puts sellers choose given seller-set price markets. These markets require a far more complicated dynamics than do perfectly competitive markets, and therefore are not usefully subsumed under perfectly competitive markets.

These papers will not end the debate about AS/AD analysis. There is clearly more to be said, but, for a while at least, this Journal will stay out of the fray, and let the dust settle over what has already been said.

KEYNESIAN THEORY AND AS/AD ANALYSIS

Thomas I. Palley
APL-CIO

INTRODUCTION

In a recent paper, Dutt and Skott (1996) have provided a defense of the aggregate supply-aggregate demand (AS/AD) framework. They focus on the usefulness of the AS/AD framework for comparing alternative macroeconomic perspectives. This paper further investigates the AS/AD framework, and focuses on the different short-run adjustment dynamics implied by different perspectives.

Dutt and Skott also maintain that the neo-Keynesian (also termed neo-classical synthesis) and Kaleckian models represent different perspectives on macroeconomics. The current paper argues that the Kaleckian model is nested within the neo-Keynesian model, and shares the same output dynamics. The Kaleckian model's adoption of a constant marginal product of labor (MPL) is a special case of the neo-Keynesian model, as is the claim that nominal wage levels are irrelevant for macroeconomic outcomes.

The significant contribution of the Kaleckian paradigm is to emphasize differences in the propensity to consume out of wages and profit income. This pushes distributional concerns to the fore of macroeconomics, and highlights the significance of capital-labor conflict. However, these distributional concerns can be incorporated readily within the neo-Keynesian model. Since the Kaleckian model has the same analytical structure, output dynamics and equilibrium closure as the neo-Keynesian model, it is argued that the Kaleckian model should be considered a part of the Keynesian family of models rather than a separate theoretical entity.

THE AD FUNCTION AND THE AD SCHEDULE

Before turning to the issue of AS/AD adjustment dynamics, it is worth excavating the foundations of the AD schedule. This is a point that has recently been raised by Colander (1995), who argues that the AS/AD model promotes a confusion of the "AD function" and the "AD schedule". The former provides a relation between price and quantity demanded that is predicated on a given output; the latter is a goods market clearing schedule which determines the price at which quantity demanded is equal to the level of output.

This difference can be illustrated as follows:

\[
Q^e = y
\]

\[
Q^d = D(P, y, \ldots)
\]

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The aggregate demand "schedule" is obtained by equating (1) and (2) so that

\[ y = D(P, y, ...) \]

It therefore establishes the price level at which quantity demanded equals output. The AD "function," which is drawn in price-quantity demanded space, shifts as output changes. It is the macroeconomic analogue of the Marshallian microeconomic demand function. The AD "schedule" is invariant to changes in output, and provides a locus of goods market clearing price-output combinations that is conditional on the exogenous factors affecting the AD function.

The AD function is invisible in the AS/AD diagram. This is because the system involves three endogenous variables — price, output, and quantity demanded — so that one must be dropped in a two-dimensional diagram.

**SHORT-RUN DISEQUILIBRIUM DYNAMICS IN THE AS/AD MODEL**

Despite the problem of being restricted to two dimensions, the AS/AD framework is still highly effective for revealing the different short-run disequilibrium price-output dynamics implied by different perspectives. Figure 1 shows a conventional AS/AD diagram, in which \( E_f \) corresponds to the initial equilibrium. The AD schedule yields the level of prices that would clear the goods market contingent on the existing configuration of factors affecting aggregate demand and the existing level of output. The AS schedule corresponds to the economy-wide marginal cost schedule, which is contingent on the level of nominal wages and the level of technology. These two schedules are given by

\[ y = D(P, y, ...) \]

\[ P = W/f'(y) \]

where \( W \) = nominal wage, and

\( f'(y) \) = inverse of the marginal product of labor (first derivative of the production function).

A positive autonomous demand shock shifts the entire AD schedule right. In a new classical world, prices and output are instantaneously flexible, and the economy immediately moves to a new short period equilibrium at \( E_f' \).

Figure 2 shows the conventional neo-Keynesian fix-price construction of output dynamics in which prices are a state variable that are fixed at any moment in time, but output is perfectly flexible. This construction corresponds to the fix-price general disequilibrium Keynesianism developed by Barro and Grossman (1971). Output immediately jumps to \( E_f' \), yielding a full multiplier effect. At this stage, prices are below marginal cost. Firms therefore begin reducing output, and the economy then slides...
up the AD schedule to $E_i$. However, this raises questions as to why profit maximizing firms initially increase production, given that prices are below marginal cost.

