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# Issues in Finance and Industry

## Essays in Honour of Ajit Singh

Edited by

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and

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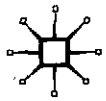



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# 9

# Competition and Industrial Rates of Return

*Anwar Shaikh*

## Introduction

I first met Ajit in 1978 when I spent a year at Cambridge as a visitor to the Faculty of Economics. It was a heady time in the economics profession, and it was personally gratifying for me to meet Joan Robinson, Nicholas Kaldor, Richard Kahn, Richard Goodwin, Geoffrey Harcourt and Luigi Pasinetti, among others, not to mention the young turks such as Ajit, Francis Cripps and John Eatwell. Karl Marx had once again been 'rediscovered' as an economist, as happens periodically, and Piero Sraffa's famous little book (Sraffa, 1963) had helped to spark a revival of interest in the classical analysis of competition.

The analysis of competition has always played an important role in Ajit's work. A quick look at his homepage showed that fully one-third of his listed articles refer to that subject, dated from 1968 to as recently as 2005. And within this subject, the analysis of profit rates has always been one of his central concerns. This is also the topic of my own contribution to this volume, which I hope will help to further Ajit's ongoing project.

## Profit rate equalization in the classical-Marxian theory of competition

The classical theory of competition conceives of profit rate equalization as a dynamic and turbulent process. Investment flows into an industry are motivated by the expected rates of return on those potential new investments that embody the best-practice conditions of production (Cohen *et al.*, 1987, p. 387). I shall call these the expected rates of return of *regulating capitals*, where the term 'regulating' refers to the lowest-cost methods operating under generally reproducible conditions.

Higher-cost methods, which are represented most often by older technologies, are excluded even though they are reproducible, because they are not competitive. On the other hand, conditions of production that rely on special locations and the like are also excluded because they are non-reproducible.

Evaluations of potential profitability are made by a heterogeneous set of investors. There is no single expected rate of return in any given industry, but rather a diverse set of expected returns that are revised continually in the light of actual outcomes.[1] Hence classical economics typically focuses on actual outcomes rather than on the various expectations that might have motivated them. In a growing economy, new capital flows are generally positive. But if the regulating profit rates in a given industry are higher than the economy-wide average, production in this industry will accelerate until the supply in the industry grows more rapidly than its demand. The rising excess supply will in turn drive down the industry's relative price, thereby reducing its regulating rate of profit. The latter may well fall below the general rate, which would then cause supply to grow less rapidly than demand, and so on. It should be noted that the changes in rate of growth of production that drive this process are brought about initially by changes the utilization of existing capacity and only later, if necessary, by changes in the rate of growth of capacity itself.[2] The end result is the turbulent equalization of actual rates of profit on new investments, over some period of 'fat and lean years' whose precise length depends on the industry in question (Botwinick, 1993, ch. 5; Mueller, 1990, pp. 1–3; 1986, p. 8; Shaikh, 1998). As Marx emphasizes, there is never a moment in which all profit rates converge to some 'uniform' rate of profit. On the contrary, in fact:

> all this involves a very complex movement in which, on the one hand, the market prices in each particular sphere, the relative [prices of production] of the different commodities, the position with regard to demand and supply within each individual sphere, and, on the other hand, competition among the capitalists in the different spheres, play a part, and, in addition, the speed of the equalisation process, whether it is quicker or slower, depends on the particular organic composition of the different capitals (more fixed or circulating capital, for example) and on the particular nature of their commodities, that is, whether their nature as use-values facilitates rapid withdrawal from the market and the diminution or increase of supply, in accordance with the level of the market prices ... These are some of the reasons why the *general rate of profit* appears as a hazy mirage. (Marx, 1971, pp. 464–5)



Non-regulating capitals do not participate directly in this equalization process: methods of production with higher unit costs will not be attractive to new capitals, while the non-reproducible conditions on privileged capitals make them unavailable to new capitals. Competition constantly weeds out the higher cost capitals, while technical change, which is one of the principal weapons of competition, constantly throws new ones into the fray (Shaikh, 1978, pp. 240–1). Hence there is *never a moment in which all capitals within an industry operate under the same conditions of production.*

Competition within an industry tends to enforce a common selling price. Given the existence of an array of production conditions, this implies that profit rates will generally differ within any given industry. At the same time, competition between industries leads to a process of entry and exit of capital in search of higher profit rates. This is the foundation for the equalization of profit rates across industries. But since competition 'dis-equalizes' profit rates within an industry, how can it also equalize them *between* industries? This apparent contradiction is resolved through the concept of regulating capital: it is the rate of return on the regulating capital that is of interest to new investment, and it is this regulating rate of return that is equalized by competition between industries.[3]

Two important corollaries can be derived from this approach. First, since the industry selling price will be regulated by the price of production (long-run competitive price) of the regulating firms, these firms will appear as the dominant, price-setting firms in each industry. Second, since competition dis-equalizes profit rates within an industry, and equalizes regulating rates of profit turbulently across industries, profit rates at any given moment will always appear to be different. It is only by tracking the movements of the regulating capitals over sufficiently long periods of time that we can assess whether or not these (risk-adjusted) rates are equalized in practice.

## Neoclassical, Austrian, Schumpeterian and oligopolistic theories of competition

Neoclassical theory operates within a static and perfectionist framework (Mueller, 1990, p. 4). Free entry and exit is assumed, to ensure that all firms within any given industry operate with the same (most efficient) method of production, and all produce the same (homogeneous) product. Within any industry, over the 'short run', competition leads to a single common price, and since these firms are identical, to a single

common profit rate for each firm. On the other hand, over the 'long run' (which, like the 'short run' is peculiarly timeless), competition between industries leads to a single common rate of profit in each industry. Since all firms within an industry have the same profit rate, and all industries have the same profit rate, so all firms everywhere must have the same profit rate. This is the fundamental neoclassical hypothesis about competition.

Sraffian theory is disappointing similar in this respect, because it typically makes three crucial assumptions. First, that all profit rates are exactly equal, which eliminates any profit rate differentials between industries. Second, only one condition of production exists in any given industry, so that the regulating conditions are also the average ones.[4] This eliminates any profit rate differentials within an industry. The one exception occurs in the theory of rent, where only the zero-rent conditions of production are the regulating ones – that is the ones that participate in profit rate equalization (Ricardo, 1951, ch. 2; Sraffa, 1963, ch. 11). The existence of more diverse types of privileged capital may therefore be viewed as a generalization of the theory of rent. And third, the capital values assigned to older vintages are assumed to be such that their profit rates are exactly the same as that on the newest vintage. In most national income accounts this is viewed as the ideal measure of the net capital stock (Gordon, 1993, p. 103). Then, under such conditions, all capital has the same profit rate, so that the average profit rate on all capital in an industry is the same as the profit rate on its new capital. As in the case of neoclassical theory, we do not have to distinguish between firms and industries in assessing differences in rates of profit.

Austrian theory takes a great step forward by emphasizing that competition is a process rather than some timeless state. A competitive process is viewed as one 'in which the forces of entry are strongly and rapidly attracted to excess profits ... and in which they rapidly bid these profits away' (Mueller, 1986, p. 4). Implicit is the notion that the process is stable. Hence, while the test of the neoclassical model is whether profit rates are more or less equal at any given moment, the test of the Austrian theory of competition is 'whether markets are stable and quick' (Geroski, 1990, p. 28). Schumpeterian economics emphasizes the constant creation, adoption and displacement of technologies, much as Marx did earlier. But unlike Marxian theory, the Schumpeterian approach tends to have little to say about intertemporal profit rate differentials. Evolutionary economics, with its similar emphasis on innovation and adaptation, also tends to suffer from the same lack of specificity. Mueller (1990, pp. 3–4) subsumes both of them under a general Austrian approach in which



empirical analysis involves estimating the long-run centres of gravity of actual profit rates, testing for their risk-adjusted equality, and estimating their speed of adjustment.

