Macroeconomics with Conflict and Income Distribution

Abstract

This paper presents a Post Keynesian model explaining the determination of employment and income distribution. A major innovation is the incorporation of the insider-outsider description of labor markets into a macro framework. This introduces power and conflict into the macro process. Microeconomic bargaining considerations are central to macroeconomic outcomes. Endogenous government deficits can sustain profitability in an otherwise contractionary environment. Firm level profit maximization may not produce macroeconomic profit maximization because firms fail to internalize the effects of economic activity on profitability.

Keywords: Income distribution, bargaining, aggregate demand, endogenous deficits, profit maximization.

JEL ref.: E1, E12, E24

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I Introduction

"Power" and "conflict" over income distribution are both important features of economic life, yet they are noticeably absent in neo-Keynesian and new classical macroeconomics. Thus, power is suppressed through the assumption of competitive markets which ensure that all are powerless, while the effects of income distribution are suppressed either through the representative agent assumption which renders all identical, or through permanent income theory in which all agents have identical propensities to consume.

This paper presents an alternative Post Keynesian construction of macroeconomics that emphasizes both power and conflict. Power and conflict are important because they affect the distribution of income, while income distribution is important because it affects the level of aggregate demand. In effect, conflict manifests itself in labor markets, while its macroeconomic significance is revealed in goods markets.

The model reveals how microeconomic "power" considerations interact with macroeconomic "aggregate demand" considerations to determine general equilibrium outcomes. The model has a close affinity with that of Dutt (1992). However, his model focuses on the process of long run accumulation rather than the short run, and uses target wage theory. The current model is constructed in terms of insider - outsider bargaining theory which provides a microeconomic basis for the treatment of labor markets in Post Keynesian macro models. It also shows how endogenous government deficits can sustain profitability in an otherwise contractionary environment, and how firm level profit maximization may not produce macroeconomic profit maximization owing to failure of firms to internalize the effects of economic activity on profitability.
II A synthetic Post Keynesian model

This section presents the formal model which consists of a labor market and a goods market. The operation of the financial sector is not addressed, and the interest rate is assumed to be exogenous. Within the model, income distribution is determined in labor markets using a bargaining closure, while output is determined in goods markets using a Kaleckian aggregate demand closure. General equilibrium obtains when both closures are simultaneously satisfied.

The architecture of the model involves a bi-directional interaction between labor market and product market conditions. Labor market conditions affect the product market through their impact on the wage share and aggregate demand, while product market conditions impact the labor market through their impact on employment and worker bargaining power. This bi-directional interaction is unique to the Post Keynesian construction of macroeconomics. It contrasts with both the classical and neo-Keynesian constructions of macroeconomics. In the former, causality runs uni-directionally from the labor market (the supply side) to the product market: in the latter, it runs uni-directionally from the product market (see Sargent, 1979).

The labor market:

The operation of labor markets is informed by Shaked and Sutton (1984). Their paper illustrates a range of issues that are germane to the problem of income distribution, and suggests how bargaining can provide a labor market closure consistent with a Kaleckian approach to macroeconomics. Firms bargain with "insider" workers, and are free to
switch to bargaining with unemployed "outsider" workers subject to a costly switching friction.

The solution to the bargaining game involves a perfect equilibrium in which firms accept any proposal that offers at least as much as can be got in any future sub-game perfect equilibrium bargain with an outsider. In the Shaked and Sutton model the profit share depends negatively on the time rate of discount and the time that must elapse before the firm can switch from bargaining with an existing insider to bargaining with an outsider. It is given by:

\[ z_p = z(R(i), T) \quad z_R < 0, z_T < 0, R_i > 0 \]

where \( R \) = the time rate of discount
\( i \) = interest rate
\( T \) = elapse time.

The parameter \( T \) measures the degree to which outsiders represent a threat to insiders, and it therefore proxies for the extent of insider or union power. Higher \( T \) means less threat from outsider workers. This parameter can be given a macroeconomic complexion by recognizing that insider power depends positively on the extent of unemployment.

This is because lower unemployment reduces the economic consequences of being fired, as well as making it more difficult for firms to find replacement outsiders.

This effect can be captured by making \( T \) a positive function of the ratio of job openings to unemployed so that

\[ T = T(O/U, X) \quad T_1 > 0, T_2 < 0 \]

where \( O \) = job openings
\( U \) = unemployed
\( X \) = technology shift factor
If openings are a fixed proportion of employment (reflecting a steady stream of
tirements), and labor supply is fixed, \( T \) is given by

\[
T = T \left( \frac{qN}{N^s - N}, X \right)
\]

where \( q \) = retirement rate

\[
N = \text{employment}
\]

\[
N^s = \text{labor supply}
\]

Consequently, insider power is now a positive function of the level of employment.

