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MONOPOLY, INEQUALITY, AND THE ECONOMY: NEO-KALECKIAN MACRO MODELS FOR UNDERGRADUATE TEACHING

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ABSTRACT

This article presents neo-Kaleckian macroeconomic models that are intended for undergraduate instruction at the introductory and intermediate levels. The neo-Kaleckian approach incorporates markup pricing, monopoly power, and income distribution into a demand-driven macro model for short-run analysis. The model is used to demonstrate the potentially stagnating effects of increased monopoly power and the more expansionary impact of tax cuts on wages compared with profits. This article also shows how a neo-Kaleckian model can be used to analyze the cases in which aggregate demand and the level of output are either 'wage-led' or 'profit-led.' For pedagogical reasons, the models are presented in a way that is parallel to how mainstream Keynesian theory is typically covered in undergraduate macro textbooks.

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Keywords

Aggregate demand; autonomous spending; multiplier; profit share; wage-led demand; profit-led demand; monopoly capitalism; markup pricing; tax cuts; Michał Kalecki; Josef Steindl; economic stagnation

JEL Codes

E11, E12, A22, B22, P10

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1. Introduction

A number of striking economic trends have been observed in the United States and other major industrialized nations since (roughly) the last two decades of the twentieth century. First, there has been a sharp rise in inequality across many dimensions, including a rising income share of the top 1 percent and a falling labor share of national income (Piketty 2014; Mishel and Bivens 2021). Second, studies have found a notable increase in monopoly power of firms and profit markup rates in the corporate sector (Eeckhout 2021). Third, much evidence now supports the commonsense view that tax cuts (or rebates) targeted on working-class and middle-class households have significant stimulus effects, whereas tax cuts for the wealthy merely worsen inequality and provide no benefits for economic growth (Hope and Limberg 2022). Yet, undergraduate students who study from standard macroeconomics textbooks will find little if any theory that would help them to interpret and connect these trends, or understand their broader policy implications.

In fact, there is an approach to macroeconomic theory that enables us to make sense of how these trends are related and to analyze what they imply for macroeconomic performance and policymaking. This is the neo-Kaleckian approach, which analyzes the connections between the monopoly power of firms, income distribution between profits and wages, and macroeconomic outcomes such as the levels of income and investment. This approach is usually considered to be a branch of post-Keynesian economics (Arestis 1992; Eichner and Kregel 1975). Several graduate-level textbooks in post-Keynesian or heterodox macroeconomics cover neo-Kaleckian models in depth (Blecker and Setterfield 2019; Hein 2014, 2023; Lavoie 2022), but there are no currently available texts that present neo-Kaleckian models at a level appropriate for an undergraduate audience.

This article is intended to fill this void in the literature by presenting a simplified neo-Kaleckian macro model at level similar to how mainstream Keynesian macro theory is presented in conventional introductory and intermediate-level textbooks. In order to make the analysis as accessible as possible, and also because of limitations of space, this article will make a number of strong, simplifying assumptions, essentially omitting many complicating factors that can be important in the 'real world' – and which are covered in the advanced neo-Kaleckian literature (for example, in the texts cited above).

To be clear, this article does not attempt to give a comprehensive overview of Michał Kalecki's own life and work or later extensions of his approach. This article only attempts to highlight certain key aspects of a neo-Kaleckian approach that can shed light on current policy issues. The models presented here are purely static and designed for short-run analysis;[1] neither inflation nor long-run growth is considered here. The virtue of this simplified analytical framework is, in addition to accessibility and brevity, that it emphasizes the core logic of the neo-Kaleckian approach. The article is intended to be read in conjunction with either a conventional macro textbook (introductory or intermediate level) or a more general text on post-Keynesian or heterodox economics.

[1] The use of static methods precludes analysis of the dynamics of the business cycle, which was a chief concern of Kalecki (1971b).

The rest of this article is organized as follows. Section 2 provides a short literature survey. Section 3 presents a basic, introductory-level neo-Kaleckian macro model. Section 4 explains the neo-Kaleckian theory of income distribution, focusing on the connections between markup pricing, the profit share, and the real wage. Section 5 then covers an intermediate-level macro model that incorporates fiscal policy and endogenous investment. Section 6 discusses how increased monopoly power can lead to economic stagnation, as well as the possibility that aggregate demand and equilibrium output can be either 'wage-led' or 'profit-led.' Section 7 concludes. Instructors in an introductory course may want to focus mainly on sections 3 and 4, while instructors in intermediate courses should also cover the remainder of the article.

2. Literature Survey

In his essays from the early 1930s, Kalecki (1971b, pp. 1–25) anticipated key aspects of Keynes' *General Theory* (1936), including the centrality of aggregate demand and the multiplier concept. Kalecki, however, was self-taught in the Marxian tradition, and put more emphasis on income distribution than Keynes did (see Sawyer 1985). Like Marx (1867 [1976]), Kalecki (1954 [1968]) distinguished wages of labor from the profits received by 'capitalists' or owners of firms. Thus, Kalecki focused on the 'functional' or 'class' distribution of income between labor and capital, and he made income distribution in this sense central to his macroeconomic models. Unlike Marx, however, Kalecki did not use the labor theory of value. More similar to Keynes, Kalecki used variables that can be derived from standard national income accounts.

Kalecki focused more on the demand side of the economy, in contrast to Marx's emphasis on the 'sphere of production' (supply side). Foreshadowing Keynes, Kalecki's early work demonstrated the expansionary effects that private sector investment, government budget deficits, and foreign trade surpluses can have on realized profits. Kalecki also pioneered the view that the distribution of income between wages and profits (labor and capital income, broadly defined) was determined fundamentally by the (average) profit markups charged by oligopolistic firms, thus linking the micro and macro levels of economic analysis.

Expanding on Kalecki's work, Steindl (1952 [1976]) argued that increased monopoly power of oligopolistic firms would lead to a tendency toward higher profit markups, an increased profit share, and economic stagnation in 'mature' capitalist economies. Steindl also emphasized the degree of excess capacity in industry as a key constraint on firms' investment spending. The ideas of Kalecki and Steindl were later incorporated into the neo-Marxian theory of *Monopoly Capital* (Baran and Sweezy 1966).[2]

After Kalecki's death in 1970, a number of economists developed a variety of models intended to capture (and expand upon) core elements of his theories, while also including insights from Steindl (1952 [1976]) and Robinson (1962), among others. A few of the most notable early contributions included Harris (1974), Asimakopulos (1975), Rowthorn (1981),

[2] More recent updates to the monopoly capital approach are surveyed in Foster (2018) and Sawyer (2022).

Dutt (1984), Blecker (1989), and Bhaduri and Marglin (1990). These neo-Kaleckian[3] models and later elaborations and debates are covered in depth in several graduate-level texts (Blecker and Setterfield 2019; Hein 2014, 2023; Lavoie 2022), which also give extensive references to other original sources.

Turning to undergraduate texts, Mitchell et al. (2019) provide an in-depth account of Kalecki's own approach, but do not present the type of neo-Kaleckian models covered here. Two otherwise excellent undergraduate texts on post-Keynesian macroeconomics do not include chapters on neo-Kaleckian models (Bougrine et al. 2025; Rochon and Rossi 2021). Prante et al. (2023) cover the Kaleckian theory of markup pricing and income distribution in relation to the Phillips Curve and inflation, but present a more standard Keynesian model of income determination. One mainstream textbook (Blanchard 2007) includes a few Kaleckian elements (markup pricing, accelerator effect on investment), but otherwise sticks to a more conventional Keynesian approach to the demand side of the economy. This article is devoted precisely to remedying this omission in the literature, and could be used in conjunction with any of these undergraduate texts or as a prelude to the more advanced ones.

