Cambridge Journal of Economics 2025, **0**, 1–31
https://doi.org/10.1093/cje/beaf036
Advance Access publication 6 November, 2025

A Theory of Profits fifty years on

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This paper updates the explanation of the share of profits in national income in my 1975 book, *A Theory of Profits*. The theory relates the profit margins of firms to their needs to generate internal finance for investment. Changes in business motives and the financial system have altered this relationship, especially for firms with monopoly power, requiring the theory to be updated. The updated theory could explain the widespread recent increase in the profit share and decrease in the wage share, though with some modification of its policy implications. The paper includes a detailed account of how the 1975 book was shaped by an outstanding past generation of Cambridge economists.

Key words: Share of profits, Company profit margins, Income distribution, Financialisation, Cambridge economics
JEL classifications: D21, D33, E12

1. Introduction

Recognition among economists that the share of profits matters for distributional inequity (e.g. Krugman, 2012) has been increased by rising concentration of wealth ownership and by the rise in this share—and a counterpart fall in the wage share—in many countries (e.g. Kohler *et al.*, 2019). There is disagreement, however, about what determines the profit share and about what has caused its rise—technology, monopoly, bargaining power, globalisation, financialisation—as well as about what governments should do in response to this rise (e.g. Autor *et al.*, 2020; Eeckhout, 2021; Hein, 2015; Karabarbounis, 2024; Piketty, 2014).

Concern about distributional inequity plus the already vigorous disagreement over causes and policies half a century ago motivated the present author, then a young economist in Cambridge, to write a theoretical book on profits (Wood, 1975). It clearly failed to resolve the disagreement, but distributional inequity has since become much worse. This paper reconsiders the book's theory and relevance to the current profit problem.

Manuscript received 21 November 2024; final version received 29 July 2025
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* Department of International Development, University of Oxford,UK. I thank the post-Keynesians of the University of Lille, especially Jordan Melmiès and Cédric Rogé, for the invitation to speak at a conference in December 2023 that motivated this paper. I am very grateful for advice and comments on a draft from Thomas Dallery, Christopher Dougherty, Ingaret Faulkner, Valpy Fitzgerald, Philip Good, Mark Lavoie, Patricia McGuire, Joel Rabinovich and Engelbert Stockhammer. The paper also benefited greatly from the advice of three referees and the *Cambridge Journal of Economics* editorial board and from a review by Valpy Fitzgerald of my consequent revisions.

As set out in the book, the theory assumes that constraints on borrowing and new share issues oblige growth-maximising companies to rely heavily on retained profits to finance investment. The share of profits in national income is therefore determined by the need for companies in aggregate to generate enough internal finance to expand their output capacity in line with the expected growth of sales. The aggregate growth rate of sales, which co-determines the share of profits, is argued to be governed by forces largely independent of this share.

The reality of company finance started to change soon after the book's publication. A shift in business ideology and big increases in managerial pay linked to share prices have given long-term shareholders more influence over company decisions. Liberalisation of financial markets and proliferation of financial instruments, combined with increased concentration of wealth, have expanded short-term private equity and medium-term venture capital, and have blurred the boundaries between financial and non-financial companies. As a result, the availability of finance now constrains the pricing and investment decisions of fewer firms.

Finance-constrained outcomes continue in firms that seek to maximise growth, and in firms that seek to maximise returns to shareholders in rapidly growing competitive markets—with a high need for investment in capacity expansion but limited scope for financing it internally by raising profit margins. Shareholder-controlled firms with more monopoly power or less growth potential, however, tend to set higher profit margins and to be financially unconstrained. The aggregate profit share is an average of the profit margins of financially constrained and unconstrained firms, weighted by the relative sizes of these two categories.

The paper is organised as follows. Section 2 summarises the theory in Wood (1975) and reviews the ways in which it has been used and analysed by others. Section 3 updates the book's model of firm behaviour and develops it into an updated theory of the share of profits. This theory is applied informally to—and seems consistent with—empirical evidence on the causes of the recent rise in the share of profits. The book's policy proposals are then modified to reflect the updating of the theory. Section 4 concludes, with an Appendix detailing model modifications.

Finally, a retrospective acknowledgements section explains how the book evolved from earlier work by Cambridge economists. It analyses the author's struggle to combine the macro theory of Nicholas Kaldor with the micro theory of Robin Marris, how Richard Kahn and Joan Robinson contributed and reacted, and how the book relates to parallel work by Alfred Eichner and Geoff Harcourt.

2. The 1975 form of the theory

The models described below rely on information and discussion in the book's first two chapters of limits both on the availability of external finance and on the freedom of companies to finance investment internally by reducing their dividend payouts. A key conclusion is that the standard theory that a firm could finance externally any investment that it would be willing to finance out of retained profits is 'unrealistic to the point of almost complete irrelevance' (Wood, 1975, p. 6). These chapters also adopt, with little discussion (*ibid.*, p. 8), the view of Marris (1964) that the typical aim of a firm's decision-makers is to maximise its growth.

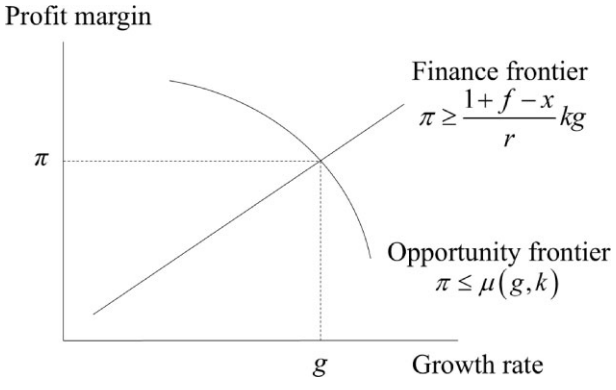

Fig. 1. *The long-run profit margin.*

Source: Wood (1975, figure 4).

2.1 Micro profit margin

Figure 1 describes the determination of a firm's profit margin (π, the ratio of profits to sales revenue, on the vertical axis). It is chosen to maximise the growth rate of sales revenue (g, on the horizontal axis). Pursuit of growth exerts two conflicting pressures on the profit margin, the balance between which determines both π and g.

One pressure is the need to increase demand for the firm's products in the face of competition from other firms. Product improvement, marketing expenditure, and low prices tend to reduce π, so the firm's 'opportunity frontier', which defines the maximum profit margin achievable at any given growth rate of sales revenue, slopes downward. The other pressure is the need to increase production capacity, which requires π to be high, because most investment must be financed from retained profits, so the firm's 'finance frontier' slopes upward.

The slope of the finance frontier, which defines the minimum profit margin needed to finance any given rate of growth of capacity, depends on the values of three parameters. The financial asset ratio, f, is the firm's addition to its minimum desired cushion of financial assets, relative to its gross investment in physical assets. The external finance ratio, x, is the maximum share of investment that can be financed by borrowing or new share issues. The retention ratio, r, is the maximum share of gross profits (including depreciation) that can be retained for investment after paying interest, taxes and an acceptable level of dividends to shareholders.

The positions of both frontiers depend on the 'investment coefficient', k, which is the ratio of gross investment to the resulting increase in the firm's output capacity. Investment in replacing older equipment can reduce operating costs and improve product quality, so that a higher k can move the opportunity frontier upward. Such investment, however, must be paid for, so the higher k also increases the upward slope of the finance frontier.

The two frontiers define a wide area of attainable outcomes. The desire for maximum growth, however, pushes the firm on to both frontiers, whose intersection determines the outcome. The value of k, which affects the positions of both frontiers, is chosen to maximise the growth rate at their intersection—where the marginal contribution to

sales growth of newer machinery is balanced by the opportunity cost of finance for capacity expansion.

As its title states, the figure describes a 'long-run' decision. Firms have a 3- to 5-year rolling time horizon, and they plan on the basis of normal capacity use. Their investment and pricing decisions are not affected by short-run fluctuations in sales and profits. Nor are their dividend payments, since shareholders value stability, so r also fluctuates. The consequent short-term financial imbalances are absorbed by fluctuations in borrowing (deviations from planned x) and by acquisition or disposal of financial assets (deviations from planned f).

The substance of Figure 1 is basically the same as in Eichner (1973, 1976), discussed in section R.3 below, but the simplicity of Figure 1 led Lavoie in his literature surveys (e.g. 1987, 2022, p. 149), to adopt a variant of it that has often been used in post-Keynesian economics to explain pricing and investment decisions. Lavoie's variant is indeed even simpler than Figure 1, though at the cost of losing some of its substance.

The main difference is a redefinition of the axes: in Lavoie's figure (as in Marris, 1964, p. 253), the vertical axis measures the profit rate on capital rather than the profit margin on sales and the horizontal axis the growth of the firm's capital stock rather than of its sales revenue. Lavoie also follows Marris in redrawing the opportunity frontier, which he renames the market frontier, with an initially upward-sloping section where growth makes a firm more profitable.[1]

The axis redefinition simplifies Figure 1 by losing the variable k. But this omission also makes the figure less useful for the purpose for which it was designed in Wood (1975), namely as the micro foundation for an explanation of the share of profits in national income. For example, the simplified figure can be misleading if exogenous changes in k alter the relationship between the profit rate and the profit share (Rabinovich, 2021).

The theory in Figure 1 has also been used by Melmiès (2015, 2019, 2023) to explain the small influence of competition on profitability. In standard theory, assuming profit maximisation, the average profitability of firms within industries is predicted to vary inversely with the degree of competition in their industries. Melmiès finds this theoretical prediction to be inconsistent with the evidence—on the effects of both market structure and competition policy—which fits better with a growth-maximising finance-constrained theory of the firm.