The generalized Austrian model of competition shares many features with the classical-Marxian one, except that it makes no distinction between regulating and non-regulating capital. Thus, in the Austrian case, the null hypothesis is 'that all individual company profit rates converge to a single, competitive level' (Mueller, 1986, p. 13). As a result, empirically observed persistent differences in firm-level profit rates are viewed as prima facie evidence of non-competitive conditions (Mueller, 1986 pp. 9–12, 31–3, 130). This is quite different from the classical-Marxian argument, in which profit rates are always expected to differ at any given moment, with only regulating rates turbulently expected to be equalized over sufficient lengths of time.

In practice, profit rates differ between industries, multiple methods of production coexist within any given industry, and vintages are seldom valued at the 'ideal' level. Indeed, direct measures of capital stocks are not usually available, so they are constructed from observed gross investment flows on the basis of highly simplified assumptions about service lives and retirement patterns.[5] This introduces an unknown and possibly large error in the estimation of long-run levels of the rate of profit. Hence, if we are to consider the issue of profit-rate equalization from a classical viewpoint, we must find a way to measure the rate of return on regulating capitals.

## Defining measures of average and regulating rates of profit

Even within a single firm, one must distinguish between the rate of profit on total capital and that on more recent investment. The cost differences between older and newer capital imply that they will have different profit margins, and if we evaluate their profit rates in terms of the initial capitals advanced for each type[6] (appropriately adjusted for inflation), which is known in national accounts as the gross capital stock concept (OECD, 2001, p. 31), their profit rates will also generally differ. This means that one cannot treat the average rate of profit in a firm as a proxy for its regulating rate. A similar problem exists at the level of an industry.[7] In both cases, it is the rate of profit on recent investment that is relevant to competition between industries.

The rate of profit on total capital is the ratio of total profits to the current-cost value of the capital stock. Using the current-cost value of capital makes this a real; that is, an inflation-adjusted measure, since

both the numerator and denominator are in current dollars. This is evident if we divide both numerator and denominator by a common price index:

$$r_{K_t} = \frac{P_t}{K_t} \quad \text{[average rate of profit]} \tag{9.1}$$

But the rate of profit on total capital is itself the average of the current rates of profit on different types of capital in the overall stock, including the profit rate on the newest types; that is, on regulating capital. From our point of view, it is the latter that matters, because it represents the current rate of return on recent investment ($r_{It}$). At any given moment, the current profit $P_t$ earned by a firm is the sum of the current profit on the most recent investment ($P_{It}$) and the current profit on all earlier vintages ($P'_t$), the latter being the profit that would have accrued in the absence of recent investment $I_{t-1}$:

$$P_t = P_{I_t} + P'_t \tag{9.2}$$

Subtracting lagged profits from both sides and rearranging this allows us to express the profits of new capital as the sum of the increment in total profits and an 'adjustment' term incorporating the effects of changes in prices, wages, efficiency, scale and capacity utilization on the surviving elements of the previous year's capital (that is, current 'older' capital):

$$P_{I_t} = (P_t - P_{t-1}) + (P_{t-1} - P'_t) = \Delta P_t + P_{t-1}\left(1 - \frac{P'_t}{P_{t-1}}\right) \tag{9.3}$$

The problem of estimating the profit on new capital therefore boils down to estimating the current profit of the older stock of capital relative to what it had been in the previous period. Let $p_t$, $w_t$, $wr_t$ and $t_t$ represent the output price, nominal wage, real wage and indirect business tax rate, and $Yr_t$, $L_t$ and $yr_t$ real output, employment and productivity of older capital, respectively. As before, variables pertaining to older capital are denoted by $wr'_t$, $Yr'_t$ etc. Let economic capacity and corresponding employment and productivity be denoted by $Ycr_t$, $Lc_t$, $ycr_t$, etc., where capacity refers to the economically desirable point of production in a competitive long run. (Kurz, 1986). Finally, let $u_t = Yr_t/Ycr_t$ = the capacity utilization rate. If employment and output move together when utilization changes, $L_t/Lc_t = u_t$ too. Since profit is the difference between the money value of output net of indirect business taxes and the money



wage bill, we can write the relative profit of older capital as the product of four distinct terms, the general contribution of each being expressed by the sign above it, as discussed below:

$$\frac{P'_t}{P_{t-1}} = \frac{p_t Yr'_t(1-t_t) - w'_t L'_t}{p_{t-1} Yr_{t-1}(1-t_{t-1}) - w_{t-1}L_{t-1}}$$

$$= \left(\frac{p_t^+}{p_{t-1}}\right)\left(\frac{Y^- cr'_t}{Ycr_{t-1}}\right)\left(\frac{u'^{\pm}_t}{u_{t-1}}\right)\left(\frac{m'^{\pm}_t}{m_{t-1}}\right)$$

$$m'_t = \left(1 - t_t - \frac{wr'_t}{yr'_t}\right) = \text{the current profit margin on older capital, and} \tag{9.4}$$

$$m_{t-1} = \left(1 - t_{t-1} - \frac{wr_{t-1}}{yr_{t-1}}\right) = \text{the previous year's profit margin on all capital}$$

The first term on the right-hand side of Equation (9.4) is the gross rate of change of prices, which in a generally inflationary environment is likely to have a positive impact on the profit ratio; that is, it will tend to raise it above one. The second term is the ratio of the current capacity of older capital to the capacity of the previous year's total capital, which will tend to be below one because of the retirement of some capital. The third term is the ratio of the capacity utilization rates of older and previous-year capitals, and if older and newer capitals in a given year have roughly similar rates, this ratio is the same as the gross rate of change of capacity utilization ($u_t/u_{t-1}$), which is likely to have a neutral impact in any interval long enough for capacity utilization to gravitate around its normal level. Finally, if the real product-wages ($wr = w/p$) of workers in particular plants are linked to the profitability and hence the labour productivity of these plants,[8] then, since tax rates tend to be stable over this interval, the last term is likely to be close to one and may safely be ignored.

Thus the first term will tend to raise the profit ratio above one, the second will tend to lower it below one, and the remaining two terms will tend to make the profit ratio fluctuate around one. For example, for the private sector as a whole between 1987 and 2005, the estimated average profit ratio ($P'_t/P_{t1}$) = 1.003, and lies almost entirely within +/− 5 per cent of this value. *Hence it is an excellent first approximation to assume that this ratio is roughly equal to one*, as I do here. In this case, we can estimate directly the current gross profits of newer capital from Equation (9.3) as the change in overall gross profit, and the rate of profit on newer capital

as the ratio of this profit to the previous period's gross investment; that is, as *the incremental rate of profit* (Elton and Gruber, 1991, p. 454):[9]

$$P_{I_t} \approx \Delta P_t \tag{9.5}$$

$$r_{I_t} \approx \frac{\Delta P_t}{IG_{t-1}} \quad \text{[Incremental Rate of Profit]} \tag{9.6}$$

In my earliest work on this subject, I used this approximation to estimate the rate of return on new, non-financial corporate capital, and showed that this measure closely tracked the stock market rate of return and even had essentially the same mean and standard deviation (Shaikh, 1998, p. 397). The use of the incremental return as a proxy for the regulating rate return was subsequently applied by Christodoulopoulos (1995) to OECD countries (which we consider below), by Schroeder (2004) to the Asian Crisis of the 1990s, and by Tsoulfidis and Tsaliki (2005) to manufacturing in Greece.