3. An Introductory Neo-Kaleckian Model

This section presents the most basic version of a neo-Kaleckian macro model. The model is intended to provide the simplest possible framework in which some of the most important implications of this modeling approach can be seen. In addition, this section will familiarize readers with key concepts and notational conventions used throughout the article. The presentation will also seek to emphasize points of commonality and difference from the simple Keynesian model found in most macro textbooks, which many students will already be familiar with.

3.1. Aggregate Demand and National Income

A key concept in any macro model is **aggregate demand** (*AD*), which equals total expenditures on newly produced goods and services in a nation's economy:

$$AD = C + I + G + (X - M) \tag{1}$$

where C is personal consumption expenditures, I is investment in real productive assets (newly produced machinery and equipment, intellectual property, and buildings, including housing), G is government purchases of goods and services, X is exports of goods and services, M is imports of goods and services, and $(X - M)$ is the trade balance for goods and services (often called 'net exports' or NX).

To keep the introductory model as simple as possible, we will focus on what may be called a 'private closed economy,' in which there is no government or international trade.

[3] Terminology for these models varies. Taylor (1983) called his work 'structuralist macroeconomics.' Hein (2014) refers to the literature after Bhaduri and Marglin (1990) as 'post-Kaleckian.' Lavoie (2022) treats this entire literature as a branch of post-Keynesian economics.

Therefore, we assume here that $G = X = M = 0$. In this case, equation (1) becomes

$$AD = C + I \tag{2}$$

According to national income accounting – the methodology used to calculate the **gross domestic product (GDP)** – the total output of (newly produced) goods and services must equal the aggregate demand for (spending on) those goods and services. Denoting the **total output** (GDP) of a country as Y, this implies the **equilibrium condition** that

$$Y = AD \tag{3}$$

Setting equations (2) and (3) equal to each other, we can see that equilibrium also requires that

$$Y = C + I \tag{4}$$

in a private, closed economy with no government or trade.

In addition, the value of output must be equal to the **national income** of the country, which is the total income received by productive agents (social classes). The two main components of national income, which we will focus on exclusively here, are the **wages** of labor and **profits** of capital. Labor income includes all wages, salaries, and benefits paid by employers to hourly workers salaried employees; we will call this 'wages' for short. Capital income includes all returns to asset ownership, broadly defined to include interest and dividends as well as net profits of corporations; we will call these 'profits' for short. Thus, we can write national income as

$$Y = W + R \tag{5}$$

where W is total wage or labor income and R is total profit or capital income. Note that we can refer to Y as either 'output' or 'income' and we will use these terms interchangeably below.

As stated earlier, the distribution of income between wages W and profits R can called the functional or class distribution of income. Assuming that profit recipients (owners of firms, stockholders and bondholders) are typically wealthier than wage recipients (workers), the share of national income going to profits can therefore be considered an indicator of **inequality**. We represent this share by the Greek letter pi (π), which is used here simply as a variable and does not have its usual meaning in geometry. Thus, we define the **profit share** as

$$\pi = \frac{R}{Y} = \frac{R}{W + R} \tag{6}$$

Assuming that wages and profits are both positive, this share has to be a positive fraction: $0 < \pi < 1$. And, since the remainder of national income goes to workers, the corresponding **wage share** is $1 - \pi = W/(W + R)$.

3.2. Kaleckian vs. Keynesian Consumption Functions

One of the key contributions of Keynes (1936) was his idea of a **consumption**

function, in which the level of consumer spending depends on the level of income in a country. The standard **Keynesian consumption function** can be written as follows:

$$C = A_C + cY \tag{7}$$

Here, A_C is **autonomous consumption**, meaning the part of consumer spending that is *not* related to (not a function of) current income. Such autonomous consumption can be financed by spending out of accumulated savings (mostly for the wealthy or retirees) or by borrowing (mostly for the middle class and working class). The coefficient c is what Keynes called the **marginal propensity to consume (MPC)** – the fraction of each additional dollar of household income spent on consumption goods and services. Importantly, we assume that $0 < c < 1$, in other words, households spend a fraction between 0 and 1 of each additional dollar of income on consumption. In the standard Keynesian consumption function, the MPC (c) is assumed to be the same for all households, regardless of their income level or the type of income they receive.

Kalecki (1954 [1968]) had a similar view of consumption, but unlike Keynes, Kalecki believed that there are *different* MPCs out of wages (W) and profits (R), which we will call c_w and c_r, respectively. Thus, the **Kaleckian consumption function** is

$$C = A_C + c_w W + c_r R \tag{8}$$

Because wage earners (workers) typically have much lower incomes than profit recipients (wealthy capitalists, including the shareholders and bondholders of large corporations), we assume that the former spend a higher share of each additional dollar of income on consumption, and therefore have a higher MPC: $c_w > c_r$. In addition, assuming that no one spends a negative proportion of any increase in their income, nor does anyone spend more than 100 percent of such an increase, we can further specify that $1 \geq c_w > c_r > 0$.

To simplify the model further, we will make the even stronger assumption that workers do not save anything, and instead spend 100 percent of their disposable wage income on consumption. This means that workers 'live paycheck to paycheck' (Kalecki's phrase was 'workers spend what they get') – that is, they earn barely enough to cover their current consumption needs. Mathematically, this implies that the MPC out of wages is one $(c_w = 1)$, in which case equation (8) becomes

$$C = A_C + W + c_r R \tag{9}$$

This is the neo-Kaleckian consumption function we will use in the introductory model.

3.3. Endogenous *vs.* Exogenous Variables

This is a convenient point at which to mention the distinction between two different types of variables in any economic model: **endogenous** variables (the ones *explained* by the model) and **exogenous** ones (determined by conditions *outside* the model, such as government policy or social norms). In any Keynesian or Kaleckian model, national income Y is endogenous – it is the main variable we are seeking to explain. Aggregate demand AD and

consumption C are also endogenous because they are functions of (depend on) Y. In other words, the endogenous variables are the 'unknowns' for which the model can be solved.

In the simplest version of the model, investment I and autonomous consumption A_C are both taken as fixed or exogenously given. We represent this by setting each one equal to a constant level, represented by the same letter with a bar over it:

$$I = \overline{I} \tag{10}$$

$$A_C = \overline{A}_C \tag{11}$$

This does not mean that these variables cannot change, but rather that they are determined by factors outside of the present model: I by business confidence (what Keynes called the **animal spirits** of entrepreneurs) and financial conditions (for example, corporate profits and interest rates); and A_C by factors such as accumulated wealth and household borrowing. These items together are called **autonomous spending**, because they are independent of the current level of national income Y. Similarly, we take the behavioral 'parameters' (mathematical coefficients) in the equations, like the MPCs (c_w and c_r) in equation (8), as exogenously given constants. We will also take the profit share π as exogenously given (although we don't put a bar over it) for the remainder of this section (the determinants of π will be explored in the following section).