This work by Melmiès appears to be the only clearly focused empirical test—albeit an indirect one—of the theory in Figure 1. Empirical work (up to the mid-1980s) on Marris's theory of the firm supports Figure 1's assumption of growth maximisation but does not directly address the determination of profit margins (Marris, 1998, pp. 117–21).

2.2 Macro profit share

Figure 2 describes the determination of the share of profits in national income, again labelled π (though the denominator of the ratio is now value added), and again referring to the long run, recognising that π fluctuates with capacity use. The horizontal axis is again labelled g, though it refers to the growth not of sales revenue but of national

[1] David Champernowne suggested the name 'opportunity frontier' during his supervision of Wood (1972). Marris (1964, p. 251) referred to the frontier in his book as 'the demand curve'.

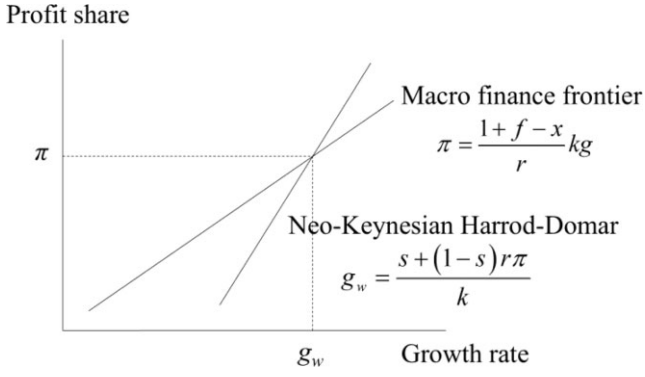

Fig. 2. *The long-run share of profits.*

Source: Author's derivation from Wood (1975, section 4.2).

income (all of which is assumed for simplicity in this figure to be produced by the company sector).

The profit share is governed by a macro version of the micro finance frontier in Figure 1. This frontier combines the finance frontiers of all industrial and commercial companies, netting out financial transactions among them. It is written as an equality because the micro assumptions of growth maximisation and competition ensure that the macro outcome will be on this frontier. At any given growth rate, the macro finance frontier determines the share of profits.[2]

An aggregate replacement for the micro opportunity frontier is needed to complete the macro model. In Figure 2, the replacement is a multiplier–accelerator growth process, with investment causing both effective demand and production capacity to expand at the same 'warranted' rate. The aggregate saving rate in the numerator of this Harrod–Domar growth equation depends on the profit share, as in Kaldor's (1955–56) theory of distribution. Following Kaldor (1966), this link here reflects the higher saving rate of firms than of households,

$$s_a = r\pi + s\,(1 - r\pi)\,, \tag{1}$$

where s_a is the aggregate saving rate, r is the retention ratio and s is the proportion households save out of dividends plus wages. The effects of retained profits on share prices and hence on household wealth could cause variation in π to be offset by variation in s, and might even leave s_a unchanged, making the Harrod–Domar line in this figure vertical. Usually, however, s_a and thus g_w increase with π, so the finance frontier is intersected by another upward-sloping line. Whatever its slope, this relationship completes the model, determining both π and g.

Like other Harrod–Domar models, the one in Figure 2 is unstable, as was noted by Bortis (1982) and Lavoie (1987, ch. 7). Shocks or investment mistakes would cause actual growth to diverge increasingly from warranted growth. Rogé (2020) shows

[2] The profit share depends also on firms' choices of k, which in principle should be influenced by the expected relative profitability of different sorts of new equipment and different rates of replacement of old equipment. At the macro level, however, the effect of profitability on k is so unclear that for simplicity the book assumes it away (Wood, 1975, pp. 119–24).

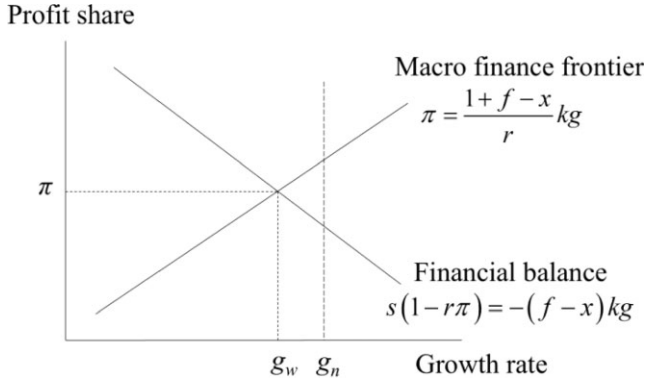

Fig. 3. *Financial relationships.*

Source: Author's derivation from Figure 2 and equations (1) and (2).

that this 'knife-edge' problem is mitigated in Wood (1975) by partial self-financing of investment and by firms sticking to their long-run strategies, as emphasised also by Botte (2019). Maintaining stable growth would nonetheless require government intervention—by suitable management of public spending (Rogé, 2020) or of the fiscal balance (Wood, 1975 and Botte, 2019).

2.3 Alternative possibilities

Even if actual growth were at the warranted rate in Figure 2, it would not necessarily equal an economy's supply-side potential (or 'natural') growth rate, g_n, which in Wood (1975) depends on population increase and technical progress. Thinking about growth has been transformed since the 1970s by evidence on many more countries and influences, so g_n must now be seen as dependent also on a country's resources, geography, infrastructure and institutions.

To align g_w in Figure 2 with an exogenous g_n would require at least one of the parameters of the neo-Keynesian Harrod–Domar equation to be endogenous. Flexibility of k to equate labour demand with labour supply by changes in technique is ruled out because (even if the aggregate production function is well behaved) the wage–rental ratio is constrained by the finance frontier (Wood, 1975, pp. 125–7). In his neo-Pasinetti theorem, which strongly influenced Wood (1975), Kaldor (1966) proposes instead flexibility of s. To explain this proposal, the equations in Figure 2 can be combined to derive a financial balance equation:

$$s\,(1 - r\pi) = -\,(f - x)\,kg, \tag{2}$$

whose left-hand side is the amount that households want to save and thus add to their holdings of bonds or shares, while its right-hand side is the amount of external finance that firms want to raise by net sales of bonds or shares. In Figure 3, equation (2) provides a downward-sloping replacement for the upward-sloping line of Figure 2's neo-Keynesian Harrod–Domar equation, with g_w in this example being less than g_n.[3]

[3] The line slopes down because a higher growth rate makes firms want to issue more securities (assuming $x > f$). To induce households to buy these securities, there must be more household saving. To generate more household saving requires a higher household share of national income and so a lower share of profits.

In Kaldor (1966), whose algebra covers both equations in Figure 3, an endogenous household saving propensity brings g_w into line with an exogenous g. From the initial situation shown in Figure 3, for example, an induced rise in s would shift the financial balance line outward to intersect the finance frontier at the natural rate. The mechanism is that raising g_w to g_n requires firms to invest more and thus, given x, to obtain more external finance by issuing new shares. The new issues depress share prices, reducing household wealth, which causes households to consume less of their dividends and wages. The profit share is therefore determined simply by a macro finance function (Kaldor's equation (6)) and the exogenous growth rate.

Wood (1975, p. 118) argues that the neo-Pasinetti household saving adjustment mechanism is unrealistic and that the right alignment mechanism for a modern economy is fiscal policy (*ibid.*, pp. 132–3). This sort of government action to align g_w with g_n can be modelled by generalising the Harrod–Domar equation in Figure 2 (Wood, 1975, pp. 112–4), or by adding the fiscal balance to equation (2), which shifts its line in Figure 3 vertically. The financial balance equation can also accommodate the trade balance and other features of a monetary economy along the lines pioneered by Wynne Godley (Cripps and Lavoie, 2017).

Rogé (2020) considers the alternatives of aligning the warranted rate with the natural rate by adjusting the financial parameters r and x. These possibilities can be assessed by rearranging the equations in Figures 2 and 3 as:

$$\pi = \frac{(1 + f - x)\, s}{r\,(1 - (1 + f - x)\,(1 - s))}, \tag{3}$$

$$g = \frac{s}{(1 - (1 + f - x)\,(1 - s))\, k}. \tag{4}$$

In equation (3), π is independent of k, as is explained in Wood (1975, pp. 115–6). Equation (4), however, shows something that is not recognised in the book, namely that g is independent of r, as was pointed out by Lavoie (1987), who called it the 'contra-Pasinetti theorem'.[4] So the warranted rate could not be aligned with the natural rate by adjusting the retention ratio.

Equation (4) confirms that the warranted rate could in principle be equated with the natural rate by adjusting the external finance ratio. In Figure 3, for example, a reduction in x could raise g_w (and would also raise π in equation (3)). Some flexibility of x, achieved perhaps by monetary policy (Wood, 1975, pp. 31–2, 167), could thus bring g_w closer to g_n. But if x were fully flexible in the sense of being whatever would make $g = g_n$ in equation (4), both Wood's (1975) theory and Kaldor's (1966) neo-Pasinetti theorem would be destroyed, since the profit share would then be determined, as in Kaldor's (1955–56) neo-Keynesian theory, simply by an exogenous investment share and different saving rates out of profits and wages.

The practical relevance of Figure 3 (and the discussion of it above) is limited by the unrealism of its simplifying assumptions. Not only does its algebra omit government and foreign trade, but all output is assumed to be produced in the company sector. As Kaldor argues in a 1977 letter (in online Supplementary Appendix A), the key point of both Wood (1975) and his neo-Pasinetti theorem is that the share of profits in company

[4] Given f, x and k, financing a given growth rate requires only a specific level of retained profits, $r\pi$. Because π can adjust, this $r\pi$ can be attained with any (sensible) value of r, as I came to understand only in correspondence with Joan Robinson after the book was published (Robinson, 1975, 6 November letter from me).

sector output is governed by the macro finance function, a theory which is not tied to any one explanation of what determines company sector output. He also argues that in an open economy of which the company sector is only a part, 'the level and the growth rate of [its output could be] determined by "outside" demand'.[5]

3. Updating the 1975 theory

Of all the changes in economic reality since Wood (1975), including globalisation and new information technology, the most directly relevant to its theory of profits is 'financialisation'—the increased influence of financial markets and institutions on other economic activity (e.g. Hein, 2015; Stockhammer, 2004). Easier financing of hostile takeovers, reinforced by far higher pay linked to share prices, has made managers more responsive to long-term shareholder interests. Increased concentration of personal wealth has financed more of both patient venture capital and private equity looting, financial firms now have more control of industrial and commercial firms, and formerly non-financial companies have diversified into financial activities.