Figure 3 shows an alternative neo-Keynesian approach to adjustment which is predicated on the assumptions that prices are instantaneously flexible, but output is a state variable that adjust sluggishly. Consequently, prices immediately increase to clear the goods market, and the economy moves to $E_i^*$. The logic is that with unchanged output and increased aggregate demand, prices must rise to clear the goods market. At $E_i^*$, prices exceed marginal cost as determined by the AS schedule, and firms therefore have an incentive to increase output. Thereafter, the economy slides down the AD schedule until it reaches $E_i$. Palley [1996, Chapter 4] provides a full account of these dynamics, and also provides microeconomic foundations for why dynamics of flexible prices and sluggish output adjustment are to be preferred. The existence of production scheduling costs and the fact that production is a time-consuming process both suggest that output is likely to be a sluggish variable, whereas instantaneous output adjustment and sluggish price adjustment results in a violation of profit maximizing behavior since firms produce in a region where prices are below marginal costs.

A final possibility, illustrated in Figure 4, is that prices and output are both sluggish. In this case, the economy slides along the AS schedule until it reaches the new equilibrium at $E_i$. Once again, this description is microeconomically problematic, since there is persistent unsatisfied excess demand along the adjustment path. This is because the market clearing price, as given by the AD schedule, lies above the price as determined by the AS schedule for the entire adjustment path.

WHAT DISTINGUISHES THE KALECKIAN MODEL FROM THE NEO-KEYNESIAN MODEL

The dynamics shown in Figures 2 and 3 are both consistent with the Kaleckian paradigm. Indeed, the Kaleckian model with its horizontal AS schedule has historically been represented in terms of Figure 2. Given this equivalence of dynamics, what distinguishes the neo-Keynesian and Kaleckian models?

One principle difference concerns the specification of the AD function. The neo-Keynesian model assumes that propensity to consume out of wage and profit income is identical, whereas the Kaleckian model assumes that the propensity to consume out of wage income exceeds that of out of profit income. The neo-Keynesian AD function is therefore given by

$$Q^* = D(WNI + [\nu - WNPl] + I + G),$$

where $I = \text{investment spending}$, and $G = \text{government spending}$.

The Kaleckian AD function is given by
Equation (8) is the AD schedule or goods market clearing condition. Equation (9) is a linearized AD function. Equation (10) has firms setting prices as a mark-up over average variable cost, and represents the AS schedule. Equation (11) defines average variable cost, while equation (12) is a standard concave production function that embodies diminishing MPL.

Substituting (9) - (12) in (8) yields

$$y = [G + (1 - b_e) / (1 + m) - b_e b / (1 + m)].$$

Per equation (13), the equilibrium level of output is independent of the level of nominal wages — the Kaleckian wage irrelevance theorem — but the AD schedule is now positively sloped in output-price space since average cost rises with output.

A similar conclusion regarding nominal wage irrelevance is reached if firms set prices as a mark-up over marginal costs so that

$$P = (1 + m) W / \Delta N.$$

If the mark-up is zero, price equals marginal cost

$$P = W / \Delta N.$$

This last specification corresponds to the standard neo-Keynesian specification of the AS schedule.

These considerations reveal that the neo-Keynesian representation of the AS schedule as positively sloped is fully compatible with the Kaleckian model, and the assumption of constant MPL is a special case. It also shows that the Kaleckian nominal wage irrelevance theorem is unrelated to the behavior of the MPL. Instead, it rests on a particular specification of the AD function that excludes nominal wealth effects (about which more below), and the identical nominal wage irrelevance theorem applies to the neo-Keynesian model if the AD function excludes nominal wealth effects.

For short-run macroeconomic analysis, the differences between the neo-Keynesian and Kaleckian approaches therefore reduce to differences over (i) the degree of emphasis on and the particular justification for the functional distribution of income affecting aggregate demand, and (ii) the microeconomics of pricing. These are differences of "degree". The Keynesian model is fully capable of incorporating distributional concerns through appropriate specification of the AD function, while the Kaleckian notion of the mark-up can be viewed as the incorporation of imperfect competition considerations into the macro model.