The distributive bargain is closed by adding the following equations determining
output, the profit share, the wage share, the income shares adding up constraint, and labor
supply:

\[
y = aN \quad a > 0
\]

\[
z_p = \frac{P}{y}
\]

\[
z_w = \frac{wN}{y}
\]

\[
z_w + z_p = 1
\]

\[
N \leq N^s
\]

where \( P \) = level of profits; \( y \) = level of output; \( z_w \) = wage share; \( w \) = real wage; \( N^s \) = labor
supply. Equation (4) is the production function, which for simplicity has constant
coefficients. This assumption facilitates the presentation of the model. Some implications
of diminishing and increasing MPL for the cyclical behavior of real wages are briefly
discussed below. Equations (5) and (6) define the profit and wage shares respectively,
while equation (7) is the adding up constraint on wage and profit shares. Lastly, equation
(8) restricts employment to be less than or equal to the exogenously given labor supply.

Given the above, the real wage is:

\[
w = \frac{z_wy}{N}
\]
Equation (9) corresponds to a "wage curve" such as that which has been empirically documented by Blanchflower and Oswald (1990, 1994). This curve replaces the conventional labor demand schedule. Equilibrium real wage outcomes lie on the wage curve, and the location and slope of the curve reflect the distribution of bargaining power between workers and employers. According to a wage curve approach, wage determination has nothing to do with labor market clearing. Instead, it reflects relative bargaining strength which in turn is influenced by employment conditions.

The behavior of real wages in response to changed employment depends on two factors: the wage share and the average product of labor, APL. In the current paper the APL is constant, and real wages are pro-cyclical owing to pro-cyclical movements in workers' bargaining power. Were the APL to be increasing owing to economies of scale, the real wage would be even more pro-cyclical. Finally, were the APL decreasing (the conventional case), the real wage could be pro- or counter-cyclical depending on whether the wage share effect dominates.

The goods market:

In the goods market, output is demand determined. The goods market closure is Kaleckian in that aggregate demand is affected by the functional distribution of income owing to differences in the propensity to consume out of profit and wage income. The equations of the goods market are:
(10) $P = mwN$

(11) $sw[1 - tw]wN + sk[1 - tk][P + iB] = I + D \quad 1 > s_w > s_k > 0$

(12) $D = G + iB - twwN - tk[P + iB] \quad 1 > t_k > t_w > 0$

where $m =$ actual realized mark-up; $s_w =$ propensity to save out of wage income; $s_k =$ propensity to save out of profit and interest income; $t_k =$ profit and interest tax rate; $t_w =$ wage tax rate; $i =$ interest rate; $B =$ stock of bonds (national debt); $I =$ level of investment spending; $D =$ government deficit; $G =$ level of government spending. Equation (9) defines the realized mark-up over the wage bill. Equation (10) is the goods market equilibrium condition, while equation (12) is the government budget constraint, which has the government deficit being endogenously determined.

*General equilibrium*

Equations (1) - (12) provide a complete model determining $z_p, z_w, T, P, D, N, y, w, m,$ and $N^s$. The model can be reduced to a two equation system given by

(13) $P = z(y/a, R, q, N^s, X)y$

(14) $\{s_w - tw[s_w-1]\} \{y - P\} + \{s_k - tk[s_k-1]\}P$

$= I + G + iB[1 - t_k][1 - s_k]$

The endogenous variables are $P$ and $y$. Equation (13) determines the profit share consistent with bargaining equilibrium in labor markets, while equation (14) determines the level of profits consistent with goods market equilibrium (i.e. saving - investment balance).
Figure 1 provides a diagramatic analogue of the full model. Equations (13) and (14) are drawn in the top right panel. Equation (14) corresponds to an IS schedule, while equation (13) is the equilibrium profit share function. The concavity of this function captures the notion that higher employment decreases the profit share (though not the level of profits). The slope of the P function gives the profit share. If the profit share were independent of the level of employment \((z_{w,N} = 0)\), then it would be represented by a ray from the origin.

