BROADENING THE THEORY OF AGGREGATE SUPPLY:

A "NEW CRITICAL" PROPOSAL

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INTRODUCTION

Recent decades have witnessed widespread rejection of discretionary government stabilization policy, and of the underlying Keynesian model. While monetary policy in practice seems to have survived the ascendancy of libertarian thought to the highest councils of the Federal Reserve system, fiscal policy, especially in the form of government spending, is in rather total disrepute. At the level of the textbooks, the theoretical foundation is now almost entirely provided by the "New Classical" macroeconomics, which teaches that competitive labor markets and a flexible, endogenous price level combine to generate a dynamic short-run aggregate supply curve, and a vertical long-run aggregate supply curve. The positive government-spending multiplier of the Keynesian model rests upon an unacceptable neglect of the labor market and the price level. At best, it points to rigidities in prices and money wages and elements of less-than-perfect competition that create a temporary space for discretionary policy to affect real output and employment. Even this effect, however, is largely nullified to the extent that people form rational expectations of government stabilization efforts. Fiscal and monetary policy thus have no significant impact on output, but instead determine only the level of money prices.[1]

While many texts appear to be settling at a point in between the New Classical and Keynesian extremes, it is common to award victory in logic to the New Classical view, while insisting, often with some puzzlement, that the facts still seem to support the Keynesian position. Thus, output fluctuations are significant, and cannot be explained by non-policy exogenous shocks alone; monetary policy is demonstrably effective.[2] In any dispute between theory and facts, however, theory ultimately wins. It is therefore of some interest to inquire whether the New Classical challenge can be met at the level of theory. The labor market is indeed decisive for overall macroeconomic behavior, but a fuller representation of what takes place in the all-important exchange of labor services for wages may result in a richer view of stabilization policy — one that does not rest solely upon myopia, imperfections and rigidities.

In this paper, the Aggregate Demand concept, as it has evolved in the literature, is retained, with attention directed towards re-conceptualizing Aggregate Supply. I

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will develop a "New Critical" alternative to the standard New Classical view, at the intermediate textbook level. If the intuition underlying my proposal seems reasonable and the results obtained fruitful, others may wish to help explore and develop the complete foundations of the theory.

As the above implies, the New Critical proposal offers a user-friendly supplement to the usual teaching materials. I have experimented with the new ideas in both introductory economics and intermediate macroeconomics classes, with generally good results. Finally, I note, in a clear attempt to dampen expectations, that nothing approaching a comprehensive survey of the literature is attempted in this paper; the "canonical" New Classical model presented below could be drawn from any number of standard texts,[3] and is part of the general *corpus* of economic theory. I will, of course, provide references for the ideas underlying the New Critical position as the argument proceeds.

The next section sets forth the New Classical model — a composite focusing on only those features that are essential for critique, comparison and, eventually, synthesis. The third section discusses the conceptual foundations, and sources, of the New Critical view. The fourth section presents the "canonical" New Critical model, at the same level of formalism as its New Classical counterpart. In the fifth section I address the possibility of synthesizing the two models; synthesis would presumably capture far more of the richness of what actually occurs in the world than either of the two models separately. This reference, incidentally, suggests that the "orthodox" position in macroeconomics is not, in some absolute sense, wrong; it is, rather, incomplete. In anticipation of a complete synthesis of the two perspectives, I offer an interim suggestion in which the two adjustment mechanisms alternate. The last section concludes and summarizes. I will anticipate here only to this extent: the New Critical proposal, and the Critical/Classical synthesis, by no means vindicate an old-fashioned "hydraulic" Keynesian multiplier view of stabilization policy,[4] but rather raise questions about the wider social conditions for, and effects of, policy interventions. Rather than attempting to counter "policy ineffectiveness" [McCallum, 1980] with "policy effectiveness," the New Critical model and synthesis offer us, I propose, an opportunity to think more fully about the question: what *kind* of effectiveness, and with what longer-range impacts?