The impact on firm behaviour has been neatly summarised by Lazonick and O'Sullivan (2000) as a move from 'retain and reinvest' to 'downsize and distribute', and thus away from some of the assumptions of Wood (1975). This section develops updated versions of the Wood (1975) micro model and macro model. It argues that the updated theory could explain the widespread rise in the profit share in recent decades and modifies the book's policy proposals.

3.1 Micro profit margin

Building on earlier contributions, particularly Stockhammer (2004), an insightful treatment of the implications of financialisation for the micro theory of Wood (1975) is provided by Dallery (2009). He distinguishes between quantitative change, in which shareholders become stronger, and qualitative change, in which shareholders take control of the firm. The effects of these two sorts of change are illustrated in Figure 4 by modifications to Figure 1.

With stronger shareholders, growth maximisation remains the firm's objective, but the finance frontier moves upward (to FF′) because shareholders want higher dividends (lower r) and fewer new issues—or buybacks—of shares (lower x).[6] The result is a higher profit margin, π', and a lower growth rate, g'. If shareholder lobbying weakened labour unions, an upward shift also of the opportunity frontier might allow a higher profit margin with no reduction of growth.

A caveat is that new financial instruments and institutions have made it easier than it was before financialisation to obtain external finance (both debt and equity). For some firms, therefore, despite increased shareholder influence on the finance frontier, the net effect of financialisation could be to move the finance frontier downward, reducing π and raising g.

[5] As is mentioned also in section 4.7 of Wood (1975), though less cogently. Kaldor's 1977 letter was prompted by unrelated comments from Wood on, and was undoubtedly shaped by, the two-sector model in Kaldor (1976).

[6] Stockhammer (2004) models this sort of change with indifference curves combining the preferences of managers and shareholders, an approach pioneered by Marris (1964, diagram 6.6), who regarded it as 'obviously superior' but 'rather inconvenient for qualitative analysis' (Marris, 1998, p. 128).

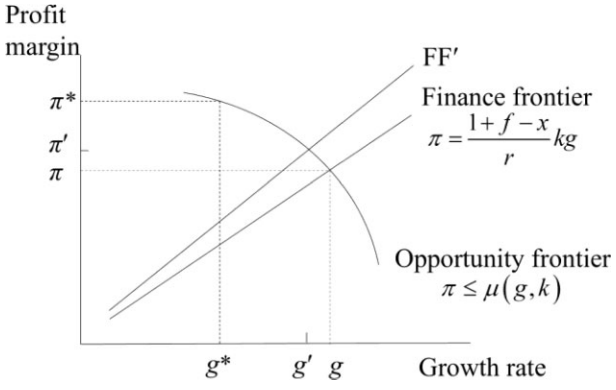

Fig. 4. *Firm-level financialisation.*

Source: Author's adaptation of Figure 1.

Shareholder control yields a fundamentally different outcome, because the choice of position on the opportunity frontier is determined entirely by the financial interests of shareholders and not influenced by any managerial preference for growth. Figure 4 assumes the chosen position, denoted by π^* and g^*, to be above the finance frontier, at an even higher profit margin and a lower growth rate than with merely stronger shareholders.

Dallery's analysis of shareholder control can be extended, within the limits of models based on optimising behaviour, by making the simple assumption that shareholders would like to be at the point on the opportunity frontier that maximises the present value of a perpetual stream of gross profits,

$$V = \frac{R_0 \pi}{i - g}, \tag{5}$$

where R_0 is the initial level of sales revenue and i is the representative shareholder's discount rate.[7] It is convenient to assume an opportunity frontier similar to Rabinovich (2021),

$$g = \alpha - \beta \pi^2, \tag{6}$$

in which the parameter α defines the firm's growth potential with a zero profit margin, which depends on its choice of products and markets, innovativeness and efficiency. The parameter β defines the extent to which its growth of sales would be reduced by a higher profit margin, which is the inverse of its dynamic monopoly power (as first noted by Robinson, 1975, October letter) and depends on the availability and relative product quality of alternative suppliers.

[7] As in other equations of this type (e.g. Kahn, 1964–72, p. 214), avoiding nonsense results requires i to be greater than g, arguably because faster growth is inherently riskier (Marris, 1998, pp. 124–5). This formulation also ignores the wide variation of interests, opinions and power among different groups of shareholders.

The shareholder-preferred profit margin can be derived (as explained in the Appendix) from equations (5) and (6) as:

$$\pi^* = \left(\frac{i-\alpha}{\beta}\right)^{0.5}, \tag{7}$$

which depends on all three parameters in (5) and (6). The preferred profit margin unsurprisingly increases with the firm's monopoly power (a lower β), and with a higher discount rate (implying a more impatient or shorter-term shareholder perspective). Greater growth potential, however, lowers the preferred profit margin—so as to obtain a larger slice of a more rapidly expanding pie.[8] The shareholder-preferred growth rate,[9]

$$g^* = 2\alpha - i, \tag{8}$$

is unsurprisingly increased by greater growth potential and reduced by a higher discount rate. The monopoly power parameter is missing because its two opposed effects on g^* happen, with the particular form of the opportunity frontier assumed in equation (6), to cancel out exactly. Higher β, for example, lowers π^*, tending to raise sales growth, but it also reduces the gain in sales from a lower π.

Because faster replacement of equipment can lower production costs and raise product quality, the parameter α of the opportunity frontier in (6) could be written as $\alpha(k)$, with replacement decisions (and hence k) also dependent on the discount rate, i. Beyond that, the choice of profit margin does not depend on the firm's capital–output ratio: shareholders just want to maximise the return on past investment. But if even the optimal profit margin would generate a profit rate on capital below the discount rate, i, the firm would never have been established or would close as soon as its capital equipment wore out.[10]

Having chosen the firm's profit margin and growth rate, shareholders can then be assumed (as in Dallery, 2009; Rabinovich, 2021) to choose f, x and r to maximise the benefits to them of the resulting stream of profits, subject to the accounting constraint in the finance frontier's algebra. Their choices depend on borrowing options, buy-back regulations, the tax system and the prospective returns on financial assets, including the shares of other firms.[11]

The graphically convenient way in which Figure 4 is drawn, with π^* and g^* on the opportunity frontier above FF′, does not mean that shareholder control makes the finance frontier irrelevant. Despite all the financial innovations, there are still important constraints on obtaining finance, so for some shareholder-controlled firms the outcome

[8] That a shareholder-controlled firm's profit margin is inversely related to its growth potential is proved also in Wood (1972, pp. A7–8) by geometrical analysis related, without attribution, to Williamson (1966).

[9] Obtained by substituting equation (7) into equation (6).

[10] Equations (5)–(8) would look the same if the profit margin were replaced by the profit rate, the growth rate were of capital rather than sales, and R_0 were replaced by the initial capital stock. The firm existence condition would then be that the optimal profit rate must exceed the discount rate. Even with this redefinition of variables, equation (5) differs from Kahn's (1964–72) valuation ratio equation, later adopted by Marris (1998), which is based on the discounted value of future dividends. In the present paper's formulation, the dividend distribution decision is assumed to be made by shareholders after their decision on the firm's profit and growth rates.

[11] Rabinovich (2021, p. 454) notes the lack of attention to mergers and acquisitions in Wood (1975). This was not because they were then less frequent (Wood, 1971), but because the main aim of the book was to explain the share of profits and because at the macro level most mergers and acquisitions cancel out (Wood, 1975, pp. 20–24). The book's micro model of firm growth, however, should have discussed mergers and acquisitions more fully.

shareholders would prefer is unattainable because their ideal profit margin would be too low to finance their ideal growth rate. In such a firm, the outcome is determined by the intersection of the opportunity frontier and the finance frontier, as in a growth-maximiser. In Figure 4, π^* would then lie below the intersection of these frontiers, rather than above it, with the actual profit margin being higher, and the actual growth rate lower, than shareholders would prefer.[12]

Intuition suggests that finance-constrained outcomes with shareholder control are likeliest in firms with high growth potential (high α) and low monopoly power (high β), because they need to invest more heavily in capacity expansion but are less able to finance investment internally by raising profit margins. Conversely, it is firms with low growth potential and high monopoly power that seem least likely to be financially constrained and to be where shareholder control is most likely to result in a higher π and a lower g than with growth maximisation.

To reinforce this intuition, note that the finance frontier's parameters (f, x, r, k) set a lower limit on the ratio of a firm's profit margin to its growth rate, π/g. The outcome shareholders would ideally like can similarly be written as the ratio of their preferred profit margin to their preferred growth rate, using equations (7) and (8), as:

$$\frac{\pi^*}{g^*} = \frac{(i-\alpha)^{0.5}}{(2\alpha - i)\,\beta^{0.5}}. \tag{9}$$

This equation confirms that low monopoly power (high β) reduces the shareholder-preferred ratio of the profit margin to the growth rate, making it likelier to fall below the financial frontier minimum ratio. Equation (9) also shows that even with high monopoly power the shareholder-preferred profit margin to growth rate ratio could fall below the finance frontier minimum in a firm with exceptional growth potential (high α). Conversely, low growth potential might make a shareholder-controlled firm with low monopoly power financially unconstrained.