3.4. Solving the Introductory Model

To solve for the equilibrium level of national income, we start by substituting the simplified Kaleckian consumption function (9) and the assumed exogenous values of investment and autonomous spending from equation (10) and (11) into the aggregate demand equation (2), which yields the **aggregate demand function**

$$AD = \overline{A}_C + W + c_r R + \overline{I} \tag{12}$$

Now, recall that, from our discussion of equation (6) above, each type of income (wages or profits) can be expressed as its share of income times total income: $W = (1-\pi)Y$ and $R = \pi Y$. Substituting these, we get

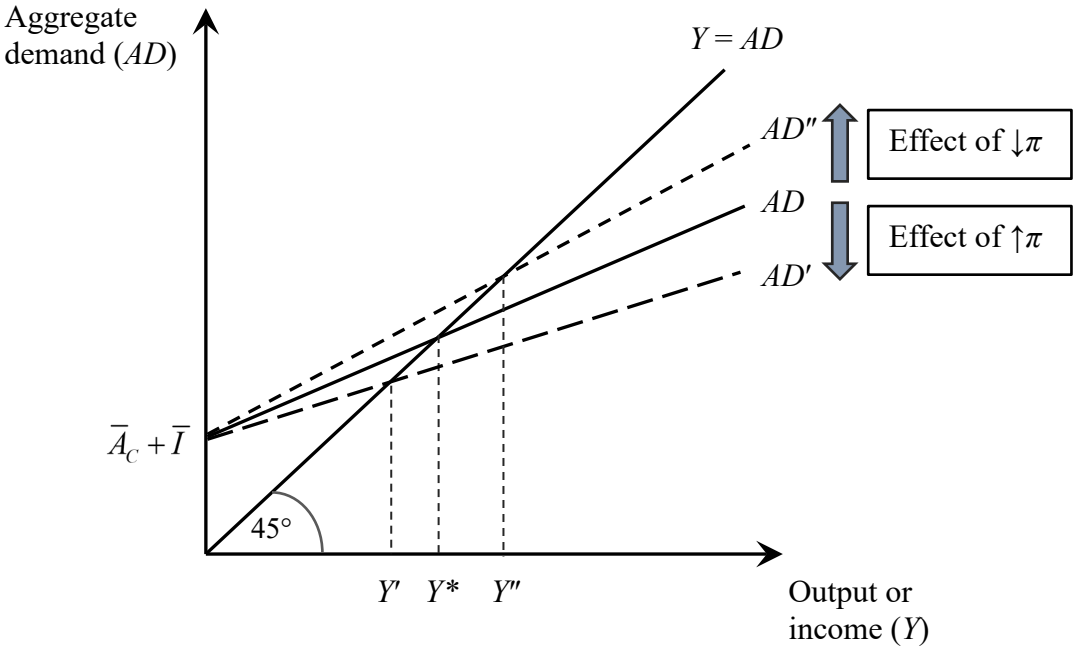
$$AD = \overline{A}_C + (1-\pi)Y + c_r \pi Y + \overline{I}$$

Grouping terms, this is equivalent to

$$\begin{aligned} AD &= \overline{A}_C + \overline{I} + [(1-\pi) + c_r \pi]Y \\ &= \underbrace{\overline{A}_C + \overline{I}}_{Intercept} + \underbrace{[1-(1-c_r)\pi]}_{Slope} Y \end{aligned} \tag{12′}$$

which is shown in Figure 1 as the solid AD line with intercept $\overline{A}_C + \overline{I}$ and slope $1-(1-c_r)\pi$. Note that, since c_r and π are both positive fractions (numbers between 0 and 1), the slope

must also be a positive fraction: $0 < 1-(1-c_r)\pi < 1$.[4]



Note: *AD* is the neo-Kaleckian aggregate demand curve. In the introductory model, the intercept is autonomous spending $\bar{Z} = \bar{A}_C + \bar{I}$, the slope is $1-(1-c_r)\pi$, and π is the profit share.

Figure 1. Neo-Kaleckian Model Equilibrium and Effects of an Increase (or Decrease) in the Profit Share

Now, we also use equation (3), the equilibrium condition that $Y = AD$, which is drawn in Figure 1 as a 45° line with the slope of 1. Notice that the equilibrium condition is *steeper* than the *AD* function. Setting Y equal to the *AD* function (12′), we have

$$Y = \bar{A}_C + \bar{I} + [1-(1-c_r)\pi]Y$$

After subtracting $[1-(1-c_r)\pi]Y$ from both sides and simplifying (by using $Y - Y = 0$), we get

$$(1-c_r)\pi Y = \bar{A}_C + \bar{I}$$

Finally, dividing both sides by $(1-c_r)\pi$, we find the solution (denoted as Y^*)

[4] This condition also has to be satisfied in order for the equilibrium income level analyzed below to be both positive and stable, where 'stable' means that the economy would return to that point if disturbed away from it.

$$Y^* = \frac{\bar{A}_C + \bar{I}}{(1 - c_r)\pi} \tag{13}$$

which is the equilibrium level of national income (output). This solution is the same as the one observed in Figure 1 at the point where the solid *AD* line intersects the 45° line (along which $Y = AD$).

Note that the solution (13) can also be written as

$$Y^* = \underbrace{\left(\frac{1}{(1 - c_r)\pi} \right)}_{\text{Multiplier}} \underbrace{(\bar{A}_C + \bar{I})}_{\substack{\text{Autonomous} \\ \text{spending}}} \tag{14}$$

The solution in equation (14) thus consists of two parts: the multiplier and autonomous spending. To fix ideas, let us rewrite this equation as

$$Y^* = k\bar{Z} \tag{14′}$$

Here, we define **autonomous spending** as $\bar{Z} = \bar{A}_C + \bar{I}$, which is the portion of aggregate demand that is *independent* of current income *Y*. Autonomous spending $\bar{Z}$ is multiplied by the **Kaleckian multiplier**, which in this model is the ratio $k = 1/[(1 - c_r)\pi]$.[5] Since, as discussed earlier, both c_r and π are fractions between 0 and 1, therefore the denominator of the multiplier ratio is also a number between 0 and 1, and hence the multiplier must be greater than one ($k > 1$). Thus, the multiplier transforms a given amount of autonomous spending into a *larger* amount of total national income.

3.5. Effects of a Change in the Profit Share

The simple neo-Kaleckian model presented above has a striking implication about the economic effect of greater inequality in the form of a higher profit share π. Since the profit share π is in the denominator of the multiplier in equation (14), and given that $(1 - c_r) > 0$ by assumption, the higher is π the lower is the multiplier, and (holding autonomous spending $\bar{Z}$ constant) the lower will be equilibrium national income Y^*. This means that, all else being equal (holding everything else constant), *greater inequality* (as reflected in a higher share of national income going to profits) *will result in a lower level of equilibrium income and output*.

The reason for this result is clear: a redistribution toward profits concentrates income in the hands of the class that spends *less* out of every extra dollar of income, namely the profit recipients (capitalists or firm shareholders), whose MPC ($c_r < 1$) is *less* than that of workers ($c_w = 1$). Less consumer demand in turn translates into a lower multiplier and reduced national income. Graphically, this effect of a higher profit share π would represent a downward rotation of the *AD* curve to *AD′*, as shown in Figure 1. In contrast, a lower profit

[5] It is always true, in any Keynesian or Kaleckian model of income determination, that the multiplier equals 1/(1 − slope of *AD* curve), and that is true here as well.

share (higher wage share, $1 - \pi$) would rotate the *AD* upward to *AD*″, as also shown in Figure 1. Accordingly, equilibrium *Y** will decrease in the former case and increase in the latter case. Note that, assuming that autonomous spending remains constant, only the slope of *AD* changes and the intercept remains the same.

4. Income distribution and monopoly power of firms

In the previous section, we took the profit share π as an exogenously given variable. Now, we dig deeper into how the level of the profit share is determined in a neo-Kaleckian framework, as well as the implications for workers' real wages.

4.1. Oligopolistic Firms and Markup Pricing

In the mythical 'perfectly competitive markets' of neoclassical microeconomics, all firms are small, 'atomistic' price-takers who choose the profit-maximizing level of output by setting marginal costs (*MC*) equal to a given price (*P*), and earn zero profits if 'free entry' is assumed. In contrast, the Kaleckian approach to the profit share rests on the assumption that modern capitalist economies are dominated by large, oligopolistic firms. Oligopolistic industries are characterized by small numbers of large firms that have significant **market power** – the ability to set *P* higher than *MC* through what is known as **markup pricing**.