A CANONICAL NEW CLASSICAL MODEL

We begin on familiar terrain. Combine a Phillips Curve — an inverse relation between the growth rate of the money wage rate and the unemployment rate — with a stable markup, and a simple linear production function — the relation between output and quantity of labor employed, with a given capital stock and in conditions of constant productivity — to find a relation between the change in the price level and the level of output Y relative to a strategic pivot level, Y^*. In discrete time, with the subscript $_{-1}$ indicating the previous time period, we have

$$P = P_{-1} + \delta(Y - Y^*) \tag{1}$$

This is the canonical Aggregate Supply (AS) curve for the New Classical case.[5] The pivotal Y, Y^*, is the level of output corresponding to a level of employment consistent, given the size of the labor force, with the "natural rate of unemployment" or NAIRU ("non-accelerating inflation rate of unemployment"), U^*. The idea is simple, and corresponds to a strong intuition running through many schools of thought: U^* is the unemployment rate at which the balance of power in the labor market is at the precise level required to keep the money wage rate from either rising or falling. $Y = Y^*$ ($U = U^*$) implies a constant money wage rate, and therefore price level ($P = P_{-1}$). $Y > Y^*$ suggests a tight labor market and rising price level, and conversely. The coefficient δ measures the strength of this transmission mechanism: the intensity with which tightness or slackness in the labor market results in rising or falling money wages, respectively, and in turn money wage changes result in corresponding movements in the price level (the degree of price flexibility). δ (> 0) is, of course, the slope of the AS curve. We will also need equation (1) written in inverse form:

$$Y = Y^* + \mu(P - P_{-1}), \text{ where } \mu \equiv \frac{1}{\delta}. \tag{1'}$$

Without unpacking it, I will represent the Aggregate Demand (AD) Curve as the linear relation

$$P = a - bY \tag{2}$$

This can be thought of either as a linearization of the IS-LM equation for equilibrium output [Dornbusch, Fischer and Startz, 85, 234], or of the quantity equation $P=MV/Y$ [e.g., Farmer, 1999, ch. 5]. Combining equation (1') with equation (2), we find a relation between today's and yesterday's price level

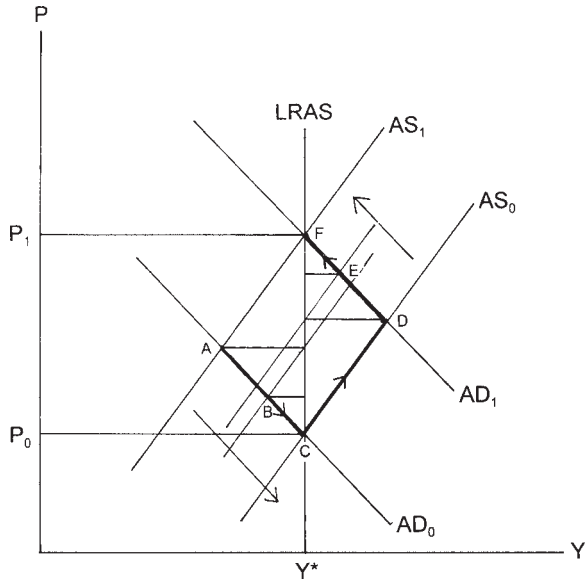
$$P = \left(\frac{a - bY^*}{b\mu + 1}\right) + \left(\frac{b\mu}{b\mu + 1}\right) P_{-1} \tag{3}$$

This is an ordinary difference equation, with solution

$$P = (a - bY^*)\left[1 - \left(\frac{b\mu}{b\mu + 1}\right)^t\right] + \left(\frac{b\mu}{b\mu + 1}\right)^t P_0 \tag{4}$$

It is clearly convergent with $\lim_{t\to\infty} P_t = P_\infty = a - bY^*$ and, using equation (2) , $Y_\infty = Y^*$. The convergent (long-run equilibrium) price level is determined by aggregate demand, and the convergent level of output is the pivotal output Y^*.

FIGURE 1
New Classical Dynamics



The logic is expressed in the familiar Figure 1. Degree of flexibility and adjustment time aside, an economy in which $Y < Y^*$ will adjust spontaneously *via* a falling P, while an attempt to increase output above Y^* will lead to rising P and $Y \rightarrow Y^*$, with at best a temporary impact on output and employment. Figure 1 captures the determination of the position of the short-run AS curve in each time period: $P = P_{-1}$ where $Y = Y^*$ (from equation (1)). The sequence of points ABCDEF represents, first, spontaneous adjustment to AD_0 *via* falling P from A to C (B is the first-period position); then, following an increase in aggregate demand to AD_1 adjustment *via* rising P from D to E (first period), and finally to F. Note that the intercept of the AS curve, equation (1), is $P_{-1} - \delta Y^*$, and that $P > P_{-1}$ implies rising P_{-1} — the AS curve shifts backward and to the left — and conversely for $P < P_{-1}$.