The slope of the profit schedule is given by
\[
\frac{dP}{dy} = z_p + y z_{p,y} > 0 \text{ if } 1 > |y z_{p,y}/z_p|
\]
It is positively sloped if the elasticity of the profit share with respect to output is less than unity. At high levels of output it may even become negatively sloped: such an outcome corresponds to the notion of a "full employment profit squeeze". Totally differentiating (14) with respect to \(P\) and \(y\) yields
\[
\left|\frac{dP}{dy}\right| = -\frac{1}{\{s_k - t_p[s_{k-1}]/\{s_w - t_w[s_{w-1}]\} - 1\} < 0
\]
Hence, the IS schedule is negatively sloped.

The equilibrium levels of profits, income, employment, and wages are determined by the intersection of the microeconomic bargaining equilibrium condition (equation (13)) and the goods market clearing condition (equation (14)). The general equilibrium is therefore subject to influence by both microeconomic and macroeconomic forces. The

\[1. \text{The realized mark-up can be expressed in terms of the profit share as } m = z_p/[1 - z_p]. \text{ Its equilibrium value is jointly determined by conditions in the goods and labor markets.}\]
The intersection of these schedules in the top right panel of Figure 1 determines the equilibrium level of profits, \( P^* \), and income, \( y^* \).\(^2\)

The bottom right panel shows the production function. Given \( y^* \), the production function determines the level of employment, \( N^* \). Lastly, the bottom left panel shows the labor supply function and the wage curve (wage bargain schedule), denoted WW. The level of employment determines where the economy settles on the wage curve, and this determines the equilibrium level of wages, \( w^* \). This wage bargain schedule provides a relationship between the level of wages and the level of employment: it embodies equilibrium outcomes achieved through bargaining between firms and insider workers contingent on any given level of employment.\(^3\)

In the current application with a constant coefficients production function, the slope of the WW schedule is positive. For the more general case, the slope is given by:

\[
\frac{dw}{dN} = \left[1 - z_p\right]\left[Nf_N - f(N)\right]/N^2 - z_p,f(N)/N > 0
\]

where \( f(N) \) = general form production function; \( f_N = \) marginal product of labor (MPL). Real wages can therefore be pro-cyclical or counter-cyclical. The extent of pro-cyclicality depends on (i) the extent to which workers' bargaining power increases with employment, and (ii) the behavior of the MPL. If the MPL is increasing in employment, this increases the positivity of the slope of the WW schedule. If the slope of the MPL is strongly

\(^2\) The proposed model has some architectural similarity with "Structuralist" macro models (Bowles and Boyer, 1989, 1990; Epstein, 1994). Significant differences in the current model are (i) the explicit links between the macroeconomic and microeconomic forces determining income distribution, (ii) the significance of existing financial asset stocks and their associated income flows for aggregate demand, and (iii) the identification of income distribution with the labor market bargain, rather than as a goods market mark-up phenomenon.

\(^3\) The WW schedule and P schedule are interdependent. If the WW schedule has a positive and increasing slope, then the slope of the P schedule is decreasing.
negative, this effect could potentially outweigh the bargaining effect, in which case the
WW would be negatively sloped.

*Stability:*

The stability of the model can be examined by adding the following dynamic
adjustment equations:

\[
(15) \quad y = g(P - P(y)) \quad g(0) = 0; g' < 0; P_y < 0
\]

\[
(16) \quad P = h(P - Z^*(y)) \quad h(0) = 0; h' < 0; Z^* \quad y
\]

where \( P(y) = \{1 + G + \{1 - s_k + t_p[s_k - 1\}iB - \{s_w - tw[s_w - 1]\}y/\}

\{s_k - t_p[s_k - 1]\} - \{s_w - tw[s_w - 1]\}\}

\(Z^*(y) = z(y/a, R, q, N^s, X)y\)

The logic behind these adjustment mechanisms is as follows. If \( P > P(y) \), actual profits
exceed the level of profits consistent with goods market equilibrium. Consequently,
saving exceeds investment plus the deficit, and there will be standard Keynesian
pressures for output to contract. If \( P > Z^* \), the actual profit share is greater than that
warranted by microeconomic bargaining fundamentals, and given the state of labor
markets there will be bargaining pressures that reduce the profit share through a process
of recontracting.

Linearizing equations (15) and (16) around the local equilibrium, and arranging in
matrix form, yields

\[
\begin{bmatrix}
\dot{y} \\
\dot{P}
\end{bmatrix} = \begin{bmatrix}
g'P_y & g' - g'P_y \\
h'Z^*_y & h' - h'Z^*_y
\end{bmatrix} \begin{bmatrix}
y - y^* \\
P - P^*
\end{bmatrix}
\]

The stability conditions are

\[-g'P_y + h' < 0\]
\[-P_y + Z^*_y > 0\]

Sufficient conditions for stability are \(P_y < 0\) and \(Z^*_y > 0\), which is equivalent to saying that the IS is negatively sloped in \([y, P]\) space, and the \(P\) function is positively sloped.