This can be seen through the model of an oligopolistic firm in Figure 2. Here, it is assumed that *MC* is constant up to a certain level of output called 'full capacity' (Y_f), after which *MC* rises. It is also assumed that firms usually produce at a level of output below full capacity, for example at Y_0 in Figure 2. As long as output remains below Y_f, *MC* remains constant, and hence equals average variable cost (*AVC*), which is the cost of labor plus raw materials, energy inputs, and intermediate goods (all measured per unit of output).

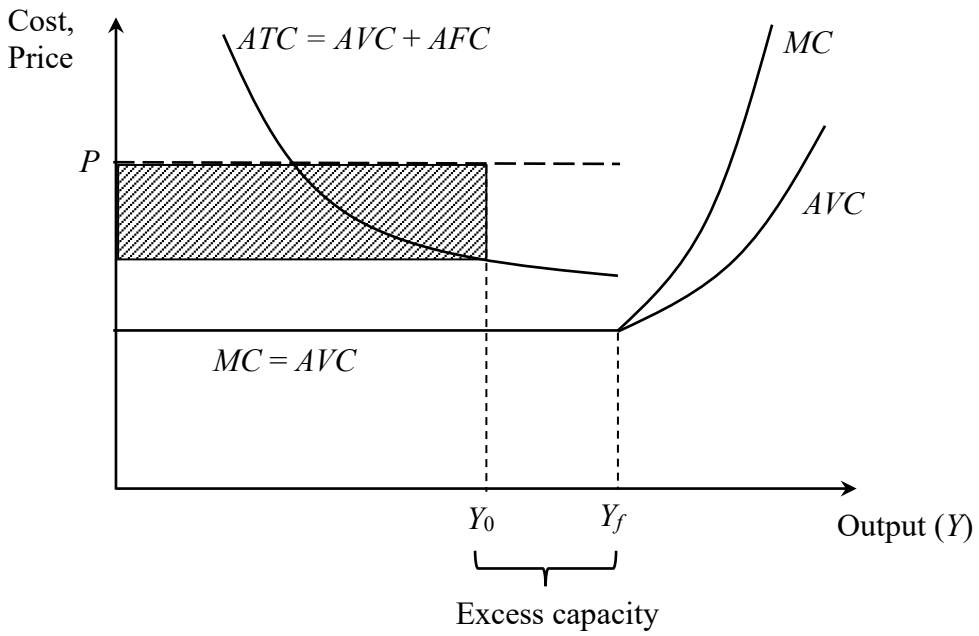
Firms also have fixed costs (*FC*), such as capital equipment and research and development (R&D) expenses. Average fixed costs (*AFC*, which are fixed costs per unit) decrease as the quantity of output rises, since $AFC = FC/Y$. Hence, average total costs ($ATC = AFC + AVC$) are also decreasing, which indicates that firms typically produce with economies of scale. Also, an oligopolistic firm normally maintains some **excess capacity**, which is the difference between full capacity production and actual output $(Y_f - Y)$ as shown in Figure 2. Oligopolies do this partly in anticipation of future demand increases, and also to deter entry by new rivals by being able to increase production to meet any new competitive threat. Hence, the firm normally produces in the range of output below full capacity $(Y < Y_f)$.

The oligopolistic firm then sets its price by a percentage markup over $AVC = MC$. The equation for markup pricing for an individual (oligopolistic) firm is thus

$$\text{Price} = (1 + \text{markup rate}) \times MC \qquad (15)$$

If output is at the level Y_0, then net profits of the firm are given by the shaded area in Figure 2, which equals $(P - ATC)Y_0$. If output is higher (or lower) than Y_0, then profits are corre-

spondingly higher (or lower).



Note: The shaded area represents net profits at output level Y_0.

Figure 2. The oligopolistic firm

Evidently, firms must set prices high enough to exceed not only $MC = AVC$, but also to exceed ATC, in order to reap a net profit. The price that a firm sets depends on the level of the **markup rate**, which is defined as $(P - MC)/MC$. Kalecki (1954 [1968]) argued that profit markups depend on what he called the **degree of monopoly** in a given industry. Of course, oligopolistic industries are not pure monopolies (which would mean only a single producer of each good), but their ability to hold profits up above costs and generate positive net profits is commonly referred to as their **monopoly power** and we will use that terminology here.

Kalecki (1954 [1968]) identified the following factors that influence markup rates, either positively or negatively: (1) the degree of industrial concentration (+); (2) the level of 'overheads' or fixed costs (+); (3) advertising and sales effort (+); and (4) the strength of labor unions (−); A few comments on some of these factors are in order. In the twenty-first century economy, (2) is increasingly important because of the large R&D expenditures that firms must make to improve their products and make their production processes more efficient. In addition, Hein (2008) has argued that interest costs on corporate debt are an important fixed cost that can positively affect markups. Both advertising (3) and a large part of R&D expenditures (a portion of 2) are dedicated to fostering 'product differentiation' and brand loyalty, which can enable firms to charge higher markups.

In addition to these four factors, we can add four more contemporary ones: (5) exposure to external competition (−); (6) offshoring of production (+); (7) taxes on corporate profits (+); and (8) monopolization of intangible assets (+). External competition (5) is the need to compete with foreign producers who may offer lower costs (or who may benefit from a depreciated currency), which can induce home country firms to reduce markups (Arestis and Milberg 1993–1994; Blecker 1989). Offshoring (6) allows home country firms in advanced economies to take advantage of lower-wage labor in developing countries, which can allow those firms to raise markups if they are not forced to fully passed through the cost savings to consumers in lower prices (Schröder 2020). Corporate taxation (7) can induce firms to raise markups if they want to pass some of the cost of the taxes on to their customers (Mott and Slattery 1994). Intangible assets (8) include intellectual property, which is protected by patents and copyrights, and the network externalities associated with large information technology (IT) platforms, all of which have become more monopolized in recent decades (Pagano 2014; Durand and Milberg 2020).

4.2. Determining the Profit Share

Moving to the macro level, we will now seek to model how the average markup rate for all firms affects the aggregate profit share of national income. For this purpose, we will make some additional simplifying assumptions to keep the mathematics accessible. First, we will assume that labor is the only variable cost (and hence the only component of marginal cost), so that $AVC = MC$ consists solely of **unit labor costs** (wage costs per unit of output). Also, to simplify the math, we will ignore fixed costs, so $ATC = AVC = MC$.

Unit labor cost (ULC) can be defined as follows:

$$ULC = \frac{W}{Y} \tag{16}$$

where (as defined previously) W is total wages paid and Y is the quantity of output (income). We can further specify that $W = wL$, where w is the **wage rate** (money wages, in dollars *per hour*) and L is employment of labor (total hours worked). Substituting this into equation (16), we get

$$ULC = \frac{wL}{Y} \tag{17}$$

Then, multiplying the numerator and denominator of this ratio each by $(1/L)$, after canceling the L terms in the numerator we get

$$ULC = \frac{w}{Y/L} = \frac{w}{A} \tag{18}$$

where $A = Y/L$ is the **productivity of labor** (quantity of output per hour worked). Thus, ULC is the ratio of the money wage rate (per hour) to the productivity of labor (output per hour).

Then, since we are assuming no raw materials, energy costs, or other intermediate inputs, the markup pricing equation (15) becomes

$$P = (1+m)ULC = (1+m)\frac{w}{A} \tag{19}$$

where $m > 0$ is the average markup rate for all firms. Hence, the price level is positively affected by the profit markup and the wage rate, and negatively affected by labor productivity.