Wood (1975) failed to make these points. Dougherty (1980, p. 181) recognised that the book's (in his view) strong assumption of growth maximisation would not be needed 'if the output and factor markets of the firm were sufficiently competitive'. Steindl (1952), cited as a precursor in Wood (1975, p. 10), similarly argued, as Lavoie (2022, p. 181) notes, that firms could escape from financing constraints only if they possessed monopoly power. Neither of these statements, however, is entirely correct: what matters in the financing context is not just a firm's monopoly power, but its monopoly power relative to its growth potential.

Even when finance does not constrain a firm's investment, Cordonnier and Van de Velde (2015) show how the limited willingness of banks to lend creates a 'glass ceiling' on dividends. Both in theory and in reality, shareholders might well want high dividends (low r) financed by high borrowing (high x). Lenders' risk, though, could keep borrowing below their desired level, and as a result force the retention ratio, r, to be higher than shareholders would prefer.

A macro counterpart to this micro glass ceiling, Cordonnier and Van de Velde (2015) also show, stems from the Kaleckian principle that capitalists earn what they spend.

[12] In such a case, the shareholder-preferred finance frontier (FF′ in Figure 4) might be below rather than above the finance frontier of a growth-maximising firm because the controlling shareholders chose to raise rather than lower x or r in order to get closer to—and perhaps even attain—π^* and g^*. But even in a new firm with a retention ratio of unity—and no foreseeable dividends—constraints on the supply of external finance could keep the profit margin higher and the growth rate lower than shareholders would ideally like.

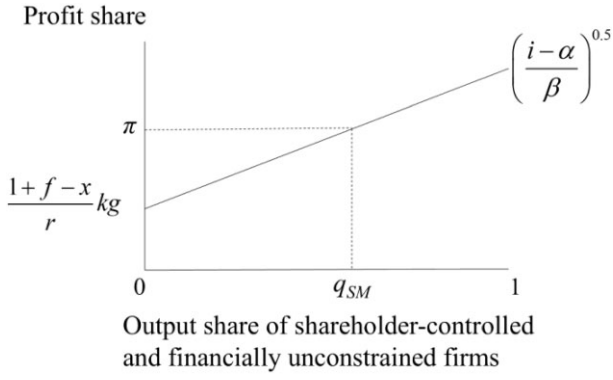

Fig. 5. *Post-financialisation profit share.*

Source: Author's derivation from Appendix equations.

For the purpose of generating profits, spending out of dividends is as effective as investment. But any saving out of dividends must be offset by spending on investment that is financed by borrowing. Given the propensity to save out of dividends, an upper limit on aggregate company borrowing thus also imposes an upper limit on aggregate dividend payouts.

3.2 Macro profit share

The update above of the Wood (1975) micro theory to accommodate financialisation provides the basis for an update of its macro theory of the share of profits, distinguishing between two categories of firms. One category is financially constrained (FC) firms, including both those that pursue growth and those that pursue shareholder enrichment but have low monopoly power relative to growth potential. The other category (SM) consists of firms pursuing shareholder enrichment that are financially unconstrained because they have high monopoly power relative to growth potential. The aggregate share of profits depends on the profit margins of these two categories of firms and on their relative shares of aggregate output, as summarised in Figure 5 (and explained formally in the Appendix).

The left-hand side of the figure shows what the profit share would be if the economy consisted only of financially constrained firms, so governed by an equation of the same form as in Wood (1975). Higher investment caused by faster growth or a higher investment coefficient, gk, tends to raise the profit share, as does a higher minimum financial asset ratio f and lower maximum values of the external finance ratio x and retention ratio r.

The right-hand side of the figure shows what the profit share would be if the economy consisted only of shareholder-controlled and financially unconstrained firms, so governed by an equation of the same form as (7) above. Assuming their objective to be to maximise the present value of future profits, and given the average shareholder discount rate, i, the share of profits depends on the monopoly power and growth potential of the average SM firm. Greater monopoly power (lower β) raises the profit share, as would a higher i. Greater growth potential (higher α) lowers the profit share by motivating shareholder-controlled firms to seek larger market shares.

These two profit shares, which for brevity can be labelled π_{FC} and π_{SM}, will usually be different. Intuitively, the profit share would be higher in an economy containing only SM firms than in one containing only FC firms, so Figure 5 is drawn with its two sides connected by an upward-sloping line. The Appendix provides support for this intuition, but it is not necessarily correct. To the extent that π_{FC} and π_{SM} differ, in either direction, the economy-wide share of profits, π, depends also on the relative size of these two categories of firms.

In Figure 5, which assumes all output to be produced by the company sector, the profit share is a weighted average of the two profit margins that increases with the output share of SM firms, q_{SM}. This output share tends to be higher in an economy with:

(a) a larger proportion of firms whose objective as a result of shareholder control is to maximise shareholder enrichment rather than growth;
(b) among shareholder-controlled firms, a larger proportion with high monopoly power relative to growth potential; and
(c) better access to finance for investment (or more exactly lower financially required minimum ratios of profit margin to growth rate).

The share of profits also depends on bargaining power, especially in SM firms. The parameter β reflects monopsony power as well as monopoly power, so stronger unions or worker-friendly labour market institutions and regulations tend to lower π_{SM}. Greater worker power is unlikely to affect the financial parameters of financially constrained firms but could lower their average profit margin (π_{FC}) by lowering their average growth rate.[13]

The growth rates of FC firms as well as of SM firms depend (as shown in the Appendix) on the growth potential parameters of their opportunity frontiers, which depend on the economy-wide growth rate. An exogenously higher aggregate growth rate would thus increase the growth rates of both categories of firms—but would move their profit margins in opposite directions. Higher α's move FC firms further along their finance frontiers, raising π_{FC}, but cause SM firms to want larger market shares, lowering π_{SM}. So faster growth would reduce the difference between π_{SM} and π_{FC} (if $\pi_{SM} > \pi_{FC}$). Which way it would move the overall profit share would depend on the sizes of the changes in π_{SM} and π_{FC} and on the relative size of the two firm categories.

3.3 Rise in profit share

Empirical work is beyond the scope of this paper, but there is an obvious opportunity to relate the updated macro theory above to existing evidence. The rise in the share of profits—and fall in the share of wages—in most countries in recent decades (e.g. Behringer, 2020; Karabarbounis, 2024; Kohler *et al.*, 2019) has prompted many economists to investigate its causes.

Although there are differences of opinion on how these shares should be measured, and on the size, timing and country coverage of the changes, it seems to be agreed

[13] Equations (A.7) and (A.9) of the Appendix show that the growth rate and hence the profit margin of a growth-maximising firm vary inversely with its β and thus directly with its monopsony power. Dallery and van Treeck (2011) also argue that worker power could cause more intensive use of equipment, thus lowering k and π_{FC} while maintaining the same profit rate on capital to satisfy shareholders.

that the rise in the profit share reflects a rise not in the cost of capital, but in pure profits (Barkai, 2020; van Vlokhoven, 2024). It also mainly reflects increases within many industries in the market shares of big firms with high profit margins (Autor *et al.*, 2020; De Loecker *et al.*, 2020).

Mainstream explanations focus on changes in technology and competition. Biases in technical progress are elusive (Karabarbounis, 2024, p. 122), but new network and platform technologies have fostered monopoly by increasing first-mover advantages and scale economies (e.g. Autor *et al.*, 2020). Changes in competition policy, with less concern about concentration, have been accompanied by slacker enforcement, including tolerance of big IT-based companies acquiring small prospective competitors (e.g. Philippon, 2019). Increased common ownership of firms may also have reduced their incentives to compete (Backus *et al.*, 2021).

Piketty (2014) attributes the rise in a broader measure of capital's share of national income to a rise in a broader measure of the capital–output ratio, which in turn he attributes to his broader measure of the rate of return on capital exceeding the rate of growth of income. Empirically, though, conventional measures of the capital–output ratio in the company sector have declined, partly because of outsourcing (Rabinovich, 2021).

Post-Keynesian economists emphasise financialisation and reduced worker bargaining power (e.g. Hein and van Treeck, 2010, table 2; Hein, 2015). They attribute the rise in the profit share partly to greater shareholder influence, more financial incentives to managers, more payment of interest by non-financial companies and the increased GDP share of financial companies. In addition, organised labour has been weakened by greater openness to trade and international mobility of capital, and by the union-busting and lobbying of increasingly profit-oriented firms.

Kohler *et al.* (2019) extend earlier econometric work on the influence of financialisation. Their results show that falling wage shares in OECD countries are strongly related to two measures of financialisation: weaker legal restrictions on international financial transactions, and higher shares of dividend and interest payments in the value added of non-financial companies. They estimate the adverse effect of financialisation on the wage share to be similar in size to that of increased openness to international trade.

The updated macro theory summarised in Figure 5 (and explained more fully in the Appendix) provides a framework in which to analyse all these and other possible causes of the increase in the profit share. It sheds light particularly on the influence of financialisation, power and intangible assets.

That many firms remain financially constrained is confirmed by the much higher average and wider dispersion of firms' hurdle rates of return than of their perceived cost of capital (Gormsen and Huber, 2025, figure 1). Increased shareholder power is likely to have raised the profit share by increasing the proportion of firms (and output) in the financially unconstrained and higher-profit-margin SM category. Joining this category, however, requires also high monopoly power relative to growth potential.