The phase plane dynamics associated with this system are shown in Figure 2. The \(P\) function is drawn as concave to the origin, a characterization which obtains if the profit share falls as output rises owing to the effects of increased employment on worker bargaining power. At high levels of output, the profit function is shown as negatively sloped and the absolute level of profits falls: this representation reflects a high employment profit squeeze that results from increased worker bargaining power. With regard to dynamics, profits are too high in regions above the IS schedule, and there is downward pressure on the level of output: in regions below there is upward pressure. In regions above the \(P\) function, profits are too high and will be bargained down: in regions below, profits will be bargained up.

In Figure 2 there are two equilibria. Equilibrium A is a stable focus. Equilibrium B is characterized by saddle path stability. The model is bounded by the 45° line which restricts profits to be less than or equal to output. The level of output is also bounded from above by full employment, \(y_{FE}\).\(^4\) If this ceiling is sufficiently to the right, then the instability properties associated with equilibrium B could potentially drive the economy to this ceiling. However, if the ceiling is to the left of B or the \(P\) function is positively sloped throughout, then only equilibrium A is economically relevant.

The stability of the model is sensitive to the slope of the IS schedule. Previously, with investment spending exogenous, the IS was shown to be negatively sloped. However, if

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\(^4\) \(y_{FE}\) is determined by the intersection of the \(N^\alpha\) and \(WW\) schedules.
investment is a positive function of income and there is a strong accelerator, the IS can be positively sloped. In this event, the model can be stable, unstable, or have a limit cycle around A. This links the model to the stagnationist - exhilarationist distinction introduced by Bhaduri and Marglin (1990). Instability occurs if a strong exhilarationist tendency dominates over all regions of output rendering the IS strongly positive over all regions of output: a limit cycle exists if there is a local region of output where a strong exhilarationist tendency dominates.

This latter outcome can emerge if the IS schedule changes slope in the region around A. This can occur if investment is a quasi-concave function of income (Kaldor, 1940), there being a middle region of output in which investment responds strongly to increased output, and two outer regions in which it responds weakly. Given counter-cyclical movement of the deficit, this means that the IS may be initially negatively sloped, then become positive over the region where investment is strongly sensitive to output, and then turn negative again. If the quasi-concavity of the investment function is sufficiently pronounced, it can produce an IS shaped such as that in Figure 3. If the IS is sufficiently strongly positively sloped, point A can be locally unstable and have a limit cycle. Indeed, in principle an S-shaped IS can generate multiple equilibria by crossing the P-function more than once. The outer equilibria would be stable, while the inner equilibrium could be stable, unstable, or have a limit cycle. The phase plane would then be divided by separatrixes.

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5. An additional factor making for a positively sloped IS is that as output expands, income distribution shifts from profits to wages. This reduces saving, which is expansionary, and causes the IS function to become positively sloped.
Finally, an alternative complementary economic justification for the IS having such a shape is if investment is a positive function of the profit rate. Over the region of output where the P function is positively sloped, the level of profits is rising. Given an initial capital stock, the profit rate is also rising and peaks with the peak in the profit function. Thereafter, the profit rate starts to fall. Thus, investment will be strongly rising over the region of rising profits and start to fall once profits peak, thereby generating an IS such as that shown in Figure 3.

Comparative statics:

Comparative statics are derived in the appendix. There are two generic types of experiment. One concerns labor markets and changes in bargaining strength: the other concerns goods market conditions.

(i) *Exogenous increase in firm bargaining power.* This rotates the P function counterclockwise: firms have greater bargaining power (increase X which lowers T) so that the profit share and the level of profits are higher at each level of income. The increase in firm power also causes the WW function to shift down so that wages are lower at any given level of employment. The new equilibrium is determined by the intersection of the IS schedule and the new P function: it has lower output and higher profits. The economic logic is that the increase in the profit share comes at the expense of the wage share, and this causes a decline in aggregate demand. The fact that profits can increase contrasts with the standard Kaleckian result whereby capitalists earn what they spend, and results from the endogeneity of the budget deficit. Despite lower total output, profits rise and
additional savings are absorbed by a larger budget deficit. Meanwhile, lower output calls for lower employment, and this causes real wages to fall as firms move down the new WW schedule.