The incremental rate of profit has two major virtues. First, it is estimated easily because its two components, gross profit and gross investment, are widely available across countries and over time: gross profit is defined as gross operating surplus (see below), while gross investment is observed directly, unlike the laboriously constructed measures of the capital stock required to calculate the average rate of profit. Second, the incremental rate of profit has a direct interpretation as the 'marginal' return on capital (Damodaran, 2001, p. 695; Elton and Gruber, 1991, p. 454), provided one understands that, like all real 'marginals', it is turbulent, spiky and discontinuous.

## Empirical evidence for OECD countries

The 1994 *International Sectoral Database* (ISDB) (OECD, 1994) contained annual data, now discontinued, from which it was possible to derive measures of gross profit (gross operating surplus – that is, GDP *minus* indirect business taxes (net of subsidies) *minus* employee compensation), gross capital stock, and gross investment for various OECD countries. This was used by Christodoulopoulos (1995) to derive measures of average and incremental rates of profit by world industry. I thank him for providing the data and for detailing the steps involved, as listed in Appendix 1. In order to achieve comparability and consistency across countries and industries, the analysis was limited to the period 1970–90 and focused on the profitability of eight manufacturing industries (Food, Textiles, Paper, Chemicals, Minerals, Metals, Metal Products, Machinery



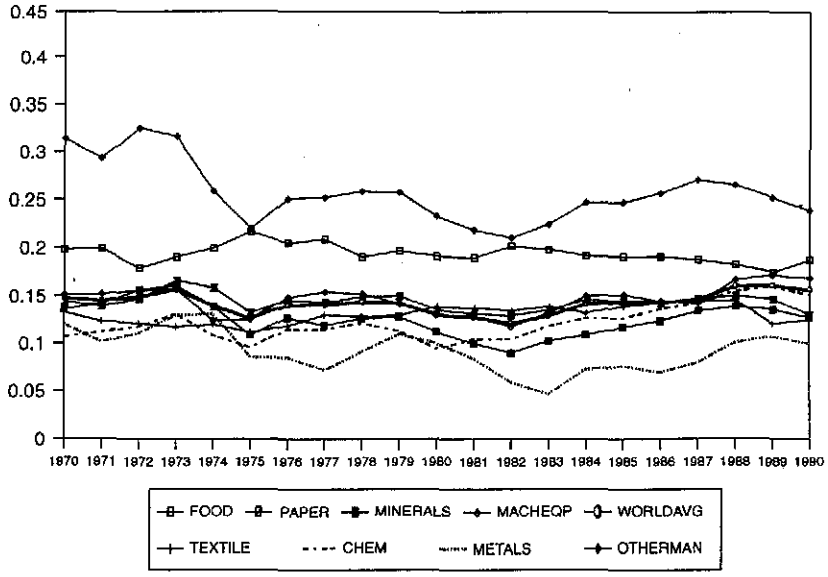


*Figure 9.1* Average rates of profit of world manufacturing industries, 1970–1990 (OECD Data, ISDB 1994: 3-yr. centred average)

and Equipment, and Other Manufacturing products) across eight countries (USA, Japan, Canada, Germany, France, Italy, Belgium, Norway). World totals for gross profits, gross capital stock and gross investment were calculated for each industry, using PPP exchange rates to make the translation into US dollars. This data was then used to calculate average and incremental profit rates for each industry at the (developed) world level.

Figure 9.1 displays average rates of profit on total capital for world manufacturing industries for 1970–90, expressed as 3-year, centred moving averages to smooth the data. As is often the case with average rates, most of them cluster around a common level, but there are some that remain persistently above or below. Given the many problems associated with measurement of capital stock, it is not easy to distinguish between actual differences and statistical artefacts. Figure 9.2 displays the 3-year moving averages of the corresponding incremental rates of profit. We now see a very different pattern, with the rates crossing back and forth in exactly the manner anticipated by the classical theory of profit rate equalization.

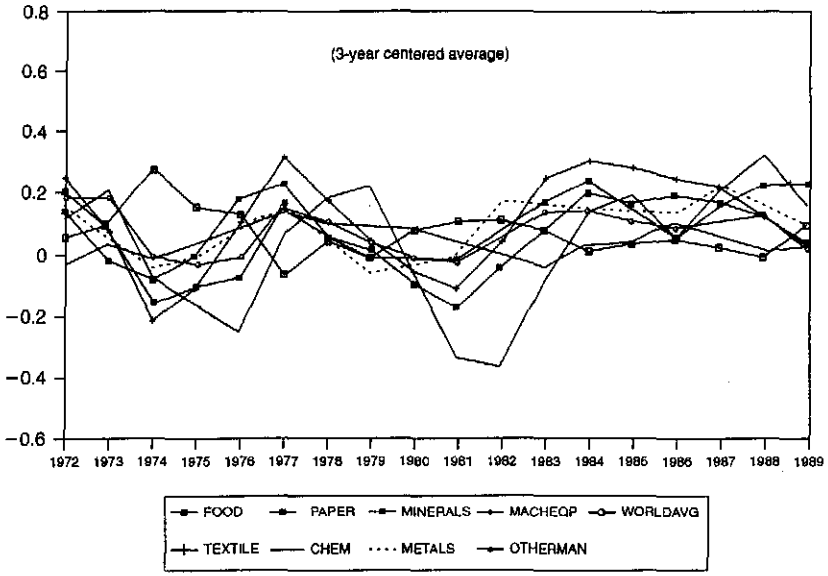


*Figure 9.2* Incremental rates of profit of world manufacturing industries, 1970–1990 (OECD Data, ISDB 1994: 3-yr. centered average)

Figures 9.3 and 9.4 depict the annual total and incremental profit rates for US manufacturing alone for 1960–90, but not smoothed this time. As in the previous case, the rates of profit on total capital exhibit some persistent differences in levels, whereas the incremental rates of profit exhibit considerable cross-over.

## Recent data for US industries

Data for more recent periods is derived from the US National Income and Product Accounts (NIPA) for 1987–2005. Five important innovations are introduced in this chapter. First, because gross operating surplus counts *all* the income of proprietors and partners as profit, a better measure of gross profit is derived by subtracting the estimated wage-equivalent (WEQ) of proprietors and partners.[10] This adjustment reduces the measured long-term profit rate in all sectors, the greatest effect being in industries with large numbers of self-employed people. For example, in Construction it reduces the measured profit rate from 90.5 per cent to 20.7 per cent. Second, I remove the fictitious measures of gross profits,



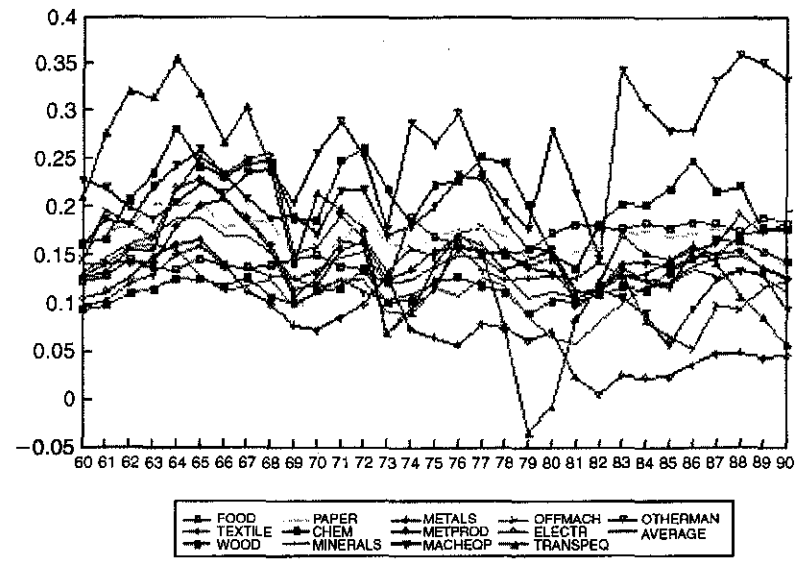


*Figure 9.3* Average rates of profit of US manufacturing industries, 1960–1990 (OECD Data, ISDB 1994: annual rates)