We are now ready to solve for the profit share π. Although we previously defined π as the ratio R/Y, it can also be expressed in the following way (where numerator and denominator are both measured per unit of output):

$$\pi = \frac{\text{Profit}}{\text{Value added}} = \frac{P - ULC}{P} = \frac{P - (w/A)}{P} \tag{20}$$

where all of the difference between price and unit labor cost is profit because we have assumed that there are no nonlabor costs (fixed or variable). Also, price equals value added because we have assumed that there are no raw materials or other variable costs. Then, if we substitute equation (19) for the price P in equation (20), we get

$$\pi = \frac{(1+m)(w/A) - (w/A)}{(1+m)(w/A)}$$

in which all of the (w/A) terms cancel out, and the equation simplifies to

$$\pi = \frac{1+m-1}{1+m} = \frac{m}{1+m} \tag{21}$$

which is an *increasing* function of the average markup rate m.

This is a remarkable result, which says that the profit share depends only (and positively) on the markup rate charged by firms, and is independent of all other variables in the model (for example, the money wage rate, labor productivity, or propensities to consume and invest).[6] It is also independent of the level of output Y in this simple version of the neo-Kaleckian model. However, it should be noted that the profit share *is* affected by all the factors that can influence the markup rate, as discussed earlier.

4.3. The Real Wage of Workers

In addition, we can solve for the **real wage** (the money wage rate adjusted by the price level, which reveals the purchasing power of the workers' wage over goods and services) by substituting equation (19) for the price level into the definition of the real wage (w/P) as follows:

[6] If raw materials are included in variable costs and/or overhead labor (a fixed cost) is also included in the model, the equation for π becomes more complicated, but π is always positively related to the markup rate m.

$$\begin{aligned}\frac{w}{P} &= \frac{w}{(1+m)(w/A)} \\ &= \left(\frac{1}{1+m}\right)A \\ &= (1-\pi)A\end{aligned} \tag{22}$$

where the w terms cancel out and $1 - \pi = 1/(1+m)$ is the wage share.[7] Thus, the real wage is determined by the wage share, which is inversely related to the markup (m), and by the productivity of labor (A), and is *independent of the output level*. The institutional justification for this is that the nominal wage rate w is set in labor contracts, while the price level P is determined by firms' markups over *ULC*, so the purchasing power of the workers' money wage depends on the level of those markups (which make consumer goods more expensive) as well as the workers' own productivity (which makes those goods cheaper and more affordable).

This does not mean that what Marx called the 'class struggle' – or what is now more often referred to as workers' **bargaining power** – has no effect on the real wage or wage share. On the contrary, Kalecki (1971a, p. 6) insisted that the 'power of trade unions restrains the mark-ups' because oligopolistic firms that still face some degree of competition from other firms or producers of related products will not be willing to raise prices fully to offset large wage increases. In fact, Kalecki pioneered the idea that workers with strong bargaining power can capture a portion of the oligopolistic rents received by their employers, thereby cutting into the profit markups of firms. Hence, explanations of the falling US wage share (rising profit share) since the 1980s based on declining bargaining power of labor (e.g., Mishel and Bivens 2021) are not incompatible with Kaleckian theory. However, the Kaleckian approach insists that the transmission mechanism between weakened labor bargaining power and a lower wage share has to include rising profit markups, which have in fact been observed since that time (Eeckhout 2021).

5. An Intermediate-Level Model

In this section, we add two more features to the neo-Kaleckian macro from section 3, in order to enhance its relevance for policy analysis and understanding contemporary capitalism. These two features are fiscal policy (government spending and taxes) and endogenous investment (making investment a function of output or income).

5.1. The Model with Fiscal Policy and an Investment Function

Since we will now include fiscal policy in the model, we need to restore government expenditures G into the definition of aggregate demand:

$$AD = C + I + G \tag{23}$$

[7] Also, to obtain the second line, we have to multiply the first line by $1 = A/A$.

where we continue to omit exports and imports on the assumption of a closed economy. In addition, we now introduce taxes, which we assume are levied separately on wage and profit income. Thus, total tax revenue of the government is $T = T_w + T_r$, where T_w is taxes on wage income and T_r is taxes on profit income.[8] To keep the math from becoming too complex. we assume that these are all 'lump-sum' taxes, so the government decides on a fixed amount of taxes to be paid by each class of income earners.[9]

Furthermore, we now specify that wage and profit income (W and R) are both measured on a pre-tax basis. Therefore, we have to modify the consumption function so that workers who receive wages and wealthy individuals who receive profits make their decisions about how much to consume based on their **disposable income** (wages or profits after paying taxes). Continuing to assume that wage earners consume 100 percent of their income, so that $c_w = 1$, the consumption function becomes

$$C = \bar{A}_C + (W - T_w) + c_r(R - T_r) \tag{24}$$

where $\bar{A}_C$ is autonomous consumption as defined previously, $W - T_w$ is disposable wage income, and $R - T_r$ is disposable profit income (on the simplifying assumption that all profit income is paid out to households, for example, as corporate dividends or net interest).

In addition, we treat investment as an endogenous variable in the intermediate model. There are many choices for how to model investment in this framework, and here we will use the simplest version that implies all the main neo-Kaleckian results. As emphasized by Steindl (1952 [1976]), the amount of excess capacity (shown in Figure 2) is a key determinant of how much firms want to spend on investment in new capital. When output falls and excess capacity increases, firms decide to hold off on their investment plans and spend less. When output rises and excess capacity shrinks, firms see this as a signal to invest more – precisely to expand the capacity that is being strained in this case. For this reason, *firms respond positively to the level of demand or sales*, which in turn is reflected in output Y, in making their investment decisions.

Based on this logic, the **investment function** can be specified as

$$I = \bar{A}_I + bY \tag{25}$$

where $\bar{A}_I$ is 'autonomous' investment (the part that is independent of current output), which is taken as exogenously given as indicated by the bar over it. The level of $\bar{A}_I$ can be thought of as reflecting Keynes' 'animal spirits' (the state of business confidence). The coefficient $b > 0$ can be called the **marginal propensity to invest**, or MPI; it can also be called the **accelerator effect** as it reflects how increases in the current level of output call forth additional amounts of investment spending in order to bolster the capital stock (increase productive

[8] Note that these are taxes *net of transfers*, that is, taxes the government takes from the public *minus* transfers (such as social security payments, welfare benefits, or subsidies) that the government gives to the public.

[9] The assumption that the *level* of taxes is exogenously fixed by policy is of course unrealistic, because in reality most taxes are levied as percentage *rates* on income, production, or spending (sales). However, more complete modeling of taxes would complicate the algebra without altering any of the main points covered here.

capacity).

5.2. Solving the Intermediate Model

Substituting equations (24) and (25) for consumption and investment, respectively, into the aggregate demand equation (23) we obtain

$$AD = \overline{A}_C + (W - \overline{T}_w) + c_r(R - \overline{T}_r) + \overline{A}_I + bY + \overline{G} \tag{26}$$

where we have also assumed that government spending, taxes, and the autonomous components of consumption and investment are exogenously given as indicated by the bars above those variables. Again using $W = (1-\pi)Y$ and $R = \pi Y$ and collecting terms, we get the aggregate demand function for the intermediate model:

$$\begin{aligned} AD &= \overline{A}_C + \overline{A}_I + \overline{G} - \overline{T}_w - c_r\overline{T} + [(1-\pi) + c_r\pi + b]Y \\ &= \underbrace{\overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)}_{Intercept} + \underbrace{[(1-(1-c_r)\pi + b]}_{Slope}Y \end{aligned} \tag{26′}$$

Next, using the equilibrium condition $Y = AD$ from equation (3), the equilibrium level of output must satisfy

$$Y = \overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r) + [1-(1-c_r)\pi + b]Y$$

Then, following the same method as used previously for the introductory model, we can solve for equilibrium national income as follows:

$$Y^* = \underbrace{\left[\frac{1}{(1-c_r)\pi - b}\right]}_{\text{Multiplier}} \underbrace{\left[\overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)\right]}_{\text{Autonomous spending}} = \frac{\overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)}{(1-c_r)\pi - b} \tag{27}$$

Once again, the solution can be interpreted as a multiplier times the sum of autonomous spending terms. To make this more explicit, we can rewrite equation (27) as

$$Y^* = k'\overline{Z}' \tag{27′}$$

where $k' = 1/[(1-c_r)\pi - b]$ is the neo-Kaleckian multiplier when the accelerator effect b is included and $\overline{Z}' = \overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)$ is autonomous spending including government spending and the autonomous part of investment (with the reduction in consumption due to taxes subtracted). This solution can be plotted on a graph similar to Figure 1, except that the *AD* line is now described by equation (26′) with intercept $\overline{Z}'$ and slope $(1-\pi) + c_r\pi + b = 1 - (1-c_r)\pi + b$.