(ii) Increases in either investment spending, $I$, or the deficit, $D$. Both changes shift the IS schedule up, resulting in a new equilibrium with higher profits, output, employment, and real wages. The reason for higher profits is that higher aggregate demand stimulates output, and part of this accrues as higher profits. Though the direction of change is unambiguous, the size of the expenditure multiplier depends critically on the slope of the P function. If the P function is relatively steep (large $z_p$), the multiplier is small: if the P function is relatively flat (low $z_p$), the effect is large.\(^6\)

This dependence of the expenditure multiplier on the microeconomic structural characteristics of labor markets is absent in neo-Keynesian constructions of the economy. The reason for the importance of the slope of the P function is that it determines how output is divided between wage and profit income, and this in turn affects aggregate saving and the magnitude of the demand leakage.\(^7\)

(iii) An increase in the profit tax, $t_p$. This shifts the IS schedule down, and causes a decline in output and profits. The increase in the profit tax decreases the deficit, which is contractionary. Though it also reduces savings which is expansionary, this is not enough to offset the former effect.

(iv) An increase in the marginal propensity to save out of profit income, $s_k$. This shifts the IS schedule down, thereby reducing equilibrium profits, output, and employment, and

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\(^6\) To the extent that the P schedule is concave, the multiplier would tend to increase in magnitude as equilibrium output increases.
wages. The logic is that increased saving represents a contraction of aggregate demand, which causes a reduction in output.

(v) Increased interest rates. If the monetary authority raises the interest rate, this is expansionary. A higher interest rate shifts the IS up and rotates the P function clockwise, resulting in increased equilibrium output. The logic behind this surprising outcome is as follows. Higher rates increase interest payments on the debt which increases capitalists' incomes, part of which are spent on consumption so that aggregate demand rises. Meanwhile, higher rates also lower firms' bargaining power, resulting in a clockwise rotation of the P function. This raises the wage share which is expansionary.

If investment spending or consumption were a negative function of the interest rate, then the IS could shift down. In this case profits would unambiguously fall, but the direction of change in the level of income would be ambiguous. Higher rates lower AD which would tend to lower income, but a lower profit share and higher wage share would still tend to raise income. Hence, the formal ambiguity.

(v) Labor exchange and technology choice. Gintis and Bowles (Gintis (1976); Bowles (1985); Bowles and Gintis (1990)) have shown how ownership and allocation of control over firms has implications for both "productive efficiency" and the "distribution of income". Skillman (1988, 1991) and Skillman and Ryder (1993) have explored the same issue within an insider - outsider bargaining setting, and they show how firms face a technology choice trade-off that balances "productive" efficiency versus "bargaining"

7Nell (1988, p.115) derives an expression for the multiplier in which it depends negatively on the profit share.
strength (i.e. the firm's replacement ability). As a result, firms may choose productively inefficient technologies in order to gain an upper hand in bargaining.\(^8\)

The problem of choice of inefficient production technology is illustrated in Figure 4 in which there are two technologies subscripted "1" and "2". Technology 1 is productively less efficient than technology 2, as indicated by the fact that production function 1 lies entirely below production function 2. However, technology 1 produces a greater profit share at each level of output, as indicated by the steeper P function denoted P\(_1\). Such a situation can explain deskilling and pursuit of a "low road" path which improves firms' bargaining power by making it easier to hire and fire workers, but also lowers productivity. Under the above conditions, firms have a private microeconomic incentive to adopt the productively inefficient technology.

The actual level of profits is determined in conjunction with the IS schedule. If the IS is negatively sloped, then adopting technology 1 raises aggregate profits, but it reduces output and employment. However, if the IS schedule were mildly positively sloped (which can happen in an exhilarationist world where investment is a positive function of output and the profit rate\(^9\)), then the realized level of profits is lower. In this case microeconomic profit maximization, predicated on concerns with bargaining strength, lowers profits owing to failure to internalize the effects of macroeconomic activity on the aggregate level of profits.

\(^8\) Allocating control to workers may also result in inefficient choice of production technology. In particular, workers may have an incentive to adopt excessively capital-specific techniques to reduce capital's \textit{ex-post} mobility.

\(^9\) In the exhilarationist world of Bhaduri and Marglin (1990) investment is a positive function of capacity utilization and the profit share.
III Macroeconomic performance and policy

Thus far the analysis has been at a theoretical level. However, the above model yields insights into recent developments within the U.S. economy. These have been driven by both microeconomic and macroeconomic forces.