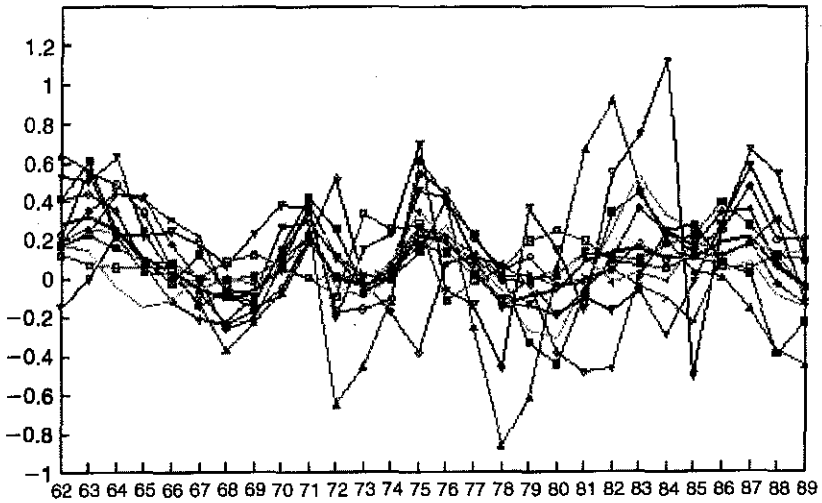

*Figure 9.4* Incremental rates of profit of US manufacturing industries, 1960–1990 (OECD Data, ISDB 1994: annual rates)

investment and capital stock inserted by NIPA as a result of its treatment of homeowners as businesses renting their homes to themselves (Mayerhauser and Reinsdorf, 2007; Shaikh and Tonak, 1994, pp. 253–4, 267). In the case of the real estate industry between 1988 and 2005, this imputed gross operating surplus amounts to 55.5 per cent, and imputed capital stock amounts to fully 76 per cent, of the corresponding industry totals. Third, where possible, estimated normal inventories were added to measures of fixed capital stock, and estimated normal inventory investment added to fixed investment flows. These were based on NIPA data for manufacturing and wholesale/retail trade; on partial census data for the construction industry; and on Flow of Funds data for the Insurance and Banking industries, in order to account for normal reserves (Panico, 1983, p. 182). Fourthly, the inclusion of reserves raises the banking and finance industry capital stock by almost 50 per cent, which, in combination with the effect of the wage-equivalent adjustment reduces the measured industry profit rate from 41.8 per cent to 17.7 per cent. Finally, a particular effort was made to focus on industries that were composed mainly of profit-driven enterprises and were deemed to be competitive internationally. This led to the exclusion of thirty-one of the original sixty-one private industries on one of three grounds: because they were dominated by non-profit activities enterprises, as in arts, museums, educational services and social services; because we lacked sufficient data for an adequate measure of the wages of proprietors and partners, as in legal, medical and computer services; or because the industries in question were non-competitive internationally, so that their rate of return on investments would not qualify as potential regulating rates, as was the case with textiles, mining and domestic oil production. All further details can be found in Appendix 2.

Figure 9.5 presents the evidence on average profit rates between 198 and 2005 for thirty US industries. It is apparent that the previously noted patterns are repeated: rates of profit on total capital cluster around some central tendency, but a substantial number remain persistently above or below the average (defined by the overall profit rate of all private industries included).

This pattern is clearer in Figure 9.6, which displays the deviations of individual sectoral profit rates from the average rate of profit. Industries whose profit rates *cross* the average rate have deviations which change sign, which can be seen by the fact that these deviations cross the zero line shown on the corresponding charts. Of the 30 industries in this sample, 18 display this tendency, while 12 do not (7 remain persistently above and 5 persistently below). It is instructive to note in industries



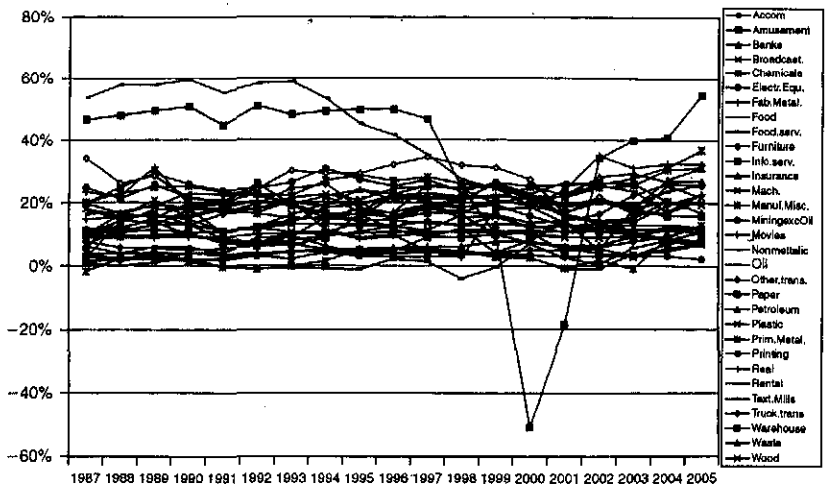


*Figure 9.5* Rates of profit, US industries 1987–2005 (see Appendix 2 for sources)

whose deviations, are highly trended, such as Nonmetallic Minerals, Machinery, Printing and Rentals, their period-average deviations can be bad proxies for their econometrically estimated long term values even though their deviations do cross over at least once,.

Figures 9.7 and 9.8 examine the incremental rate of profit in the same manner. Figure 9.7 shows that, unlike average profit rates, incremental rates of profit do 'cross over' a great deal. This is clearest in Figure 9.8, which displays the deviations of individual industry incremental profit rates from the overall average. *In every case, individual incremental rates of profit cross back and forth relative to the average incremental rate*: the smallest number of such crossing is four (Fabricated Metals), while the largest is twelve (Broadcast). This is a radically different picture from that presented by average rates of profit in the same sample.

There remains the interesting question of how rates of return might be linked to risk, and how growth rates of capital might in turn be linked to rates of return. We have already seen from the charts in Figure 9.8 that the period-average of an industry's rate of return may not be a good proxy for its long-term equilibrium level. None the less, since econometric investigation is beyond the scope of this chapter, it is interesting to see in Figure 9.9 that period-averages of industry incremental rates of return are positively correlated with the standard deviations of these incremental rates. Finally, I noted in the first section of the chapter that the first response to persistently increasing rates of return on new investment