The substantive analytic contribution of the Kaleckian model is its implied focus on capital-labor conflict which follows from its "particular" construction of the macroeconomic effects of income distribution. However, even here the output effects are ambiguous since higher mark-ups will raise profits, and if investment responds strongly to profitability (i.e., investment is not exogenously determined), then AD and output could actually increase. This possibility has been identified by Bhaduri and Marglin [1990] with their distinction between "exhilarationist" and "stagnationist" regimes.

**Nominal Wages in the Neo-Keynesian and Kaleckian Models**

The previous section showed that the nominal wage irrelevance theorem rests on neither income distribution effects nor the presence or absence of diminishing returns to labor. Instead, it rests on the absence of nominal wealth effects on aggregate demand.

The conventional neo-Keynesian model includes a Pigou effect in the AD function. Thus, AD depends positively on real money balances, and a reduction in the price level brought about by a reduction in nominal wages will increase AD. Clearly, the same argument holds if a Pigou effect is included in the AD function of the Kaleckian model.

Some neo-Keynesians [Tobin, 1980] have argued that the Pigou effect may be dominated by the Fisher debt effect, and that price and nominal wage reductions reduce AD. The argument is that lower prices increase the wealth of creditors, but also increase the burden of debts on debtors. If debtors have a higher marginal propensity to consume than creditors, price level reductions may reduce aggregate demand.

This emphasis on the distinction between debtors and creditors complements the Kaleckian distinction between wage and profit income, which is itself frequently represented in terms of a distinction between worker and capitalist households. Indeed, since workers tend to be net debtors, the two sets are likely to be highly overlapping.

The implications of including the Pigou and Fisher effects in a Kaleckian model can be readily seen from the following model.

$$y = AD.$$

$$AD = b_w W / N + b_w (y - W / N) + b_w P / W + b_w P / N - W / N + b_w M / P + 1 + G,$$

$$\frac{1}{b_w} \geq b_w > 0, b_w < 0, b_w > 0, b_w > 0.$$

$$P = (1 + m) AC.$$

$$AC = W / N.$$

$$y = f(\Delta N),$$

where $L_w =$ stock of nominal inside debt owed by workers,

$L_c =$ stock of nominal inside debt owed by capitalists, and

$M =$ nominal money supply.
The only change from earlier is the inclusion of a Pigou and Fisher effect in equation (19). These effects are captured through the terms $b_y$, $b_p$, and $b_f$.

The Fisher debt effect for workers operates on worker borrowings, $L_w$. It is scaled with respect to the wage bill, reflecting the fact that worker households are debtors. A decrease in nominal wages therefore increases the debt burden of workers, and since they have a higher propensity to consume, this reduces AD. The Fisher debt effect for firms operates through capitalists’ borrowings, $L_c$. The coefficient $b_f$ also allows for the possibility that higher debt burdens may negatively affect the spending of debt-laden capitalists. However, capitalists’ debt burdens are scaled by reference to nominal profit income.

The AD schedule (equation (14)) is negatively sloped in employment-price space if (i) the AD function (equation (15)) is a negative function of price, and (ii) the elasticity of the AD function with respect to employment is less than elasticity of output with respect to employment. The AS schedule (equation (16)) is always positively sloped. Such a construction is identical to that of the neo-Keynesian model.

Nested within the model given by equations (14) - (18) are a range of possible responses to a nominal wage reduction, and these are illustrated in Figures 5 - 8. Figure 5 corresponds to the case where $b_y > b_t > 0$, and $b_p = b_f = 0$. In this case, the AD schedule is vertical, and nominal wage reductions lower the price level but have no effect on output. This representation of AD corresponds to Keynes’ construction of AD in Chapter 8 of The General Theory. It also corresponds to the construction of AD in the income-expenditure model, so that Figure 5 provides an ASAD analogue of that model. This is the Keynesian nominal wage irrelevance theorem, and it is identical to the Kaleckian irrelevance theorem.

Figure 6 corresponds to the case where $b_y = b_t > 0$, $b_p = b_f = 0$, and $b_t > 0$. In this case the AD schedule is negatively sloped. Reductions in the nominal wage shift the AS schedule down, while leaving the AD schedule unchanged, and output expands.

This case corresponds to the conventional textbook neo-Keynesian case in which income distribution is irrelevant for AD, and there is a Pigou effect but no Fisher debt effect.

