspectives* 6, Summer: 79-100.
- Christensen, Clayton M. 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Cambridge: Mass. Harvard Business School Press.
- John R. Dilyard and H. Peter Gray. 2000. Increasing the Contribution of FDI and Foreign Portfolio Investment to Sustainable Development: Recent Domestic and International Policy Measures. in Juergen Holst, editor. *Finance for Sustainable Development: Testing New Policy Approaches*. New York: United Nations.
- Dunning, John H. 1977. Trade, location of economic activity and the MNE: a search for an eclectic approach in Bertil Ohlin, Per-Ove Hesselborn and Per Magnus Wijkman, editors. *The International Allocation of Economic Activity*, London: Macmillan Press: 395-418.
- . 1992. The global economy, domestic governance, strategies and transnational corporations: interactions and policy implications. *Transnational Corporations* 1. December, 1992: 7-46.

----. 1995. Reappraising the Eclectic Paradigm in an Age of Alliance Capitalism. *Journal of International Business Studies*, Fall: 463-489.

Ehrbar, Al, and Gary Hamel. 1997. Debate: Duking it Out over EVA. *Fortune*. August 4: 186.

Gray, H. Peter. 1990. Free Trade, Economic Integration and Nationhood, *Journal of International Economic Integration* V. Spring: 1-12.

----. 1996. The Eclectic Theory: The Next Generation. *Transnational Corporations* 5: 51-65.

----. 1999. *Global economic Involvement: A Synthesis of Modern International Economics*. Copenhagen: Copenhagen Business School.

Gray, H. Peter and Paul J. Miranti. 1990. International Financial Statement Translation: The Problem of Real and Monetary Disturbances. *International Journal of Accounting* 23. Number 2: 19-31.

Hamel, Gary. 1997. How Killers Count. *Fortune*. June, 23.

Jensen, M.C. and W.H. Meckling. 1976. Theory of the Firm, Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*. October: 305-360.

Keynes, J. M. 1936. *The General Theory of Employment, Interest and Money*, London: Macmillan Press.

Lanjouw, Jean. 1997. The Introduction of Pharmaceutical Product Patents in India: 'Heartless Exploitation of the Poor and Suffering'. Yale Economic Growth Center Working Paper No. 775.

Mataloni, Raymond J. Jr. 2000. An Examination of the Low Rates of

Return of Foreign-Owned U.S. Companies, *Survey of Current Business*, March: 55-73.

Milberg, William S. and H. Peter Gray. 1992. International Competitiveness and Policy in Dynamic Industries. *Banca Nazionale del Lavoro Quarterly Review*, March: 59-80.

Miranti, Paul J. Jr. 1990. *Accountancy comes of Age*, Chapel Hill: University of North Carolina Press.

Rahman, M. Zubaidur. 1998. The role of accounting in the East Asian financial crisis: Lessons learned. *Transnational Corporations* 7, December: 1-52.

Wenger, Ekkehard and Christoph Kaserer. 1998. The German system of corporate governance: A model which should not be imitated" in Black, S. W. and and M. Moersch editors. *Competition and Convergence in Financial Markets: The German and Anglo-American Models*, New York: Elsevier. Ch. 3.

1. Mataloni (2000) assesses the profitability of foreign-owned MNE affiliates in the United States relative to the profitability of U.S. domestic firms.
2. Rahman (1998) examines the role of inaccuracies of profit-reporting as a contributing cause to the July, 1997, financial crisis in Thailand (also see Dilyard and Gray, 2000).
3. While knowledge capital is important and will prove to be the major focus of this paper, a superior international distribution of physical assets could provide a short-term source of quasi-rents.
4. Technology that is in the public domain and utilized in an economy is "social knowledge capital".
5. Young S-firms usually are too deeply engrossed in reaching some minimum size in their home economy to have the managerial resources to become multinational.
6. Miranti suggested to me that there is a third category, Chandler (C-) firms, which rely heavily on having established themselves as the leader in an industry and which maintain their lead by virtue of developing ever-greater efficiency through time.
7. Regulations governing public accountancy determine what expenses can be claimed in the computation of accounting profits.

For this purpose, taxes are considered as a cost or revenues can be defined as net of taxes.

8. Dunning (1977, p. 399) explicitly identifies assets as comprising all possessions capable of generating a future income stream. His purpose in using the Fisherian definition of assets was to widen the concept of productive assets well beyond physical assets such as land, buildings and capital goods. He does not address the problems of valuation.

9. In practice, firms are usually directed at maximizing the joint wealth of shareholders and agents: on the problem of agents, see Meckling and Jensen (1976) and for an indictment of current German practice, see Wenger and Kaserer (1997). This paper assumes that agents have as their goal the joint maximization of share-holders' and agents' wealth and that the joint maximization process does not differ substantially from that which would result from maximizing shareholder wealth with "honest" agents. However, agents' self-interest can affect the market capitalization of the firm in the short run: see Hamel (1997).