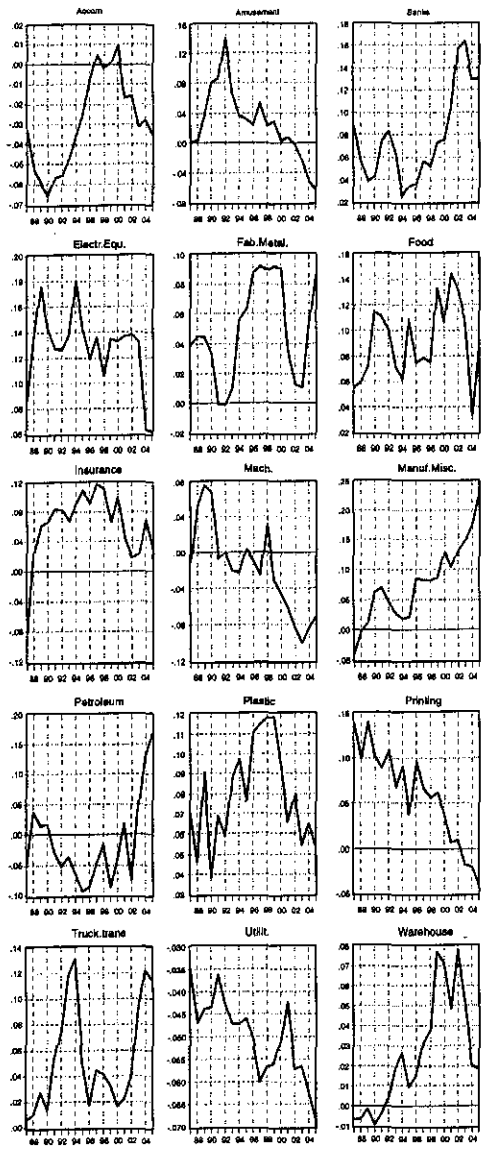


*Figure 9.6* Deviations of average rates of profit from the average, US 1987–2005 (see Appendix 2 for sources)



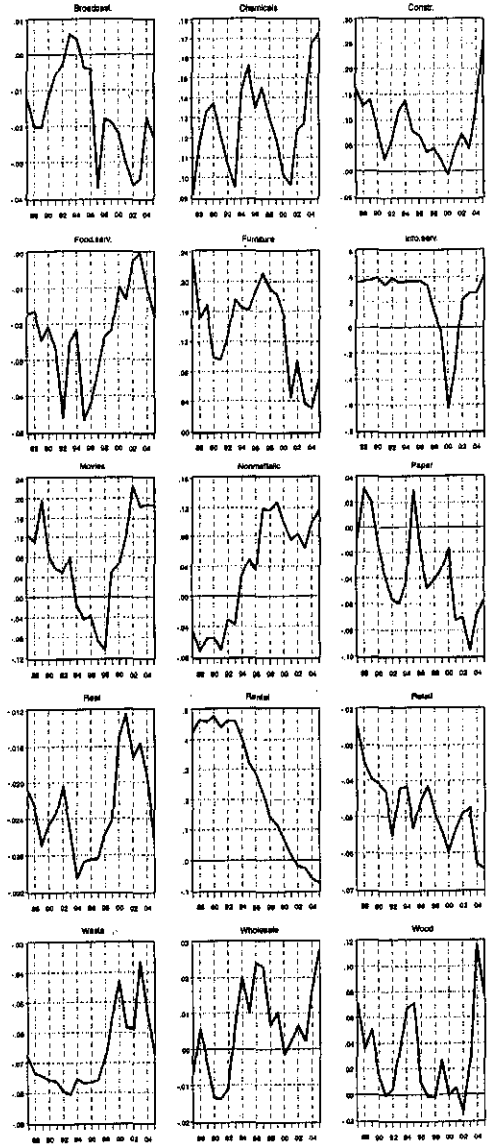


*Figure 9.6 Continued*

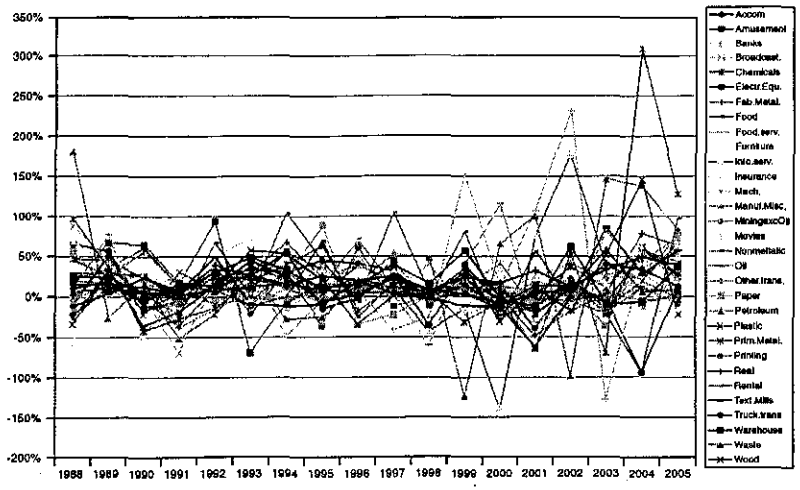


*Figure 9.7* Incremental rates of profit, US industries 1988–2005 (see Appendix 2 for sources)

will be an acceleration in output as a result of the increased utilization of existing capacity, followed subsequently, if at all, by changes in the rate of growth of capacity itself. But if new investment in a particular industry is more profitable than the average new investment for any extended period of time, this would gradually raise the average rate of profit in the industry. At the same time, any resulting acceleration in real investment would gradually raise the industry's rate of growth of real capital. Thus we would expect to see a positive correlation between period averages of industry average rates of profit and the corresponding growth rates of real capital. Figure 9.10 shows that such a correlation does indeed exist.

## Summary and conclusions

Profit rate equalization is a central concept in all theories of competition. This chapter has outlined a classical view of industrial competition, in which profit rate equalization is conceived as a dynamic and turbulent process involving ceaseless fluctuations around a moving centre of gravity. New capitals are constantly entering the battle of competition as older ones fall away. This perpetual fray gives rise to profit rates that generally differ across capitals. But what is relevant for competition is the profit rate on new investment, which is different from that on older capitals.



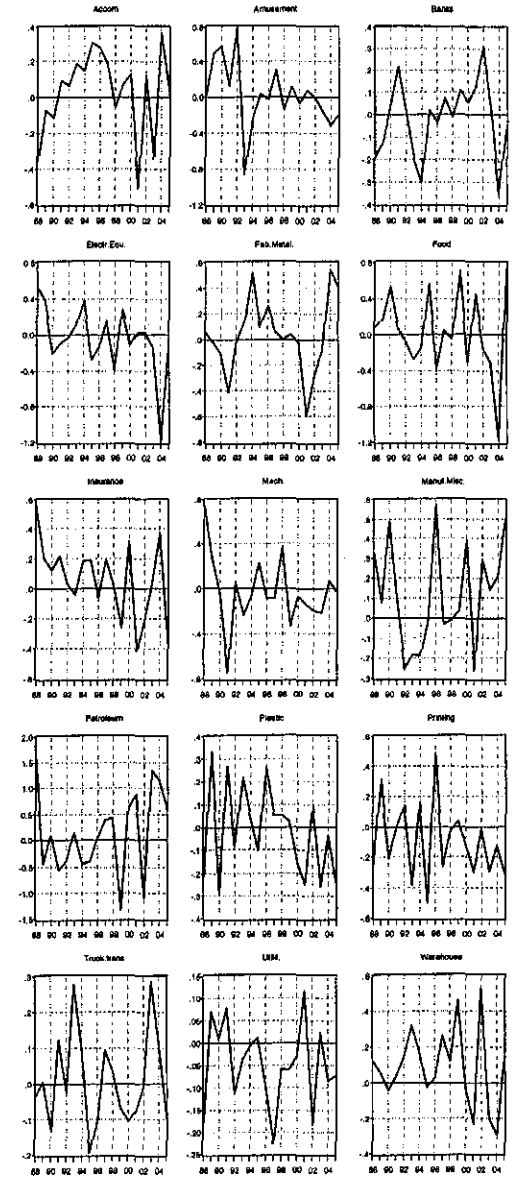


*Figure 9.8* Deviations of incremental rates of profit from the average incremental rate, US 1988–2005 (see Appendix 2 for sources)