The multiplier k' is more complex than the one we found in the introductory model, because the denominator now includes the MPI or accelerator effect, b from the investment function (25). For any given level of π, the higher are the two marginal propensities to spend of capitalists (c_r for consumption and b for investment), the smaller is the denominator and the larger is the ratio, making the multiplier and hence equilibrium Y^* higher (for any given

level of autonomous spending $\overline{Z}'$). Again assuming $\overline{Z}'$ is positive, the multiplier must also be positive in order to get a positive solution for Y^*. This means we must assume that $(1-c_r)\pi - b > 0$, which implies that the spending propensities c_r and b cannot be too high.[10]

One thing has not changed from the introductory model: the effect of a rise in the profit share π on equilibrium Y^* is still negative. Once again, π is multiplied by the positive fraction $(1-c_r)$ in the denominator of the multiplier, so an increase in π reduces the multiplier and makes equilibrium output Y^* smaller, for any given level of autonomous spending $\overline{Z}'$. In this sense, greater inequality (a redistribution of income to wealthy profit recipients) is still contractionary for the economy.

The model can also be solved for the **equilibrium level of profits**, which can also be called **realized profits.** Recalling that $R = \pi Y$, we can obtain equilibrium R^* simply by multiplying the solution for Y^* in equation (27) by π, which implies:

$$R^* = \pi Y^* = \frac{\pi[\overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)]}{(1-c_r)\pi - b} = \frac{\overline{Z}'}{(1-c_r) - (b/\pi)} \tag{28}$$

where we use the definition of $\overline{Z}'$ and also multiply the numerator and denominator each by $(1/\pi)$ to obtain the last expression. This solution shows that equilibrium (realized) profits are fundamentally driven by autonomous spending and by the MPC and MPI of the wealthy owners of firms (profit recipients). Surprisingly, the realized (equilibrium) *level* of profits is *inversely* related to the profit *share* π. This occurs because, when income is redistributed toward profits (so that π rises), the fall in Y^* is large enough to outweigh the rise in π so that $R^* = \pi Y^*$ ends up lower.[11]

Similarly, we can solve for equilibrium investment by substituting the solution for Y^* from equation (27) or (27′) into the investment function (25) to get

$$I^* = \overline{A}_I + bY^* = \overline{A}_I + \frac{b[\overline{A}_C + \overline{A}_I + \overline{G} - (\overline{T}_w + c_r\overline{T}_r)]}{(1-c_r)\pi - b} = \overline{A}_I + bk'\overline{Z}' \tag{29}$$

which is also inversely related to π (recall that a rise in π lowers k'). This should be fairly obvious, because a rise in π reduces Y^* and this is the only channel through which π influences I^* in this model. We will explore the implications of these solutions further in section 6. But first, we take a detour to analyze the impact of fiscal policy.

5.3. Fiscal Stimulus and Tax Cuts in the Neo-Kaleckian Model

The expansionary effects of a deficit-financed increase in government spending in the neo-Kaleckian model are qualitatively similar to the same effects in a standard Keynesian model.

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[10] This same condition $(1 - c_r)\pi - b > 0$ is also necessary for stability of the equilibrium, that is, for actual output Y to move toward equilibrium Y^* if the economy is out of its equilibrium state.

[11] Note that, if we were to use equation (27′) instead of (27), so that $R^* = \pi k'\overline{Z}'$, it would still be true that R^* must fall because a rise in π reduces k' more than proportionately to the increase in π.

If government spending increases by $\Delta\overline{G}$ (where Δ signifies increase in), while taxes are held constant, the solutions (27) and (27′) imply that the increase in equilibrium output is

$$\Delta Y^* = \left[\frac{1}{(1-c_r)\pi - b}\right]\Delta\overline{G} = k'\Delta\overline{G} > 0$$

In fact, because the multiplier $k' = 1/[(1-c_r)\pi - b]$ is greater than 1, the increase in equilibrium output (income) must be greater than the initial increase in government spending, because of the additional 'rounds' of consumer expenditure sparked by the injection of government demand into the system.

Next, we turn our attention to a fiscal policy question that the neo-Kaleckian model is more uniquely designed to address: whether tax cuts, intended for economic stimulus purposes, should be targeted on workers and the 'middle class' or on the wealthy. The neo-Kaleckian model shows why a tax cut targeted on the wages of workers and the middle class will have a higher multiplier or stimulus effect on the economy than one targeted on the profits of the wealthy (upper class).

Suppose the government gives an equal-sized tax cut (or rebate) of, say, $1,000 to each wage-earner *or* profit-recipient.[12] Mathematically, this means we are comparing $\Delta\overline{T}_w = -\$1,000$ versus $\Delta\overline{T}_r = -\$1,000$ (be sure to note that these changes are negative!). It is easy to see that the stimulus effect will be greater in the case of a tax cut on wages compared to an equal-sized tax cut on profits, because of the higher MPC out of wages. If the tax cut is on wages, the change in equilibrium income will be

$$\Delta Y^* = \frac{-1}{(1-c_r)\pi - b}\Delta\overline{T}_w = -k'\Delta\overline{T}_w > 0$$

which is positive because $\Delta\overline{T}_w < 0$. In contrast, if the tax cut is for profits, the change in equilibrium income will be

$$\Delta Y^* = \frac{-c_r}{(1-c_r)\pi - b}\Delta\overline{T}_r = -k'c_r\Delta\overline{T}_r > 0$$

and even though the latter increase is also positive, it is smaller than the former because $c_r < 1$ (wealthy profit recipients spend less than 100 percent of their income) and we have assumed the tax cuts to be of equal size.

Of course, our simplifying assumption that $c_w = 1$ (workers consume 100 percent of their income and do not save) is not realistic. If we allow for workers to save some portion of their wages so that $c_w < 1$, the increase in income deriving from a tax cut on wages will be somewhat smaller than what is shown above, which assumes $c_w = 1$. Nevertheless, as long as the MPC is higher for wage income than for profit income ($c_w > c_r$), the stimulus effect will

[12] In the real world, of course, a tax cut is usually a decrease in the percentage tax rate for a certain income bracket or type of income (for example, wages versus dividends or capital gains), but for simplicity we analyze a lump-sum tax rebate here. Also, note that the discussion here refers to cuts (or rebates) in personal income taxes, not corporate income taxes.

still be greater for a tax cut on wages than an equal-sized tax cut on profits.

These results imply that a carefully designed program of public spending, combined with a progressive income tax that imposes higher rates on the wealthy and lower rates on workers and middle class, could help to boost an economy toward a level of output consistent with full employment. This is certainly true from a technical viewpoint, although other considerations, for example about inflation, monetary policy, and foreign trade, would have to be taken into account in a more complete analysis. However, Kalecki (1943) prophetically warned that wealthy interests might oppose full employment policies, in spite of the potential benefits for corporate sales and profits, for reasons of both ideology and self-interest.[13]

6. Broader Implications and Alternative Models

Now we are in a position to pull together all the insights from the neo-Kaleckian models developed so far to derive some broader conclusions about the nature of a macroeconomy described by such a model. The implications of these models are discussed in subsection 6.1, while the consequences of modifying some of the strong assumptions we have made up to this point are considered in subsection 6.2.