10. Permitting or requiring investments in knowledge capital to be "expensed" is effectively giving such investments a 100 percent rate of depreciation. The tax treatment of the creation of knowledge capital is, in principle, a dimension of macroorganizational policy but such is the enthusiasm for ensuring

the international competitiveness of domestic S-industries, allowing firms to expense R&D and other means of building knowledge capital is virtually universal. Immature assets are not sure sources of future quasi-rents or revenues, so that mandatory expensing of investments in knowledge capital could be interpreted as a safeguard against exaggerated profits. The taxation of investment of knowledge capital is returned to below. Nothing suggests that the treatment in this paper comes close to exhausting this question.

11. It is tempting to suggest that the goal of an S-firm or MNE is to maximize quasi-rents. This is not quite true because many firms continue to produce goods which they have invented, even though patent protection has expired -- provided always that the return on such production exceeds the firm's opportunity cost of the capital employed. The ratio of sales earning quasi-rents to sales of standardized goods (former S-goods) is an important component of the average profit margin and of overall profitability.

12. There exists a third measure of profits: economic profits. This variant can be applied to both S- and M-firms. It includes as a cost, the appropriate risk-adjusted return on equity capital.

13. Future profits, of course, allow for any investments in knowledge capital mandated by the need to keep up with

competitors' accretions of proprietary knowledge capital (Milberg and Gray, 1992).

14. Of course, an accretion to proprietary knowledge can, in principle, merely reduce a diminution of profit brought about by a competitor's greater efficiency (or luck) in technology-generation: see below. There is nothing, in principle, that precludes a firm from delaying the depreciation of its investments in knowledge capital.

15. No system can completely exclude the possibility that the managers of the firm will embellish its results by "creative accounting".

16. Some overhead costs associated with an expansion of capacity can usually be deducted.

17. This paper relies on what may be termed Anglo-Saxon measures of profit (Miranti, 1990). Some countries do allow for greater complexity which introduces some of the aspects of the financial criterion. In the Netherlands, for example, a firm may adjust asset balances to reflect secular price changes. Practice in extractive industries can allow for changes in the value of mineral reserves.

18. This measure of profits is a one-period measure but incorporates expectations about a (potentially large) number of

future periods. In this sense, it can allow for changes in expected net revenues in each period.

Note that the value of  $PVNRA_T$  is not that implied by the total value of equity priced by an equity market/stock exchange: see below.

19. For simplicity, equation 1 does not specify whether the firm has been adding to its own capital base during the period. If the firm had sold equity or acquired debt, the equation would need to allow for any increase in the firm's liabilities during the period. Similarly, repurchases of outstanding equity or debt could be accounted for in equation 1a.

Thus:

(1a)  $\Pi = PVNRA_T + D - PVNRA_t - \text{net additions to the capital base.}$

20. The size of the swing would depend upon the breadth of the product line of the firm and upon the quasi-rent earned by being first to market.

21. This is a valid reason for not having the measure adopted for tax and reporting purposes but the exercise does illustrate the weaknesses in the present system. It could also open opportunities for agents to use the weaknesses of the existing measure to their own advantage. Use of the finance measure would also be likely to introduce an unnecessary element of variability in reported

profits as accountants' criteria were influenced by cyclical factors and as different accountants were involved in auditing a single firm through time.

22. This procedure would allow profits to be measured independently of the rate of discount for the period: this could be important in times of macroeconomic change. Such a procedure would have the effect of allowing *PVNRA* to vary through time: if the cost of capital were to increase from one year to another, *PVNRA* might need to be computed at one rate when it was the end of a period and at another cost of capital when it was computed for the beginning of the succeeding period.

23. The thrust of Hamel (1997) is that the increase in the value of the knowledge capital portfolio is very important in the longer term. Ehrbar's (1997) measure, market value added (*MVA*), uses the capitalization of an S-firm's assets in the equity market as a measure of *PVNRA* for profits defined in equation 1.

24. Probably pharmaceutical companies are the most vulnerable to the expiration of patents because some prescription drugs have a virtual monopoly for particular ailments and generate very large returns. On expiration of the patent the owning S-firm finds itself in competition with producers of generic drugs (often in countries with cheaper per-unit factor costs. India, for example, does not permit foreign pharmaceutical firms to patent drugs in

India so that local firms are able to bypass intellectual property rights and to produce drugs for their home market (Lanjouw, 1997).

When a patent expires in the industrialized world, the Indian producer is able to compete in the industrialized markets on a more-or-less equal footing with the owner of the erstwhile patent and has a distinct short-run advantage over other producers of generic drugs in foreign countries.

25. This hypothesis could be set out in terms of the rate of technological change in the industry. On the managerial implications of the speed of technological change, see Christensen (1995).

26. In fact, there is an obvious parallel between Keynes's (1936) discussion of the computation of a firm's profits and the finance measure of profit described in this paper.

27. Gray and Miranti (1990) note that a physical asset located in a country, in which the real rate of exchange remains more-or-less constant, even though the spot rate may vary substantially, is likely to maintain the value of its asset in the currency of the parent country as increases in the value of the asset in host-country currency offset the depreciation of the currency's spot rate.

28. Any attempt to summarize a paper of some 28 pages, which itself draws on a massive range of other research, must run the

risk of cavalierly downplaying some of the inherent subtleties.