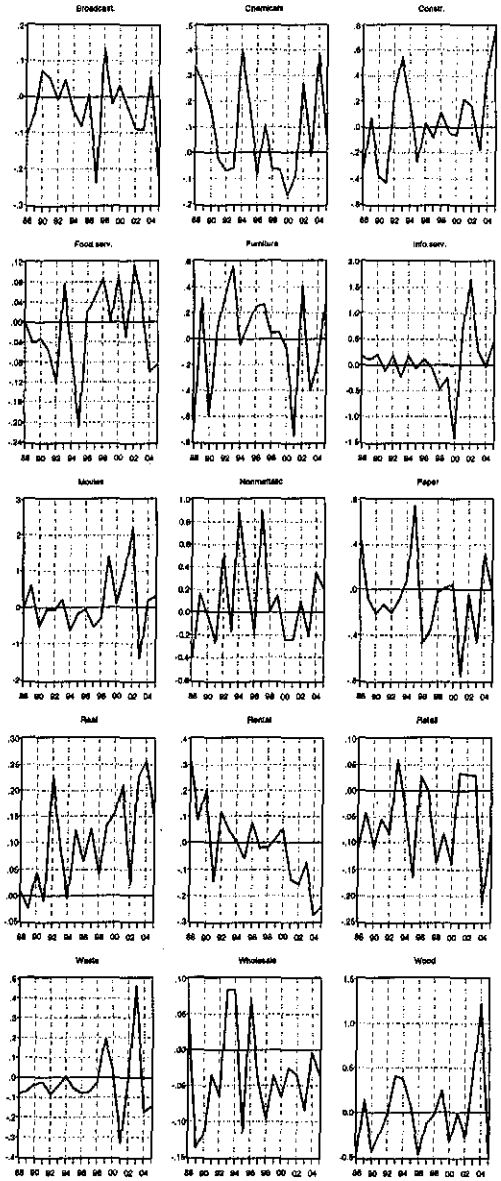

*Figure 9.8 Continued*



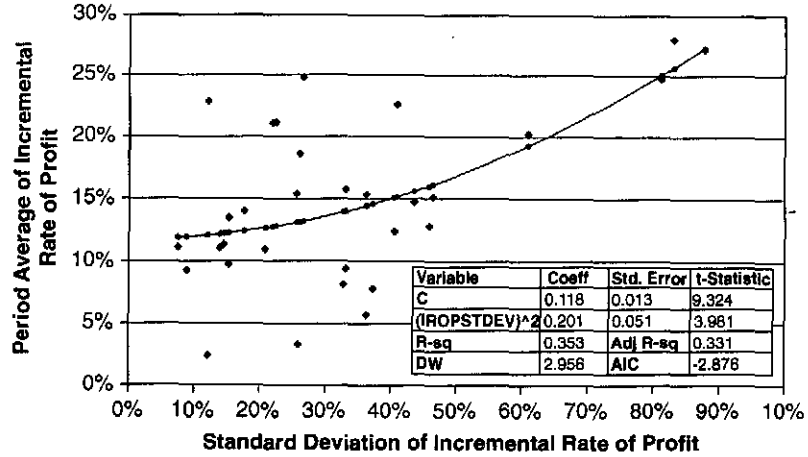


*Figure 9.9* Risk and return: incremental rate of profit vs. standard deviation US industries, period-averages 1988–2005 (see Appendix 2 for sources)

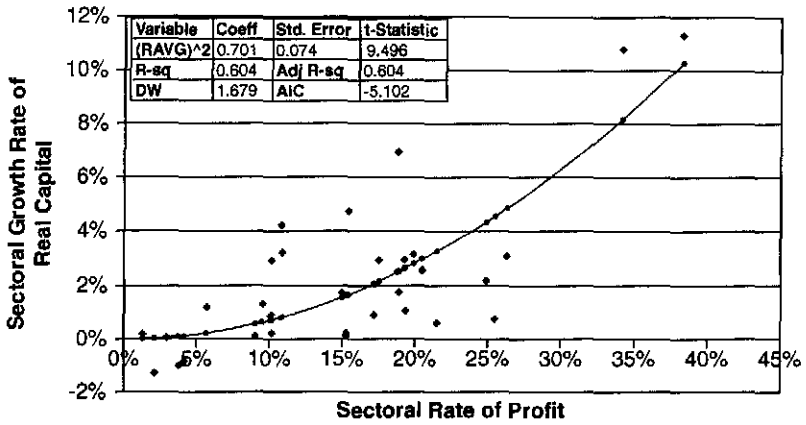


*Figure 9.10* Growth and return: growth rate of real net capital vs rate of profit US industries, period-averages 1988–2005 (see Appendix 2 for sources)

The profit rate on total capital is simply the ratio of profits to capital stock. I develop a measure for the profit rate on recent investment, and argue on theoretical and empirical grounds that this can be well approximated by the incremental rate of profit, defined here as the ratio of the change in gross profits to the previous period's gross investment flows. At an empirical level, average and incremental measures both

require measures of gross profits, data for which is nowadays available across industries and countries. But the rate of profit on total capital also requires the prior estimation of capital stocks, and this is considerably more problematical, because such measures are notoriously dependent on a widely criticized set of simplifying assumptions whose use imparts an unknown degree of error to estimates of the average rate of profit. By contrast, the incremental profit rate is fairly easy to measure, since the only additional data it requires is that on gross investment, which is directly observed and is widely available.

The empirical section of this chapter first examined the evidence on average and incremental rates of profit for eight developed-world manufacturing industries (Food, Textiles, Paper, Chemicals, Minerals, Metals, Metal Products, Machinery and Equipment, and Other Manufacturing products) aggregated across eight OECD countries (USA, Japan, Canada, Germany, France, Italy, Belgium and Norway). Similar data is presented for US manufacturing alone, from 1979–90, and subsequently for thirty US industries from 1987–2005. While most rates of profit on total capital cluster around a common mean, several remain persistently above or below that level. On the other hand, incremental rates of profit consistently cross back and forth, as would be expected from the classical theory of turbulent profit rate equalization. While period-average incremental rates of return in each industry are generally poor proxies for the theoretical long-term rates, it is encouraging that they seem to be positively correlated with risk (as measured by the standard deviation of incremental rates of return). An analytical examination of the process of profit rate equalization also leads us to expect a positive correlation between period-averages of industry profit rates and the corresponding growth rates in real capital, and this too is borne out by the data. Subsequent work will focus on econometric specifications of the adjustment process, and tests of the properties of estimated long-run profit rates on both average capital and new investment. So far, at least, the results are supportive of the classical theory of competition.

## Appendix 1: OECD data, 1970–90, for Figures 9.1–9.4

Data for Figures 9.1–9.4 comes from the OECD *International Sectoral Data Base* (ISDB) of 1994. This contains annual data for several categories of fourteen OECD countries. For the detailed analysis of the production and use of goods and services, the economy is divided into approximately thirty branches according to *International Standard Industrial Classification* (ISIC) used in the National Accounts publication by OECD.[11] In order



to achieve comparability and consistency across countries and industries we had to limit our sample to eight manufacturing industries (Food, Textiles, Paper, Chemicals, Minerals, Metals, Metal Products, Machinery and Equipment, and Other Manufacturing products) across eight countries (USA, Japan, Canada, Germany, France, Italy, Belgium and Norway).[12]

For each country, nominal gross operating surplus (GOS) in each industry was calculated as nominal GDP *minus* employee compensation *minus* indirect business taxes, while nominal gross capital stock was calculated by reflating the real gross capital stock through the investment deflator (which was itself calculated as the ratio of nominal to real gross investment). For world industries, gross operating surplus in local currency in any given industry was converted into US dollars, using annual GDP PPP-ratios, while corresponding nominal capital stock and gross investment were converted using annual gross investment PPP-ratios. The world average rate of profit in each industry was calculated as the ratio of its total world gross operating surplus to its total world gross capital stock, while the incremental rate of profit was calculated as the ratio of the change in nominal world gross operating surplus to the previous period's gross investment. For US measures, the nominal US variables were used directly. Further details are in Christodoulopoulos (1995, app. A).