6.1. Stagnation Tendencies, Wage-Led Demand, and the Paradox of Cost

The neo-Kaleckian models presented in the previous sections can be used to illustrate the theory of **monopoly capitalism**, discussed earlier. In this theory, increased monopoly power of firms creates a tendency toward **stagnation** (chronically depressed output). To see this how this occurs, suppose that a change in one of the determinants of monopoly power (for example, increased concentration of industries, stronger intellectual property rights, or weakening of labor unions) allows firms to raise their profit markups (m). According to equation (21), increased m causes a rise in the profit share π. As a larger share of income goes to the wealthy who receive profits, this can be considered an increase in inequality.

Holding the other exogenous variables constant, the rise in π then has all the contractionary effects we have discussed (decreases in output Y^*, investment I^*, and realized profits R^*), according to equations (27) to (29). The reason this occurs is, fundamentally, because the higher profit share constitutes a redistribution of income toward the wealthy owners of capital, whose MPC is lower than that of workers who rely only on wage income ($c_r < c_w \leq 1$). Furthermore, if firms increase their monopoly power, so that they face less challenges from rival firms, they may be less motivated to invest in new capacity, in which case the animal spirits parameter $\bar{A}_I$ and/or marginal propensity to invest b could decrease, resulting in further reductions in those variables. Also, note that the real wage w/P would be depressed by

[13] On the ideological side, wealthy individuals and corporate interests are likely to oppose a larger government role in the economy. In terms of self-interest, they are likely to oppose public initiatives that could compete with private enterprise and to fear that sustained full employment would empower workers to demand higher wages and better working conditions.

the higher markup and profit share (for any given level of productivity A), per equation (22).

Although this is a static model, in the sense that we only consider *levels* of these variables (not their growth rates), if we extrapolate over time we can see that *persistent* increases in markups and the profit share could lead to *chronically* depressed levels of those variables (Y^*, I^*, and R^*) in the long run, as hypothesized by Steindl (1952 [1976]). Certainly, if investment is depressed, the society's capital stock would grow more slowly, which would further limit the country's future productive potential. Of course, as Steindl also realized, this is only a *tendency*, and it can be offset by other factors (for example, increased government spending or consumer spending financed by borrowing), but at least there would be an underlying tendency toward stagnation created by the increased monopoly power.[14]

Looked at from a different perspective, these same results can also be interpreted as implying the possibility of **wage-led growth** (see Lavoie and Stockhammer 2013). To see this, suppose that (for example, because of union organizing or labor militancy) workers win wage increases that firms are unable to fully pass through to customers in higher prices, so that the real wage (w/P) rises – and, according to equation (22), the markup rate m must decrease (holding labor productivity A constant). The decrease in m would then *lower* the profit share π, per equation (21). A lower π would then have the *opposite* effects of what we showed above: the *AD* curve would rotate upward (as shown in Figure 1), and Y^*, I^*, and R^* would all *increase*. In other words, a redistribution of income toward workers (a higher real wage w/P and a higher wage share $1 - \pi$) would have an *expansionary* impact on the economy.

Also, it is worth noting that the inverse relationship between a rise in the profit share π and equilibrium (realized) profits R^* has been called the **paradox of cost** (Lavoie 2022, pp. 18–19). In this model, a rise in the real wage (which constitutes an increase in firms' costs, holding productivity constant) causes an *increase* in total realized profits R^*, even though the profit share π and markup rate m must be lower. This surprising result stems from several assumptions in the model, including not only the higher MPC out of wages compared with profits, but also the accelerator effect built into the investment function. This guarantees that when wages increase, even though individual firms' costs rise, the resulting increase in consumer demand stimulates additional increases in income and investment that guarantee a rise in total output (national income) sufficient to enable firms to increase their realized profits.[15] Essentially, even though wealthy capitalists get a smaller share of national income, they more than make up for the lower profit share through a proportionately larger increase in the volume of their sales (output). Mathematically, in the equation $R^* = \pi Y^*$, Y^* increases by a bigger percentage than π falls.

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[14] Offsets to stagnation from government military spending were emphasized by Baran and Sweezy (1966). The role of household borrowing in boosting consumption in the United States and some other countries is emphasized in Cynamon et al. (2013). For an advanced model of stagnation that extends the original analysis of Kalecki and Steindl, see Hein (2016).

[15] This is true in the aggregate, but not for any individual firm, so individual firms are 'rational' to view wages only as a cost. Thus, no individual firm would want to pay higher wages by itself, yet all can gain if they all do so simultaneously – which is an argument for state policy to support higher wages.

6.2. The Profit-Led Possibility

The conclusions discussed above depend on the strong assumptions built into the neo-Kaleckian models presented thus far. It is important to flag that, by relaxing some of these assumptions, a range of other possible outcomes becomes possible. Here, we will show how a few alternative specifications of the consumption and investment functions create the possibility that output could be profit-led instead of wage-led.[16]

To demonstrate this point, we will now make two seemingly modest modifications to the model as specified earlier. First, we drop the assumption that workers spend 100 percent of their (after-tax) wage income on consumption. Instead, we will allow that the MPC out of (after-tax) wages is less than one, even though it is still higher than the MPC out of profits: $1 > c_w > c_r > 0$. Thus, the consumption function becomes:

$$C = \overline{A}_C + c_w(W - T_w) + c_r(R - T_r) \tag{30}$$

Second, we will replace the investment function (25) with an investment function that emphasizes profits rather than output as the driving force that motivates firms to invest:

$$I = \overline{A}_I + \beta R \tag{31}$$

where β (Greek beta) is the (positive) marginal propensity to invest *out of profits*. Profits are likely to stimulate investment spending for two reasons: (i) profits are the incentive to invest, and current profits can be used by firms to form expectations about likely future profits; and (ii) profits allow firms to finance at least part of their investment spending internally (via retained earnings), while high profits also attract external funds (loans or bond sales) by indicating that firms are good credit risks to potential lenders (banks or bondholders).

The mathematical solution for equilibrium output Y^* in the modified model, using equations (30) for consumption and (31) for investment, is detailed in Appendix A. The solution implies that the economy will be **wage-led** (that is, a higher real wage w/P and lower profit share π, corresponding to a decreased markup rate, will increase Y^*) if the following condition holds:

$$c_w > c_r + \beta$$

In other words, a redistribution toward labor will be expansionary if the MPC out of wages is greater than the marginal propensity to spend out of profits, where the latter is the sum of the marginal propensities to consume and invest out of profits.

In the opposite case, if

$$c_w < c_r + \beta$$

then the economy will instead be **profit-led**: a redistribution toward profits (resulting from a higher markup m and accompanied by a fall in the real wage w/P) will cause Y^* to rise. Intuitively, in this case there is so much total spending out of each extra dollar of profits that, even

[16] For reasons of space, we do not analyze the conditions for investment and realized profits to be profit-led or wage-led in this extended model here. These conditions may differ from the condition for output to be profit- or wage-led discussed below, as shown in Hein (2014) and other sources.

though the MPC is still higher for wages ($c_w > c_r$), aggregate demand is increased by a rise in the profit share. Clearly, this can only occur if there is a strong profitability effect on investment, that is, the coefficient β in the investment function (31) is relatively high.[17]

Although we have not considered international trade so far in this article, reintroducing net exports ($NX = X - M$) into the aggregate demand equation (1) can possibly make an economy profit-led, regardless of whether there is a strong profitability effect on investment or not. The math for this case is complex (see Blecker and Setterfield 2019, pp. 190–197; Hein 2014, pp. 286–297), but the fundamental reason is easy to understand. Suppose that wages rise relative to labor productivity, so that $ULC = w/A$ increases, in a given country. Assuming that markups either remain constant, or don't decrease enough to offset the rise in ULC, prices of home country products also increase per equation (19), thus making home goods less competitive (more expensive) compared to foreign products. This in turn will tend to reduce exports (X) and increase imports (M), and hence is likely to worsen the trade balance ($NX = X - M$), which in turn has a negative impact on AD and equilibrium output Y^*.