The effect of increased shareholder power on the average profit margin of firms still in the FC category was probably small. Firms that remained growth-maximisers lowered their retention or external finance ratios, tending to raise the FC profit margin. Financially constrained firms that became shareholder-controlled, however, would also become more willing to borrow (since shareholders worry less than managers about the risks of debt) and to forgo dividends in order to get closer to their preferred positions

on their opportunity frontiers, tending to lower the FC profit margin. Evidence on all (not just FC) firms shows that dividends have risen, notably in the UK and the USA, but on average across firms and countries retention ratios have hardly changed, partly because depreciation has become a larger share of gross profits.[14]

Deregulation of financial markets—another aspect of financialisation—also seems unlikely to have had a big effect on the profit share. By improving access to lenders, deregulation reduced the proportion of shareholder-controlled firms that are financially constrained and so increased movement from the FC to the SM category, but since the movers were firms with less monopoly power than the average incumbent SM firm, their addition to the SM category tended to lower its average profit margin. Within the FC category, easier access to debt would have made less difference to growth-maximisers, whose borrowing is more tightly constrained by its risks for managers. Better access to equity capital must have expanded the SM category, but failures of venture-capital-financed businesses may have reduced its average profit margin.

The profit share was probably raised by increases in monopoly or monopsony power as a result of changes in technology or competition policy or reduced labour bargaining power. By raising the ratios of shareholder-preferred profit margins to growth rates, greater market power moved some shareholder-controlled firms that would otherwise have been financially constrained into the higher-profit-margin SM category. The increased profit-margin-to-growth-rate ratios would also have increased the average profit margin of incumbent SM firms (π_{SM}), since market power has little effect on shareholder choice of growth rates. The profit margins of firms that remain financially constrained (π_{FC}), too, could have been raised by greater market power, because it improves their opportunity frontiers and thus increases their growth rates.[15]

Although π_{FC} could in principle have been raised also by more investment due to a rise in k or g, the aggregate share of investment in output has not increased (Rabinovich, 2021). But what has risen greatly is spending by firms on knowledge-based intangible assets such as software, attributed designs, procurement networks, and marketing systems, which strongly shape their opportunity frontiers (e.g. Corrado *et al.*, 2022).[16] Most such spending is classified as operating costs (so omitted from the investment coefficient, k, of Wood, 1975), and is hard to finance by borrowing because it generates no usable collateral. Knowledge-based assets, however, are at risk of sudden obsolescence from new knowledge or competition, requiring high replacement spending in a short time, which must somehow be financed (Falato *et al.*, 2022; Li, 2025).

To provide for such contingencies, firms hold much larger stocks of liquid financial assets than formerly (Behringer, 2020; Chen et al., 2017), and particularly so for intangible–intensive firms (Li, 2025, section I). To accumulate these stocks, their minimum financial asset ratios, f, also need to be much higher, which has shifted finance frontiers upwards, with firms in aggregate becoming net lenders rather than net borrowers. This upward shift has probably contributed to the rise in the economy-wide

[14] Figure 5 of Behringer (2020) shows dividend shares for G7 countries, and his figure 6 implies little change in the average ratio of corporate saving to corporate profit in about 40 countries (as also do the global aggregates in figure 2 of Chen *et al.*, 2017). Table 1 of Dallery *et al.* (2023) shows a rise from 49% in 1971 to 64% in 2022 of the share of capital consumption in the gross profits of French non-financial companies.

[15] As shown by equations (A.9) and (A.10) in the Appendix.

[16] Gutierrez and Philippon (2017) argue that only part of the observed fall in physical investment in the USA has been offset by greater spending on intangible assets.

profit share by raising π_{FC}. It must also have reduced q_{SM}, but the firms that moved into the FC category had been marginal members of the SM category, so their exit raised the average profit margin of the SM category (π_{SM}), too.

Empirical application of the theory in Figure 5 requires some way of distinguishing statistically among the different categories of firms—financially constrained or unconstrained, controlled by managers or by shareholders. SM firms might be identified as those which buy back their own shares (indicating that they are both shareholder-controlled and financially unconstrained). Within the FC category, firms that are shareholder-controlled might be distinguished from those that are growth-maximisers by their higher levels of debt, with the risks of which shareholders are more comfortable than managers.

Dividing lines between firm categories would enable the rise in the share of profits in company sector output to be decomposed into its three major elements in Figure 5 (changes in $q_{SM}, \pi_{FC}, \pi_{SM}$). Possible explanations of the change in each element could then be tested empirically. For example, the effects of changes in the average finance frontier could be exposed by comparing financially constrained firms now with financially constrained firms in the 1970s. The effects of shareholder control could be tested by comparing SM firms, growth-maximising FC firms and shareholder-controlled FC firms. The opposite effects in theory of slower aggregate growth on the profit margins of FC and SM firms could also be put to a statistical test.

3.4 Policy implications

Updating the theory in Wood (1975) also alters the proposals for improving the distribution of income discussed in its last chapter. Several of them rested on the book's theoretical conclusion about the incidence of taxes on profits, which was that corporation taxes tend to be completely shifted, whereas personal taxes on interest, dividends and capital gains tend to fall squarely on their recipients (*ibid.*, pp. 134–40).

The logic of this conclusion for firms in aggregate was simple. It assumed that their investment was determined by an exogenous aggregate growth rate and that there was a given and binding constraint on external finance, requiring a certain level of aggregate retained profit, $(1 + f - x)I$, which could not be affected by corporation tax (unless it altered f or x). If in addition dividends could not be less than some given share of after-tax profits, corporation tax could not affect the aggregate amount of after-tax profits, either (unless it altered the retention ratio).[17]

This logic remains relevant in principle to financially constrained firms—growth-maximisers or shareholder-controlled and in competitive markets—but in the growth-maximisers its policy relevance has been reduced by the lower retention ratios on which more powerful shareholders insist, moving more of profits into more easily taxable personal income. Assuming exogenous aggregate investment for financially constrained firms is now also questionable, since they are only part of the company sector.

Even in principle, moreover, this logic does not apply to shareholder-controlled and financially unconstrained firms. Profit above the minimum needed to finance investment is rent, and taxes on rents should not be shiftable. Income inequality could thus

[17] Kalecki (1937) had reached a similar conclusion about short-run tax incidence through a different mechanism, later extended by other economists (e.g. Mott and Slattery, 1994).

now be reduced by corporation taxes, as well as by taxes on interest, dividends and capital gains, even if shifting continued in financially constrained firms.

The logic of Wood (1975) is also inconsistent with recent empirical evidence. Although in the past there may have been complete shifting (Beath, 1979; Krzyzaniak and Musgrave, 1963), reductions over time in corporation taxes have been associated not with the falling profit shares that would be predicted if they had been shifted, but with rising profit shares (Chen *et al.*, 2017; Dao and Maggi, 2018). International mobility of capital has tended to increase tax shifting, but at most half of corporate taxes are now estimated to fall on workers (Risch, 2024).[18]

Wood (1975) used the same logic to argue that improving income distribution by taxing profits should not be deterred by concerns about reducing aggregate investment. Even in shareholder-controlled financially unconstrained firms, investment should not be deterred by taxing the rent element of profits. These economy-wide predictions are consistent with evidence that variation in tax rates among firms within countries causes investment to vary inversely (Hanappi *et al.*, 2023; Link *et al.*, 2024). They are harder to reconcile with evidence of investment in particular countries responding to changes in corporate tax rates over time (Chodorow-Reich *et al.*, 2024), though consistent with the cross-country panel data regression results of Goda (2024).

Modification is also required of Wood's (1975, pp. 162–3) view that competition policy could not reduce the share of profits, even though it could be useful for reducing other adverse effects of monopolistic behaviour by growth-maximising firms. With more shareholder power, and thus part of aggregate profits being rent, competition policy could potentially also improve aggregate income distribution.

It is uncertain, however, how much of the rise in rent is due to an increase in monopoly power (opportunity frontiers becoming steeper), and how much to more shareholder control causing more effort to extract rent (upward movement along opportunity frontiers). Increased market concentration, for instance, might be a result of firms seeking higher profits by focusing more on domination of existing markets than on expansion into new markets.

4. Conclusion

Wood (1975) combined macro and micro elements of contemporary Cambridge economics into a theory of the share of profits in national income. The book argued that the share of profits matters for distributive fairness, that the motivation of those who control firms matters for distributional outcomes, and that it matters how the investment of firms is financed.

Over the next few decades, these three elements of the book—profits, motives and financing—evolved and interacted in ways that not only made them all even more important but also required updates to the book's theory. The updated version of the theory continues to offer a starting point for understanding how the share of profits is determined and how policies related to profits might make income distribution more equitable.

[18] This result is derived from data on variation of tax rates among firms within countries. Variation among countries is more relevant, but poses greater estimation problems, including tax evasion by multinational companies.

Retrospective acknowledgements

Over the decade before Wood (1975) was published, I had the great good fortune to have been educated and employed as an economist in Cambridge. The book was inspired by my teachers and colleagues—and particularly by two in King's College, Nicholas Kaldor and Robin Marris, whose work provided key ingredients.

Many other economists—mostly in Cambridge and thanked by name in its preface—provided help with the book. Space constraints, however, limit what follows to three small but significant sets of people. Kaldor and Marris evidently require special attention. Of particular interest, too, are the inputs and reactions of the original Keynesians, Richard Kahn and Joan Robinson, and the connections between Wood (1975) and the similar work of Alfred Eichner (1973, 1976) and of Geoff Harcourt and Peter Kenyon (1976).

The book was my third written output on profits. The first two were the dissertation that earned me a Fellowship at King's (Wood, 1968) and three chapters of my subsequent Cambridge PhD thesis on income distribution (Wood, 1972). Common threads ran through all three outputs, but there were also big changes along the way. The dissertation and thesis, whose tables of contents are in online Supplementary Appendix B, are crucial sources of evidence for the analysis below, supplemented by a mass of unpublished contemporary notes and correspondence. (A more personal account of how this book fitted into my career as a whole is in Hein and Lavoie, 2024.)