## Appendix 2: US data, 1987–2005, for Figures 9.5–9.12

Since the US Bureau of Economic Analysis (BEA) now only calculates net capital stock, the rate of profit on total capital is defined here as the ratio of nominal net profits (gross profits minus depreciation) to current-cost net capital stock On the other hand, since gross investment figures are widely available and are independent of the debatable assumptions needed to estimate capital stocks, the incremental rate of profit is defined as the ratio of the change in nominal gross profits to lagged nominal gross investment. Further details of the derivation and use of these and other relevant variables are listed below.

1. The basic flow variables were taken from the US Bureau of Economic Analysis (BEA) Gross Domestic Product (GDP) by Industry tables 1947–97 GDPbyInd_VA_NAICS and 1998–2005 GDPbyInd_VA_NAICS, available at http://www.bea.gov/industry/gdpbyind_data.htm. From these were calculated current gross value added (GVA), employee compensation (EC), gross operating surplus (GOS),[13] the price index for GVA (VAPI) which was used to create real

GVA (GVAR), and employment data on full and part-time employees (FTPE), self-employed persons (SEP), and full-time equivalent employees (FEE). All of these were available for 1987–2005 except SEP and FEE, which were only available for 1998–2005.

2. For each sector, a wage equivalent (WEQ) was calculated by applying the average full-time wage per worker ($w \equiv EC/FEE$) to SEP, and the resulting value was subtracted from GOS to create gross profits (PG). This was done because the NIPA calculation of GOS implicitly treats all of the income of proprietors and partners (that is, of self-employed persons) as profit-type income. Since SEP and FEE were only available for 1998–2005, the 1987 ratios of FEE/FTPE and PEP/FTPE were used along with 1987–97 values of FTPE to fill in these earlier years.
3. Current cost capital stock (K), gross investment (GI), and current cost depreciation (DEP) for each sector, and the quantity index for net capital stock (KQI) were taken from the following BEA Wealth tables: Table 3.1ES. Current-Cost Net Stock of Private Fixed Assets by Industry; Table 3.4ES. Current-Cost Depreciation of Private Fixed Assets by Industry; Table 3.7ES. Historical-Cost Investment in Private Fixed Assets by Industry; and Table 3.8ES. Chain-Type Quantity Indexes for Investment in Private Fixed Assets by Industry, all downloaded on 11 August 2007, last revised on 8 August 2007. The industries in the Wealth tables were matched to those in the NIPA accounts, which required aggregating sectors 50–51 and 69–70 in the former tables. Real capital stocks (KR) were created by scaling up the quantity index using the base-year (2000) values of current cost stocks.
4. Imputed values for owner-occupied-housing (OOH) were removed from the real estate industry values of GVA (space rent line 134 *minus* intermediate input line 135), GOS (GVA *minus* taxes net of subsidies (line 135 *minus* line 136), and DEP (line 140), there being no imputation made for EC, using NIPA Table 7.12. Imputations in the National Income and Product Accounts, Bureau of Economic Analysis (downloaded on 11 April 2007, last revised 1 August 2007). But whereas the BEA NIPA accounts now allocate all imputed values for OOH to the real estate sector, it still splits the Wealth stock components of OOH imputations between Farms and Real Estate, which had to be removed using Table 5.1. Current-Cost Net Stock of Residential Fixed Assets by Type of Owner, Legal Form of Organization, Industry, and Tenure Group, lines 15–16, respectively. A similar adjustment was made for GI, using Table 5.7. Historical-Cost Investment in Residential Fixed Assets by Type of Owner, Legal Form of Organization, Industry, and Tenure Group, lines 15–16.



5. Inventories were added to the capital stocks of manufacturing and wholesale/retail trade industries, using NIPA Table 1BU. Real Manufacturing and Trade Inventories, (http://www.bea.gov/national/nipaweb/nipa_underlying/SelectTable.asp) and Table 2AUI, Implicit Price Deflators for Manufacturing and Trade Sales, both downloaded on 11 August 2007, last revised 3 February 2004. The 1987–2005 average ratio of real inventories to real capital stock in each sector was taken to be its normal ratio, and this was used in conjunction with annual real capital stocks to create annual normal inventories for each sector. These were then converted to current-cost inventories using the implicit price deflators for manufacturing and trade sales.

   For the Construction industry, data on inventories of materials and supplies was available from the 1992, 1997, 2002 Economic Census of Construction, Table 3. The value of construction work was available for establishments reporting inventories; reporting no inventories; and non-reporting. The ratio of the Construction sales of the first two sets was used to split the last set into subcomponents, with and without inventories, the inventory sales ratio of the first set was applied to the first subcomponent of the last set to estimate its inventory levels, and this was added to reported inventories to achieve an overall total. The average inventory/GVA ratio for 1992, 1997, 2002 (which was stable at around 4 per cent) was then used to define a normal ratio, and this was used to estimate annual normal inventory stocks in the construction sector. The same ratio was also applied to the sector's fixed investment in order to estimate normal inventory investment. Total capital and investment were defined as the sums of their fixed and inventory components.

   In the Insurance and Related Activities industry, total reserves were calculated as the sum of checkable deposits and currency, money-market funds and security RPs in US Flow of Funds Tables L.116, Property-Casualty Insurance Companies (lines 2–3) and L.117, Life Insurance Companies (lines 2–3), downloaded 1/08/08. Since the ratio of reserves to net current-cost capital declined over time and fluctuated from one year to the next, its normal level was defined by its exponential trend. This trend value was then applied to annual capital stocks to obtain the normal reserve stocks, and to annual investment flows to obtain the normal investment in reserves, the resulting figures being added to fixed capital stocks and investment to get the total capital stock and investment. A similar procedure was followed for the Banking and Finance industry, which encompasses

*Table 9.A1* Full list of excluded industries

| Industry No. | Industry level | Industry title |
|---|---|---|
| 1 | Agriculture | Farms |
| 2 | Agriculture | Forestry, fishing, and related activities |
| 3 | Mining | Oil and gas extraction |
| 4 | Mining | Mining, except oil and gas |
| 5 | Mining | Support activities for mining |
| 10 | Manufacturing D | Primary metals |
| 13 | Manufacturing D | Computers and electronic products |
| 15 | Manufacturing D | Motor vehicles, bodies and trailers, and parts |
| 16 | Manufacturing D | Other transportation equipment |
| 20 | Manufacturing ND | Textile mills and textile product mills |
| 21 | Manufacturing ND | Apparel and leather and allied products |
| 29 | Transportation | Air transportation |
| 30 | Transportation | Rail transportation |
| 31 | Transportation | Water transportation |
| 33 | Transportation | Transit and ground passenger transportation |
| 34 | Transportation | Pipeline transportation |
| 35 | Transportation | Other transportation and support activities |
| 37 | Info | Publishing industries (includes software) |
| 42 | Finance | Securities, commodity contracts, and investments |
| 44 | Finance | Funds, trusts, and other financial vehicles |
| 47 | Profess. | Legal services |
| 48 | Profess. | Computer systems design and related services |
| 49 | Profess. | Miscellaneous professional, scientific, and technical services |
| 50 | Management | Management of companies and enterprises |
| 51 | Admn&Waste | Administrative and support services |
| 53 | Educ. | Educational services |
| 54 | Health&Soc. | Ambulatory health care services |
| 55 | Health&Soc. | Hospitals and nursing and residential care facilities |
| 56 | Health&Soc. | Social assistance |
| 57 | Arts | Performing arts, spectator sports, museums, and related activities |
| 61 | Other Services | Other services, except government |

commercial banks, savings banks and credit unions, with reserves defined as the sum of vault cash and currency, reserves at the Federal Reserve, banks' own checkable and time deposits and currency (but not that of their customers), and Fed Funds and RPs, as taken from US Flow of Funds Table L.109 (lines 2–4), L.114 (lines 2–5), and L.115 (lines 2–4), downloaded 1/08/08.