Whether these international competitive effects are large enough to outweigh positive effect of the greater MPC out of wages (compared to profits) then depends on certain factors, especially how open the economy is to trade (whether imports and exports are a large or small portion of GDP) and whether the goods the country trades are ones for which firms compete on price rather than other characteristics (such as qualitative or technological superiority). A careful empirical study by Onaran and Galanis (2013) found that, for most countries considered, it was the strength (or weakness) of this international competitive effect that was most important for determining whether aggregate demand was wage-led or profit-led.

It is important to clarify that none of the model extensions discussed in this subsection imply that an economy is *necessarily* profit-led. Even in the extended model, with positive saving out of wages and investment depending on profits, and even if international competitive effects are taken into account, the economy could still be wage-led if the gains in consumer demand from higher wages outweigh the possible losses in investment and net exports. As summarized in Figure 3, increased wages (or a reduced profit share) have positive effects on consumption, likely negative effects on net exports, and ambiguous effects on investment. The ultimate impact on equilibrium output depends on the relative strength of these different effects.

7. Conclusions

Neo-Kaleckian models of the type presented here were pioneering for their demonstration of how greater inequality can potentially worsen economic performance – or, conversely, reducing inequality can improve economic outcomes. Specifically, the models depict a mechanism

[17] The theoretical possibility of a strong profitability effect on investment raises the question of whether cuts in corporate income taxes (as opposed to personal income taxes on profits paid out to wealthy households, which we have modeled here), could result in a significant economic stimulus. Gale et al. (2024) show that there is no evidence of a significant increase in US investment at the macro level following the reductions in corporate tax rates in the Trump-era Tax Cuts and Jobs Act (TCJA) of 2017.

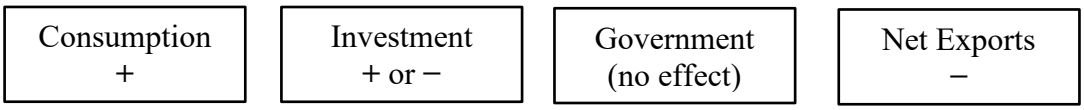

Figure 3. Effects of a Rise in the Wage Share (Fall in the Profit Share) on the Components of Aggregate Demand

through which a more unequal functional distribution of income (a higher profit share π) depresses the equilibrium levels of output, investment, and even realized profits, whereas a more equal distribution (lowering π or raising the wage share $1 - \pi$) does the opposite.

If an economy is typically wage-led, as implied by both the introductory and intermediate models presented here), this in turn has important policy implications. For example, anti-trust or 'competition' policies can be essential to curb the monopoly power of large, oligopolistic firms (for example, by blocking anti-competitive mergers and acquisitions). Similarly, pressures from corporations to strengthen protections for intellectual property rights or data monopolization should be resisted, not supported. Labor mobilization to win higher wages can be beneficial, not only for the workers themselves, but also for the entire economy, provided that the wage increases are achieved by cutting into firms' profit mark-ups. The wage-led case thus supports policies such as increasing minimum wages and strengthening labor unions.

However, the characterization of the economic system as necessarily wage-led rests on a number of simplifying assumptions in those models, especially the absence of a strong profitability effect on investment and ignoring the potentially negative impact of higher labor costs on net exports. As this article has also shown, these and other modifications to the basic models imply the possibility that an economy *could* be profit-led instead of wage-led. Nevertheless, even in the extended version of the model, the economy could *still* be wage-led, as long as the consumption gains from higher wages outweigh any possible losses in investment and/or net exports. Also, one should be cautious before concluding that a profit-led economy could only benefit from policies that would worsen inequality. For example, the conclusion that personal income tax cuts will be more expansionary if targeted on wage income remains valid, even in an otherwise profit-led economy, since this conclusion rests only on the (realistic) assumption of a higher MPC out of wages ($c_w > c_r$). Furthermore, reducing wage inequality between high-earning, highly educated, professional and managerial workers and low-earning, less-educated production workers can still be expansionary, even in a profit-led economy (see Palley 2017).

Furthermore, the distinction between wage-led and profit-led economies is only the beginning, and not the end, of what can be analyzed using a neo-Kaleckian approach. Macro models with a neo-Kaleckian foundation have been further extended to incorporate many

such other dimensions, including: personal (as distinct from functional) income distribution; workers differentiated by gender or ethnicity; the dynamics of adjustment to a 'normal' rate of capacity utilization (or normal level of output); business cycle fluctuations; financial relationships, monetary policy, and debt dynamics; additional open economy considerations (for example, real exchange rates, foreign direct investment, and offshoring); more detailed specifications of fiscal policy and tax rates; inflation and unemployment; and making profit markups, workers' wages, and labor productivity endogenous. Readers who are motivated to pursue these extensions of the neo-Kaleckian approach are referred to the advanced literature referenced earlier.

Appendix A. Extended Neo-Kaleckian Model

Substituting equations (30) for the consumption function and (31) for the investment function into the aggregate demand equation (23) for a closed economy with a government sector, the aggregate demand function is

$$AD = \overline{A}_C + c_w(W - \overline{T}_w) + c_r(R - \overline{T}_r) + \overline{A}_I + \beta R + \overline{G}$$

where again we assume that all autonomous expenditures, taxes, and government spending are exogenously given. Using $R = \pi Y$ and $W = (1-\pi)Y$ and then grouping terms, we get

$$\begin{aligned} AD &= \overline{A}_C + c_w(1-\pi)Y - c_w\overline{T}_w + c_r\pi Y - c_r\overline{T}_r + \overline{A}_I + \beta\pi Y + \overline{G} \\ &= \overline{A}_C + \overline{A}_I + \overline{G} - (c_w\overline{T}_w + c_r\overline{T}_r) + [c_w(1-\pi) + c_r\pi + \beta\pi]Y \\ &= \overline{Z}' + [c_w + (c_r + \beta - c_w)\pi]Y \end{aligned}$$

where $\overline{Z}' = \overline{A}_C + \overline{A}_I + \overline{G} - (c_w\overline{T}_w + c_r\overline{T}_r)$ is autonomous spending in the intermediate-level model.

Now we set $Y = AD$ according to the equilibrium condition (3), which implies

$$Y = \overline{Z}' + [c_w + (c_r + \beta - c_w)\pi]Y$$

Next, subtract $[c_w + (c_r + \beta - c_w)\pi]Y$ from both sides to get

$$\begin{aligned} Y - [c_w + (c_r + \beta - c_w)\pi]Y &= \overline{Z}' \\ [1 - c_w - (c_r + \beta - c_w)\pi]Y &= \overline{Z}' \end{aligned}$$

Finally, divide both sides by $[1 - c_w - (c_r + \beta - c_w)\pi]$ to get the equilibrium solution

$$Y^* = \frac{\overline{Z}'}{1 - c_w - (c_r + \beta - c_w)\pi}$$

where the denominator must be positive for the equilibrium to be stable. If $c_r + \beta - c_w > 0$, then a rise in π lowers the denominator and increases Y^* (profit-led case). If, however, $c_r + \beta - c_w < 0$, then a rise in π increases the denominator and reduces Y^* (wage-led case).

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