R.1 Kaldor and Marris

Wood (1968) was a test, using 1870–1965 UK data, of Kaldor's (1955–56) theory that the share of profits is determined by the need to equate saving with a given share of investment at full capacity output. This work was inspired by a (now-lost) small test in an undergraduate essay suggested by Luigi Pasinetti. To fit the theory to the data, 'investment' had to be broadened to include the trade surplus and the fiscal deficit, which left me doubtful about the usefulness of neo-Keynesian distribution theory in an open economy with a government.

The results were at odds with the theory, too, in the sense that there had been a large long-term fall in the profit share, but no corresponding fall in the investment share.[19] This discrepancy seemed due mainly to a rise in the saving propensity out of profits caused by a rise in the share of firms that were incorporated (with higher measured saving propensities). The trend towards incorporation, if exogenous, could thus reconcile the empirical results with Kaldor's (1955–56) theory. Moreover, Kaldor (1966) had already redefined the two income-receiving categories as corporations and households rather than capitalists and workers.

This redefinition created the opportunity to try in my PhD thesis to provide a better explanation of the share of profits by combining Kaldor's macro theory with Marris's micro theory of the firm.[20] Kaldor's (1966) algebra, with internal and exter-

[19] A later test of neo-Keynesian distribution theory by Seccareccia (1984) encountered a similar problem.

[20] I had been taught by Marris and knew his work well, partly through helping him organise a conference (Marris and Wood, 1971). I knew Kaldor's work, but as an undergraduate had seen little of him because he was mostly in London as a special adviser to the UK Treasury. He was one of the referees of my King's Fellowship dissertation (not a Fellowship Elector, as I said in Hein and Lavoie, 2024), the other having been Robin Matthews.

nal financing of company investment and a valuation ratio, was also similar—without attribution—to that of Marris (1964).

An obstacle to combining their theories, however, was deep disagreement between them about the economic meaning of similar equations. Marris had a Kaleckian view of the determination of the share of profits, and never accepted Kaldor's macro distribution theory, mainly because it lacked micro underpinnings (Marris, 1964, pp. 309–10, 1991, pp. 203–11). Kaldor's (1966) adoption of macro equations similar to Marris's micro equations might thus have been expected to reduce their disagreement, but it actually drove them further apart.

This divergence reflected their different views of the financial behaviour of firms. Without any discussion or explanation, Kaldor (1966) treated the retention ratio and external finance ratio as exogenous parameters. Marris, by contrast, had become convinced by Modigliani and Miller (1961, 1967) and by Kahn (1964–1972) that these financial ratios were not only endogenous but also irrelevant to a firm's choice of profit margin and growth rate. He thus believed, as he later wrote in Marris (1991, p. 206), that by assuming them to be exogenous in his neo-Pasinetti theorem Kaldor had 'destroyed himself'.

Wood (1972) was a compromise. Its chapter 6 on the financial behaviour of companies used the latest Marris analytical framework (as in Marris and Wood, 1971), with a formal model of share valuation as the basis for its discussion of new share issues and the determination of the retention ratio. Finance mattered, however, because of the risks of debt, because new issues lowered share prices, and because shareholders distinguished between dividends and retained earnings. In short, the thesis argued that Modigliani and Miller were only partly right.

On that basis, chapter 7 set out a micro model in which a firm's long-term profit margin, growth rate, external finance ratio and retention ratio were simultaneously determined by managerial pursuit of growth, subject to the constraint of a minimum valuation ratio.[21] It then developed a macro model of the share of profits by aggregating these elements, but with output determined by a Keynesian multiplier and held at full capacity by fiscal policy—with the budget balance filling any gap between firms' desired external finance and households' desired saving.

This closure assumption came from chapter 5 of the thesis (discussed in section R.2 below). Chapter 6 explained that gap-filling fiscal policy would not be necessary if, as in Kaldor (1966), the aggregate valuation ratio adjusted to equate household saving with firm demand for external finance but doubted that this mechanism was of general practical relevance.

There is no written record of Marris reading or commenting on my thesis, but it had benefited from a few exchanges with Kaldor, who also wrote a complimentary examiner's report.[22] The report included three suggestions for improving chapter 7, of which the most challenging was to analyse the interactions between firms in an

[21] My limited analysis of the alternative assumption of valuation ratio maximisation at one point remarkably says, 'which I am inclined to believe is in general a better approximation to the truth' (Wood, 1972, pp. 7–19).

[22] My files contain correspondence in 1971 about corporation tax (modern archive of King's College, Cambridge, reference NK/3/19/191–8), comments in 1972 on the determination of the valuation ratio and conversations about my completed thesis both shortly before and shortly after the 1973 viva. The examiner's report is in the modern archive of King's College, Cambridge, reference NK/3/30/212.

oligopolistic price-leadership framework.[23] That suggestion was not adopted in my book, whose macro theory required only that competition of some sort pushed firms on to their finance frontiers (Wood, 1975, p. 109).

The text of Wood (1975) was completed about two years after the thesis. The form of the book is similar to that of the thesis: a chapter on company financial behaviour precedes chapters on the micro profit margin and the macro profit share—the same sequence as in chapters 6 and 7 of the thesis. The core model of the macro chapter 5 of the thesis has disappeared (as explained in section R.2 below), but other elements of chapter 5 are woven into the macro chapter of the book. An introductory chapter and the concluding chapter on policy implications are added.

The style and substance of the book, however, are different from the thesis. Above all, it puts forward a simpler and clearer theory of the determination of the share of profits. At the micro level, a firm's profit margin is determined by the unqualified objective of growth maximisation subject to exogenous constraints on increasing sales and on the availability of finance. At the macro level, the share of profits is determined by an aggregate of the micro finance constraints combined with an essentially exogenous aggregate growth rate.

This more clear-cut style yielded a more readable book. But it also reflected a substantive shift in my thinking about the economics of company finance—from, to put it simply, believing that Modigliani and Miller were only partly right to believing that they were almost entirely wrong. The external finance ratio and retention ratio are therefore treated as largely exogenous, rather than as endogenously and simultaneously determined alongside profit and growth rates.[24]

A stimulus to this shift in my thinking was my first—and unhappy—experience as an ordinary shareholder. I had recently inherited a portfolio of shares, which between mid-1972 and mid-1974 lost about two-thirds of their value in a stock market collapse, during which I had to sell a lot of them to pay for home improvements. The pain prompted reflection on the thesis and a more thorough review of the empirical literature on company finance.

As a result, the chapter on company finance in the book differs greatly from its counterpart in the thesis. Although some sections have similar titles, the one in the thesis entitled 'A simple model of share valuation' has vanished—as have all 20 equations—and been replaced by 'The interests of ordinary shareholders'. The book chapter also contains twice as many words as the thesis chapter, and twice as many references.

This revised thinking on finance simplified the micro model, enabling it to be explained in the diagram (Wood, 1975, figure 4) that is the book's best-known feature. The diagram is similar, though the book fails to say so, to diagram 6.5 of Marris (1964). In that vintage of his thinking, the downward slope of a 'demand curve' relating a firm's profit rate to its growth rate intersects a 'supply curve' that relates an upper limit on the availability of finance to the profit rate. The supply curve has an upward slope, which depends inversely on the maximum acceptable debt–equity ratio and directly on the degree of shareholder dislike of new share issues.[25]

[23] The other suggestions, used in Wood (1975), were to provide a better explanation of the investment coefficient and to discuss more fully the consequences of firms working at less or more than full capacity as a result of mis-predicting sales growth.

[24] This endogeneity and simultaneity are relegated to one paragraph and one footnote (Wood, 1975, pp. 90–1).

[25] Pages 220–23 of Marris (1964) make clear that he then disagreed with the Modigliani and Miller argument that shareholders are indifferent to the level of the retention ratio.

A corollary of the book's micro model being further than in the thesis from the contemporary vintage of Marris's thinking was its macro model being closer to that of Kaldor (1966), in the sense of treating the aggregate retention ratio and external finance ratio as largely exogenous. The book went beyond Kaldor (1966) in providing much more justification for that treatment, including a micro explanation of why aggregate investment would be at the upper limit defined by these financial ratios. Like the thesis, though, the book rejected Kaldor's macro valuation ratio adjustment mechanism (in just a single footnote: Wood, 1975, p. 118).

Marris read the book and unsurprisingly disagreed with it (although our friendship continued). Two initial letters, based on a partial reading, were mild: 'your book … increasingly impresses me despite my disagreements'. In Marris (1977), though, after comparing my book favourably to Eichner (1976), he strongly attacks the assumption in both books of exogeneous dividend policy. Later on, in Marris (1991, p. 210), he describes my book simply as 'misguided'.

Kaldor read the book, too, as shown by the correspondence in Supplementary Appendix A, in which he downplays our disagreement about his neo-Pasinetti theorem's endogenous saving mechanism, and he cites it approvingly in Kaldor (1985). Pasinetti (1983, p. 100) likewise cites the book in a positive but non-specific way. Wynne Godley (1993, pp. 68–71), who read a draft of the macro model in my thesis and later influenced the book's treatment of sectoral financial imbalances, praises and explains its theory of the pricing mark-up.[26]

R.2 Kahn and Robinson

Richard Kahn and Joan Robinson had not only a major background influence on Wood (1975), but also one important specific influence. Neither of them was involved in the writing of my PhD thesis, except for two seminar comments from Robinson.[27] Kahn, however, seems to have asked for a copy of the thesis, and nine months after its completion he sent me the first letter in a correspondence that over the next six weeks also engaged Robinson and covered about 90 hand written pages (Kahn-Robinson, 1973).