6. The NAICS dataset has sixty-one individual private industries, plus an overall aggregate (All Private Industries) and several subaggregates such as Total, Durable, and Nondurable Manufacturing. Detailed descriptions of each industry are available online (StatCanada, 1997). Particular care was taken to focus on industries that were dominated by profit-driven enterprises and were also competitive on a world scale. This led to the exclusion of thirty-one the original sixty-one private industries, with a concomitant redefinition of the overall rate of profit and incremental rate of profit. The first set of industries were excluded if they were dominated by non-profit activities enterprises (for example, arts, museums, educational services, social services) or if the available data on the wages of employees significantly understated the wage-equivalent of the proprietors and partners (as, say, in the case of law firms or medical offices).[14] Such considerations applied to Administrative and Support Services, Ambulatory Health Care Services, Educational Services; Funds and Other Financial Vehicles, Hospitals and Nursing and Residential Care Facilities; Other Service Except Government (which include Religion, Grant Making, Civic, Professional and Similar Organizations); Performing Arts, Spectator Sports, Museums, and Related Activities; Legal Services, Computer Systems Design and Related Services, and Miscellaneous Professional, Scientific, and Technical Services; Publishing Industries; and Social Assistance. These sectors typically had either extremely low or negative 'profit rates' (for example, Educational Services), or very high ones (for example, Administrative and Support Services, and the various subsectors of Professional, Scientific, and Technical Services). Finally, another eighteen industries were excluded because either their average or incremental rates of profit had period-averages below 5 per cent (several even had negative or near-zero averages).[15] These were deemed to be uncompetitive internationally on a world scale. See Table 9.A1 for the full list of excluded industries.

## Notes

1. In traditional finance theory, the focus is on 'the' prospective rate of return, defined as the *constant-over-time* internal rate of return (IRR) implicit in any expected future cash flows. But heterogeneous investors will have different evaluations of any given project. Hence there is no such thing as 'the' expected rate of return (Lutz, 1968, p. 218). In the end, the hypothesis of

arbitrage across investments – that is, of profit rate equalization – must refer to the *ex-post* process.

2. I thank Adrian Wood for directing my attention to the role of capacity utilization in profitability measures, and Randall Wray for suggesting an examination of the relations between profitability, risk and growth.
3. The notion of regulating capital is quite different from Steindl's idea of a marginal capital. His marginal capitals are those with the highest cost, and he assumes that they earn zero net profit; that is, that 'they just cover costs' (Steindl, 1976, p. 39). But a regulating capital always earns some profit, and in the long run it earns a normal rate of profit. Moreover, in the case of industry, it embodies the *lowest* generally reproducible costs. In the case of agriculture and mining, to the extent that better conditions of production are not reproducible, the regulating capitals may well have the highest costs, as in Ricardo's producer on marginal land (Ricardo, 1951, ch. 2). But, even here, there may be different technologies in use on the marginal land, in which case the lowest-cost producer on the marginal land is the regulating capital.
4. Alternatively, if two methods of production for a given commodity coexist at some given real wage, it is assumed that they can do so in competitive equilibrium only if they have the same rate of profit (Sraffa, 1963, pp. 38–9).
5. Although the validity of these assumptions has been questioned widely, they continue to be used in most countries because of their great computational convenience (OECD, 2001, ch. 8, pp. 75–81).
6. Vintages and types are two separate issues. Every type of capital may exist in different vintages, depending on how long it has been in operation.
7. Moreover, since an industry may itself be global, the international equalization of regulating rates is consistent with persistent national differences in average rates of profit for a given industry (see the next section).
8. An aggregate connection between real wages and productivity is a common theme in many different traditions (Shaikh, 2003). A classical take on the microeconomics of wage-setting is given by Botwinick (1993, ch. 6–7).
9. In the definition of the incremental rate of profit, the numerator $\Delta P_t$ is a proxy for the current profit ($P_{new}$) and past investment $I_{t-1}$ is a proxy for the current cost of recent capital ($K_{new}$). Just like the current cost average rate of profit, the current cost incremental rate of profit is simultaneously a real rate.
10. We used this procedure in Shaikh and Tonak (1994, pp. 110–13). It has recently been incorporated into the Annual Macro-Economic Database (AMECO) of the European Commission's Directorate General for Economic and Financial Affairs, available at http://europa.eu.int/comm/economy_finance/indicators/annual_macro_economic_database/ameco_contents.htm.
11. Branches are defined as groups of units of homogeneous production, each engaged in a single activity. The use of the word 'branch' here is synonymous to industry.
12. Compensation of employee data is not obtainable for the years prior to 1970, while capital stock and gross fixed capital formation data is available only for some industries of some countries in the ISDB database.
13. Gross operating surplus = gross value added –employee compensation – taxes on production and imports.



14. We wish to thank George Smith and Denise McBride of the Bureau of Economic Analysis for helping us to identify potential sectors. However, the final decisions were ours.
15. Duménil and Lévy (2004, pp. 84–5) argue that, in two of these industries, Pipeline Transportation and Railroad Transportation, the extremely low measured rates of profit were primarily because the BEA methods yield excessively high values for their capital stocks as a result of the very long service lives the BEA assigns to pipelines and rail tracks.

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# 10

# Accounting for Business Combinations

*Geoff Meeks and Geoff Whittington*

## Introduction

Ajit Singh's monograph '*Takeovers: Their Relevance to the Stock Market and the Theory of the Firm*' (1971) was a pioneering study of the link between takeovers and the performance of the participants before and after the deal. A large literature has since developed on the characteristics of taken-over firms, and of post-merger performance. One line of development has focused on the choice of statistical technique. Ajit Singh pioneered the use of discriminant analysis for the identification of the characteristics of taken-over firms and, since then, alternatives have included logit and probit analysis, factor analysis, and neural networks. A second line of development has been on the research question. Some later studies have tended to regard the prediction of the takeover event as an end in itself, rather than regarding takeover studies as tests of theories of the firm, the central concern of the Singh study. This narrower remit can be understood in the light of the substantial gains to be made from accurate prediction: takeover targets typically experience share price rises of around 25 per cent in the days preceding the bid, so predicting that event offers the prospect of major financial gains (see Hughes, 1993). The third line of development has been to shift the focus of performance measurement, from accounting data to share price movements on the stock market (see, for example, Agrawal *et al.* (1992), Andrade *et al.* (2001), Gregory (1997)). Ajit Singh measured market valuations as well as accounting profitability, but many subsequent studies have reported only share price data – because such data are more easily accessible or because of concerns about the reliability of accounting data. Some studies have persisted with accounting data, however – for example, Chatterjee and Meeks (1996); Cosh *et al.* (1989); Dickerson *et al.* (1997); Kumar