Figure 7 corresponds to the case where $b_y > b_t > 0$ and $b_p = b_f = 0$. This is the Kaleckian version of the neo-Keynesian model in which the functional distribution of income matters, but there is no Pigou or Fisher debt effect. The AD schedule is downward sloping, while the AS is upward sloping. Reductions in the nominal wage shift the AD and AS schedules down by an equal amount, and equilibrium output is unchanged.

Lastly, Figure 8 corresponds to the case where $b_y > b_t > 0$, $b_p > 0$, $b_f > 0$, and $b_f > 0$. This is the general neo-Keynesian case in which income distribution can matter for AD, and there are both Pigou and Fisher debt effects. In this instance, there are two possible different qualitative outcomes in response to a nominal wage reduction. The initial equilibrium corresponds to the pair $(y_p, P)$, and is determined by the intersection of the AD, and AS schedules. Lower nominal wages shift the AD schedule down. If the Pigou effect dominates the Fisher effect, the AD schedule shifts down to AD1, and the new equilibrium is marked by higher output of $y_1$. This increase in output is less than would have been the case were there no Fisher debt effect.
CONCLUSION

This paper has shown how the AS/AD framework can be used to illustrate the competing approaches to (i) the dynamics of short run price - output adjustment, and (ii) the employment and output effects of nominal wage reductions. The paper has also argued that the Kaleckian model represents a variation on the neo-Keynesian model, embodying the same equilibrium concept, the same pattern of output dynamics, and the same comparative statics in response to changes in the nominal wage. Nominal wages affect equilibrium output and employment if AD is subject to the Pigou and Fisher effects, and not otherwise. The Kaleckian model assumes a constant MPL, but this is merely a simplifying assumption. Once removed, the similarity between the neo-Keynesian and Kaleckian models is rendered transparent.

The principal contribution of the Kaleckian approach is a concern with the AD effects of the functional distribution of income. This introduces the mark-up as an important independent variable, and focuses attention on capital-labor conflict. This feature is an original and important contribution, and ultimately leads to a different theory of income distribution. However, when it comes to AS/AD analysis, the Kaleckian model is encompassed within the neo-Keynesian model.

NOTES

1. This holds if \(-k \cdot WN + \lambda \cdot WN - \lambda \cdot \Delta P - WN - k \cdot M < 0\). Lower prices increase real wages and the value of real balances: they lower real profits and increase the burden of capitalist debts. If the effect of the former on AD dominates, then the IS function is negatively sloped.

2. This corresponds to the standard Keynesian assumption that the marginal propensity to spend is less than unity. Thus, when output increases by one unit, AD increases by less than one unit, thereby more slowly bringing the goods market to clear.

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ON AN ALLEGED INCONSISTENCY IN AGGREGATE-SUPPLY/AGGREGATE-DEMAND ANALYSIS

Amata Krishna Dutt
University of Notre Dame

INTRODUCTION

Aggregate supply and aggregate demand (AS/AD) analysis is a popular tool in the teaching of macroeconomics theory. This analysis—which is to be found in most well-known economics principles and intermediate macroeconomics texts—involves the use of a diagram with an aggregate supply curve and an aggregate demand curve in price level and real output space to show how the equilibrium levels of price and real output are determined at their point of intersection.

A number of economists, however, have recently argued that the AS/AD analysis is logically flawed by internal inconsistency. No less a macroeconomist than Barro has argued that the AS/AD analysis is "unsatisfactory and should be abandoned as a teaching tool" (1994, p.4). Other recent critics include Fields and Hart (1996), Colander (1995) and Blasdui, Laski and Risse (1995). These views are being endorsed by other economists as well, including Geithman (1994) and Colander (1997), although they are interested primarily in its suitability as a teaching tool, and not in the theoretical aspects of the analysis. The debate is about whether the AS/AD analysis is suitable as a teaching tool, of course, is not independent of whether or not the analysis is theoretically unsatisfactory and inconsistent. One should hardly use an analysis for teaching purposes if it is known to be theoretically unsound. If indeed the analysis is theoretically unsound, all books which use the AS/AD analysis should be recalled or rewritten.

The purpose of this note is to discuss one important problem with AS/AD analysis which has been pointed out by a number of critics, to examine how widespread the problem actually is in intermediate macroeconomics texts, and to propose a possible solution to the problem.

THE PROBLEM

A large number of problems have been raised about the AS/AD analysis. Most of them, however, are relevant only for particular versions of the analysis. One problem, however, is argued to exist in most presentations of the AS/AD analysis. The problem arises from the way macroeconomic models are presented in most textbooks,