Almost all the correspondence was about section 5.3 of the thesis, which set out a hybrid model of the determination of the share of profits that combined a finance function explanation with a 'Kaldorian' explanation based on the need to equalise saving with investment. The external finance ratio was treated as an upper limit that would bind only when total output was below full capacity—with the share of profits then being determined by the macro finance function. At full capacity, external finance would be below this limit—with the share of profits being determined in the Kaldorian way.

Kaldor had really liked this model, describing it in his examiner's report as 'a major original contribution to Keynesian macroeconomic theory'.[28] His fellow-examiner

[26] Involvement with Godley in a public controversy in late 1974 about taxing stock appreciation (Shipman, 2019) also resulted in several last-minute revisions to the typescript that I had already submitted to the publisher (Wood, 1975, index entry on 'stocks, measurement of investment in').

[27] In February 1972, she asked if my conclusion about new issues of shares depended on my assumptions about uncertainty. In November 1972, she said I still needed Kalecki's short-period degree of monopoly as a bridge between individual-firm price policy and the overall share of profits.

[28] In May 1974, he brought my model into a contentious correspondence with Kahn and Michael Posner about the Cambridge New School's position on the relationship between the fiscal balance and the trade balance (modern archive of King's College, Cambridge, references JVR/7/228/3 and JVR/7/228/3A).

Tony Atkinson felt it needed further development. Kahn took it apart, in great detail and with relentless attention to its economic meaning with different assumptions about its parameters. He noted in particular the difficulty of fitting the two explanations together in transitions between under-capacity and full-capacity output. (The hybrid model, the examiners' reports on it, and an abridged version of the correspondence with Kahn and Robinson are available online in Wood, 2025.)

The combined intellectual firepower and energy of Kahn and Robinson in this correspondence were astonishing—as was their generosity to me. Kahn's comments also arrived at an ideal time, since I was in the process of turning the profits chapters of the thesis into a book and had not yet got to the macro analysis.[29] What I concluded from them was that the two explanations of the share of profits in the hybrid model could not be combined in an economically sensible way, and that it would therefore be a mistake to include the hybrid model in the book, which should focus on only one of the explanations, namely the finance function theory.

That conclusion of mine, however, prolonged the correspondence, because neither Kahn nor Robinson agreed with me that the two theories were basically different. Both of them saw the finance function theory as just a variant of the Cambridge theory of distribution formalised by Kaldor. Our unsuccessful attempts to resolve this difference of views were ended, two weeks and many letters later, by departures for summer holidays.

The book's macro chapter separates the two explanations of the share of profits in section 5.3 of the thesis, with the 'Kaldorian' explanation becoming a distinct 'neo-Keynesian' theory. In the book's theory, as in the finance function explanation in the thesis, the external finance ratio is pushed to its upper limit by growth maximisation. Unlike that case in section 5.3, however, the book assumes output to be at the full capacity of the capital stock—replacing the one-period multiplier in the thesis with a multiplier–accelerator growth process.

After the book came out, I got a nice letter from Robinson. She liked its micro model but still disagreed that its macro theory differed from the neo-Keynesian theory. The result was another 50 pages of correspondence (Robinson, 1975, available as online Supplementary Appendix C). Each of us tried many ways of convincing the other, but without success and with growing frustration.[30] More positively, we both said we had learned from the exchange, and I concluded by emphasising that my book was a development and extension of Cambridge distribution theory.

In retrospect, I fear that the unsatisfactory 1975 correspondence with Robinson was caused by poor exposition in the macro chapter of my book, with which I was never happy. The chapter suffers from the absence of diagrams and an awkward mix of text and equations. It also over-differentiates my contribution from earlier Cambridge work, marginalising in particular Kaldor (1955–56, 1966). If section 4.2 of that chapter had been written as in sections 2.2 and 2.3 of this paper, Robinson might well have found it acceptable.[31]

[29] My preliminary list of inputs for the macro chapter of the book consists of relevant sections of the thesis, various batches of notes (mainly left over from writing the thesis) and 'The Kahn Dossier' (i.e. Kahn-Robinson, 1973).

[30] One afternoon during the correspondence, when I was walking from the Economics Faculty to King's College to give supervisions, I met Robinson coming in the opposite direction and we talked briefly about the book. My students, who were behind me and saw the meeting, told me how unhappy she looked after it.

[31] I am indebted to Franck van de Velde for saving me from repeating the errors of the book in this paper.

R.3 Eichner and Harcourt

The idea that the profit margin of a firm is set to generate enough internal finance for investment in capacity expansion, as often assumed in post-Keynesian economics (Lavoie, 2022, section 3.4), surfaced at the same time in different places (Eichner, 1973, 1976; Harcourt and Kenyon, 1976; Wood, 1975). The aim of this section is to shed more light on that coincidence (drawing on files I had not reviewed when discussing it in Hein and Lavoie, 2024). There can alas now be no correction by the three other authors to the obvious risk of bias in my assessment. I have tried to be objective, but readers should be cautious and draw their own conclusions.

I met Eichner when he visited Cambridge in mid-1972 and subsequently corresponded with him and other people about his work. Almost all this correspondence is in Lee (2000). In brief, it documents that I gave Eichner advice on how to get his 1976 book accepted by the Cambridge University Press and some help with getting his 1973 article into the *Economic Journal*, one of whose editors was my PhD thesis supervisor, David Champernowne.

How might Eichner and I have influenced each other's work? During his Cambridge visit, he showed me the paper that became Eichner (1973), and I showed him my almost completed thesis. In October 1972, shortly after I had submitted the thesis, I received the typescript of his book, and sent him suggestions, mainly on how to shorten it. At the very end of 1972, I read his paper much more closely for the *Economic Journal*.

After re-reading this material, including Eichner (1973, 1976), I can see no sign that my work influenced his. When he saw my draft thesis, he had complete versions of his 1973 article and 1976 book, none of my suggestions on which referred to their substance. He thanks me in his book for these suggestions but cites only the unrelated Wood (1971).

There must be more of a presumption (because of the sequence of events) that Eichner's work influenced mine. This appears not to have been the case for my thesis, even though I had read his paper before finishing it. In June 1972, he wrote about the draft thesis: 'There is something very reassuring about encountering someone who, starting from a quite different tack, reaches the same conclusions that you have.'[32] I can find no written comments from him on the draft chapters, and nor can I see any effect of his paper on the final thesis.

In retrospect, I think Eichner may have influenced my book, although I can see no specific signs of influence, especially on the big change in my views on company finance. However, just as Eichner was reassured by seeing my work, so perhaps was I by seeing his, and thus emboldened to tell a simpler and clearer story in the book than in the thesis. Knowing that his article was published, and that his book probably soon would be, may also have influenced my decision to split the thesis into two books, and to publish the book on profits first.[33]

[32] In an initial letter omitted from Lee's (2000) compilation.

[33] In April 1973, I had signed a contract with the Cambridge University Press to publish a revision of my whole thesis, entitled *An Analysis of Income Distribution*. In April 1974, having revised only the chapters on profits, I proposed that the Press should publish them separately, in order to avoid both further delay and the problem of little connection between the two parts of the originally agreed book. I made this proposal in a letter dated 18 April, unaware that on 17 April Eichner had written to me to say that the (US affiliate of the) Cambridge University Press had finally accepted his book for publication. The Press accepted my proposal in a letter of 2 May.

A sense of rivalry, despite my help in getting his work published, may partly explain, too, why my book refers to Eichner only in one footnote that cites his article alongside works by others with 'similar ideas' (Wood, 1975, p. 10).[34] Robinson (1975, October letter) rebuked me for this minimal reference.[35] Unlike Eichner (1976, pp. ix–x), however, I did not regard the idea that our work shared—profit margins being determined by the need to finance investment—as being novel (tracing it back to Marx in Wood, 1975, pp. 9–13).

Our books also had different aims. My purpose was to explain 'the share of profits in national income' (Wood, 1975, p. 1). His was to explain 'how prices are determined in the oligopolistic sector … and … affect the growth and stability of the economy' (Eichner, 1976, p. 1). I offered no detailed account of price setting, and he avoided even the word 'profit', regarding dividends and retained earnings as fundamentally different (*ibid*., p. 60).

I read the paper by Geoff Harcourt and Peter Kenyon that became their 1976 article soon after mailing a complimentary copy of my book to Harcourt in Adelaide. Its preface thanks him for comments during his 1972–73 sabbatical in Cambridge on my PhD thesis, which are in online Supplementary Appendix D. He seems to have read the thesis closely, including its footnotes, although half of his comments on the footnotes were reactions to what he saw as its—unintended—slighting of Harcourt (1972).

Before the book got to Adelaide, I received a joint letter from him and Kenyon. They had seen a review of my book and were concerned that their paper, of which they sent me a copy, might have used some of my ideas without attribution. I replied in a letter with comments on their paper. But before my letter arrived, Harcourt had received the book and written again to say that he had concluded that the ideas in their article stemmed mainly from his own earlier work. Transcripts of these letters are also in online Supplementary Appendix D.

R.4 Envoi

How long ago this all was, how recent it feels when the archive documents are in front of me, how lucky I was to have known all these remarkable people, and how grateful I still am for all that I learned from them and the help that they gave me.

Supplementary appendices

Supplementary appendices A-D are available at *Cambridge Journal of Economics* online.

Conflict of interest statement. No conflicts of interest.

Appendix: Formalising the updated theory of the macro profit share

The updated macro theory of the share of profits in section 3.2 above, summarised in Figure 5, involves the profit margins of two main categories of firms. One is financially

[34] Earlier evidence of a sense of rivalry is that I never sent Eichner a copy of the final version of my thesis, despite proposing initially to do so, and indeed failed to send any replies to his last three letters to me in 1973 and 1974, which included offers to help with my thesis and to include it in a post-Keynesian bibliography (Lee, 2000).