Within labor markets (the microeconomic level) there has been a shift of bargaining power away from workers. The causes of this shift are multiple: they include lower transportation costs that have facilitated production in distant regions, and technological improvements that have increased physical capital mobility and made multi-national production commonplace. In addition there has been a significant decline in trade union membership, and an increase in the ability of firms to replace striking insider workers with outsiders. All of these developments have lowered firms' costs of replacement, thereby increasing the credibility of firms' replacement threat.

These microeconomic developments have had important macroeconomic consequences since they rotate the P function upward, and increase the share of profits at the expense of wages. This shifts the point of intersection with the IS schedule left, resulting in lower output and employment. These changes have also flattened the WW schedule, resulting in lower real wages for each level of employment.

Another cause of poor macroeconomic performance, is the cumulative effect of persistent deficits which have raised the level of the national debt. Let the debt:deficit ratio be given by

(17) \( \frac{B}{D} = b \quad b > 0 \)

Substituting (17) in equation (11) and rearranging yields

(18) \( P = \frac{I + D - s_N[1 - t_p]wN}{s_k[1 - t_p]} - ibD \)
Equation (18) corresponds to the IS schedule. Initially, an increase in D is expansionary and shifts the IS up since \( \frac{dP}{dD} > 0 \). However, over time, cumulative persistent deficits increase the coefficient "b", which pulls the IS schedule down. In the U.S., the deficit was fairly constant throughout the 1980s and early 1990s at around $200 billion, but the debt rose from $1 trillion in 1980 to over $4 trillion in the mid-1990's. Thus, "b" has risen from 5 to 20, which is contractionary. The U.S. is now in a stage where D has fallen substantially, so that the there is no longer an expansionary flow (deficit) dimension to the budget, but the contractionary stock (debt) dimension remains.

Lastly, the anti-clockwise rotation of the P function resulting from the decline in worker power also explains why expansionary fiscal policy has become less effective. This rotation has shifted income shares from wages to profits, and caused the expenditure multiplier to fall. Thus, as output expands, profits now receive a greater share of the increment, and as saving out of profits is larger than that out of wages, this has increased the demand leakage out of the system and reduced the multiplier.
Appendix

This appendix derives the results presented in the section on comparative statics. Totally differentiating equations (13) and (14) yields

(A.1) \[ dP = z_y dy/a + z dy + yz_X dX + z_R R_i dI \]

(A.2) \[ \{s_w - t_w[s_w-1]\} dy - \{s_w - t_w[s_w-1]\} dP + \{s_k - t_k[s_k-1]\} dP \]

\[ + [1 - t_k]P d s_k - [s_k - 1]P d t_k = dI + B[1 - t_k][1 - s_k] dI \]

\[ - iB[1 - s_k] d t_k - iB[1 - t_k] d s_k \]

It is assumed that the profit share falls as output rises, reflecting greater insider power.

Signing the partial derivatives and arranging (A.1) and (A.2) in matrix form then yields:

\[
\begin{vmatrix}
+ & - & dP & + & 0 & 0 & dX \\
+ & + & dy & 0 & + & - & + \\
+ & + & ds_k & dt_k & dI & dI
\end{vmatrix}
\]

The Jacobian, |J|, is positive. Using Cramer's rule the comparative statics are:

\[
dP/dX > 0 \quad dy/dX < 0
\]

\[
dP/di > 0 \quad dy/di > 0
\]

\[
dP/ds_k < 0 \quad dy/ds_k < 0
\]

\[
dP/dt_k < 0 \quad dy/dt_k < 0
\]

\[
dP/dI > 0 \quad dy/dI > 0
\]
References


Figure 1 The determination of equilibrium profits, output, employment, and real wages.
Profit

Figure 2  Phase plane diagram associated with the dynamical system given by equations (14) and (15).
Figure 3 The case of a limit cycle, which emerges if the deficit is counter-cyclical and the investment function is sufficiently quasi-concave in output, so that the IS schedule becomes positive over a certain range of output.
Profit

\[ P_1 = s_1 y \]

\[ p^*_1 \]

\[ P_2 = s_2 y \]

\[ p^*_2 \]

IS

\[ y_1 \quad y_2 \quad \text{Output} \]

\[ N_1 \]

\[ N_2 \]

\[ y_1 = f^1(N) \quad y_2 = f^2(N) \]

Employment
Figure 4 Illustrates the potential conflict between efficiency and control resulting from the trade-off between productive efficiency and bargaining strength.