[35] I learned only later of all her correspondence with Eichner (Lee, 2000, chs 3–5). She refers jointly to our two books in Robinson (1977, p. 11).

constrained (FC) firms, of which some are growth-maximisers and others shareholder-controlled (although this category could in principle consist entirely of either sort of firm). Their profit margin depends on a subscripted version of the macro finance frontier equation in Figures 2 and 3:

$$\pi_{FC} = \frac{1 + f_{FC} - x_{FC}}{r_{FC}} k_{FC} g_{FC}. \tag{A.1}$$

The other main category is shareholder-controlled and financially unconstrained (SM) firms, whose profit margin is determined as in equation (7) by the objective of maximising the present value of future profits (equation (5)) in the face of an opportunity frontier of the quadratic form assumed for convenience in equation (6).[36] Adding subscripts, equation (7) becomes:

$$\pi_{SM} = \left(\frac{i_{SM} - \alpha_{SM}}{\beta_{SM}} \right)^{0.5}. \tag{A.2}$$

The profit share of the economy as a whole, assumed here to consist only of firms, is an average of these two profit margins,

$$\pi = (1 - q_{SM})\, \pi_{FC} + q_{SM} \pi_{SM}, \tag{A.3}$$

weighted by the shares of total output produced by the two categories of firms, with q_{SM} being the SM output share.

What puts some shareholder-controlled firms, subscripted SC, into the FC category is that their preferred profit margin, π^*, is below the financially required minimum profit margin for their preferred growth rate,

$$\pi^*_{SC} = \left(\frac{i_{SC} - \alpha_{SC}}{\beta_{SC}} \right)^{0.5} \leq \frac{1 + f_{SC} - x_{SC}}{r_{SC}} k_{SC} \left(2\alpha_{SC} - i_{SC}\right), \tag{A.4}$$

where the preferred growth rate at the end of the finance frontier term is a subscripted version of equation (8). By contrast, the preferred profit margin of the shareholder-controlled firms that are in the SM category is above this financial minimum,

$$\pi^*_{SM} = \left(\frac{i_{SM} - \alpha_{SM}}{\beta_{SM}} \right)^{0.5} > \frac{1 + f_{SM} - x_{SM}}{r_{SM}} k_{SM} \left(2\alpha_{SM} - i_{SM}\right), \tag{A.5}$$

as a result of differences in the parameters of their opportunity frontiers or finance frontiers, or in their discount rates. SC firms are financially constrained because they have less monopoly power relative to their growth potential than SM firms, or more restricted access to finance, or more patient shareholders.

The profit margin of growth-maximising firms in the FC category, subscripted GC, is governed by their finance frontier,

$$\pi_{GC} = \frac{1 + f_{GC} - x_{GC}}{r_{GC}} k_{GC} g_{GC}, \tag{A.6}$$

with their growth rate, which is maximised subject to the constraints of their finance frontiers and their opportunity frontiers (which are assumed to have the same quadratic

[36] Equation (7) is derived by replacing g in equation (5) with the right-hand side of equation (6), differentiating the resulting expression with respect to π, and setting the result equal to zero.

form as those of shareholder-controlled firms), being[37]:

$$g_{GC} = \frac{\left(1 + 4\alpha_{GC}\beta_{GC}F_{GC}^2\right)^{0.5} - 1}{2\beta_{GC}F_{GC}^2}, \tag{A.7}$$

where F_{GC} is the minimum financially required profit margin-to-growth rate ratio,

$$F_{GC} = \frac{\pi_{GC}}{g_{GC}} = \frac{1 + f_{GC} - x_{GC}}{r_{GC}} k_{GC}. \tag{A.8}$$

The growth rate of a GC firm unsurprisingly increases with both its growth potential (α_{GC}) and its monopoly power (lower β_{GC}).[38] So does its profit margin:

$$\pi_{GC} = F_{GC}g_{GC} = \frac{\left(1 + 4\alpha_{GC}\beta_{GC}F_{GC}^2\right)^{0.5} - 1}{2\beta_{GC}F_{GC}}. \tag{A.9}$$

Again unsurprisingly, tighter financial constraints (higher F_{GC}) have opposite effects on a GC firm's profit margin and growth rate, raising π_{GC} but lowering g_{GC}.[39]

An SC firm's profit margin is determined in the same way as that of a GC firm, namely by the intersection of its finance frontier and opportunity frontier, and thus by a similar equation,

$$\pi_{SC} = \frac{\left(1 + 4\alpha_{SC}\beta_{SC}F_{SC}^2\right)^{0.5} - 1}{2\beta_{SC}F_{SC}}, \tag{A.10}$$

but could differ because of different values of α, β and the parameters underlying F.

The relative output levels of the FC and SM categories, as well as their relative profit margins, depend on (among other things) the parameters of finance frontiers and opportunity frontiers. In particular, the SM output share, q_{SM}, increases with the proportion of shareholder-controlled firms that are in the SM rather than the FC category. This proportion rises with higher discount rates and with the share of firms with high monopoly power relative to growth potential, both of which raise the shareholder-preferred ratio of profit margin to growth rate (equation (9)). It also increases with looser financial constraints (lower F, because of lower f and/or higher x or r and/or lower k), which reduce the proportion of shareholder-controlled firms whose preferred profit margin to growth rate ratio is too low to be financed.

Simplification of the model

The growth potential of most individual firms depends on the growth rate of the economy as a whole. The analysis can thus be simplified by assuming the growth potential parameters of all three categories of firms (GC, SC and SM) to be equal because they all have a similar link to this aggregate growth rate. The difference between the opportunity frontiers of SC firms and SM firms is then limited to their β's (monopoly power). The average growth-maximising firm's β_{GC} can also be assumed equal to the average

[37] With k assumed exogenous, equation (A.7) can be derived by solving by substitution the simultaneous equations (A.6) and (an appropriately subscripted version of) equation (6).

[38] The effect of a higher α_{GC} in equation (A.7) is obvious. The square root in the numerator of equation (A.7) causes its numerator to be reduced proportionally less than its denominator by a lower value of β_{GC}.

[39] Because F_{GC} is squared in the denominator of equation (A.7) but not of equation (A.9).

β of all shareholder-controlled firms, so that GC firms have less monopoly power than SM firms but more than SC firms.

The growth rates of all three categories of firm must be less than their α's (which define their growth at a zero profit margin). The lowest growth rate would be of SM firms: GC firms would grow faster because their aim is to maximise growth, and because the greater monopoly power of SM than of GC firms would not affect their preferred growth rate (since β does not appear in equation (8)). The highest growth rate would be of SC firms, which is above that of GC firms because the diversified shareholders of SC firms are less scared of debt than the managers of GC firms, making $F_{SC} < F_{GC}$. In other words, SC firms borrow more than GC firms, and more than their shareholders would ideally like, in order to get closer to their preferred higher growth rates (which are again unaffected by their relatively low monopoly power).

Comparing the profit margins of these three categories of firms is less straightforward because there is more scope for variation among the relevant equations (A.2, A.9, A.10). To rank them it can be assumed that SM and GC firms have similar financial frontiers ($F_{SM} = F_{GC}$), with $F_{SM} > F_{SC}$ reflecting the lower level of debt preferred by financially unconstrained shareholders. If so, given the simplifying assumptions of common α and $\beta_{SM} < \beta_{GC}$, SM firms would have higher profit margins than GC firms. This is because with the same values of α, β and F a shareholder-controlled and financially unconstrained firm would set a higher profit margin than a growth-maximiser (Figure 4) and even more so if the shareholder-controlled firm had more monopoly power (lower β in equation (A.2)). With a common α in equations (A.9) and (A.10), both $\beta_{SC} > \beta_{GC}$ and $F_{SC} < F_{GC}$ would tend to make the profit margin of SC firms lower than of GC firms. The average profit margin of SM firms would therefore be higher than the average profit margin of all financially constrained firms ($\pi_{SM} > \pi_{FC}$), as intuition suggests.

Changes over time in the profit share

As a starting point for analysis, changes in an economy's profit share can be decomposed into changes in the three variables on the right-hand side of equation (A.3). So the widely observed recent rise in π could reflect rises in (one or more of) the average profit margin of financially constrained firms (π_{FC}), the average profit margin of shareholder-controlled and financially unconstrained firms (π_{SM}), or the output share of SM firms, q_{SM} (if $\pi_{SM} > \pi_{FC}$).

Equations (A.1) and (A.2) identify potential proximate causes of change in these profit margins. Increases in π_{FC} could in principle have been caused by tighter financial constraints—higher f_{FC} or lower x_{FC} or r_{FC}—by a rise in the investment coefficient, k_{FC}, or by faster growth caused by increases in the α's of FC firms, due perhaps to faster economy-wide growth. Increases in π_{SM} could in principle have been caused by a rise in the discount rate due to more short-term shareholding, or by an increase in monopoly power (lower β_{SM}), or—in contrast to FC firms—by a decrease in α_{SM} as the result of a fall in economy-wide growth.

A rise in q_{SM} is unlikely to have been caused by faster output growth in SM firms than in FC firms, since on the simplifying assumptions above SM firms would grow slower than FC firms. It would be more likely to reflect a rise in the relative number of shareholder-controlled firms as a result of financialisation, either through differences

in birth or death rates between FC and SM firms or through switches of formerly GC firms to shareholder control.

Firms could have moved from the FC category to the SM category not only because of switches to shareholder control but also because of changes in shareholder discount rates or opportunity frontiers or finance frontiers that caused some formerly SC firms to become SM firms or vice versa. Since migrating SC or SM firms would usually be marginal members of their categories, their movement would affect the relative average profit margins of the FC and SM categories as well as the relative output levels of these two categories.

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