The New Classical adjustment mechanism thus captures one aspect of labor-market behavior: the effect of excess demand for labor on the money wage rate and the pass-through to the price level. The leftward shift of AS as the price level rises mirrors a similar leftward shift in the supply curve of labor — the money wage rate drawn against the quantity of labor supplied — which in turn rests on the assumption that underlying conditions of labor supply have not changed. Once workers discover the impact of the rising price level on the real wage rate, they demand a higher money wage rate, w_m, for each given quantity of labor supplied; the supply curve of labor in terms of the real wage rate, w, is unaltered.

A FULL-BLOODED LABOR MARKET: THE DOBB EFFECT

The reference above to an unchanging supply curve of labor in real terms provides the key to an expanded view of the aggregate supply of output. To reveal the underlying issues, it will be useful first to derive labor supply from an explicit microfoundation: utility maximization over income, *Y*, and leisure, *LE*. The utility function must have multiplicative separability; the familiar Cobb-Douglas form is, as always, the easiest to work with:

$$U = Y^{\alpha} LE^{\beta} = (wL + \pi)^{\alpha} (\bar{L} - L)^{\beta}, \text{ with } \alpha, \beta \in (0,1) \tag{5}$$

where *w* is the real wage rate, π is non-labor income, *L* is labor employed, and $\bar{L}$ is the total time available for allocation to labor and leisure. Equation (5) is a well-defined unconstrained optimization; $\frac{\partial U}{\partial L} = 0$ has the solution

$$L_S = \varphi \bar{L} - (1 - \varphi)\frac{\pi}{w}, \text{ where } \varphi \equiv \frac{\alpha}{\alpha + \beta}. \tag{6}$$

This is the supply curve we are seeking. It has the required upward slope, rising to an asymptote at $L_S = \varphi \bar{L}$. Most interesting is what it reveals for what might be called the "pure" working-class case, in which there is no non-labor income: $\pi = 0$. This strong case, in effect, posits *two* representative agents: one that owns property and one that does not (cf. the conventional bias in favor of a *single* representative agent [e.g., Farmer, 1999, ch. 4]). If we assume that workers have no ownership of land or other natural or productive resources, and no significant accumulated savings providing them with interest income above some nominal amount, then $L_S = \varphi \bar{L}$; the labor supply curve is vertical and independent of the wage rate. I will use this strong case in what follows, pending generalization to situations in which π is significantly > 0.

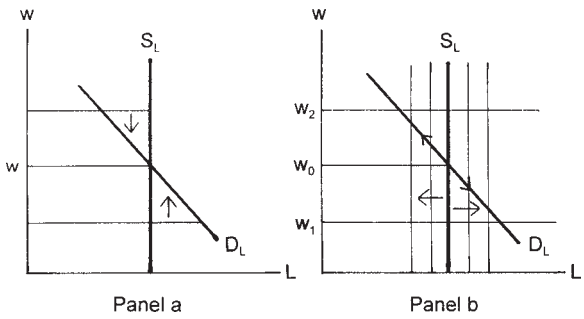
The question now is, what determines φ, the relative elasticity of utility (well-being) with respect to *L*? If social and economic events (such as stabilization policy moves) affect the supply of labor, this will appear as a change in φ; the preference parameter φ is therefore intrinsically endogenous.

This point was made in a seminal and unduly neglected paper by the British economist and economic historian Maurice Dobb, "A Skeptical View of the Theory of Wages," which appeared in the *Economic Journal* of December 1929. Dobb sought to establish the basis for a determinate outcome, such as an equilibrium of the wage rate. A necessary condition for this, in his view, is the substantial independence of the determining forces — the supply of and demand for labor — from that which is being determined. In a microeconomic setting, labor supply to a particular firm or sector may be thought to be reasonably independent of the wage offered by that firm or sector. Since the economic position of the supplier rests in significant measure on the

opportunity to seek employment elsewhere, the wage offered by the individual firm or sector is not the sole, or even a major, determinant of the income-earning possibilities of the supplier. In this sense, the microeconomic wage bargain resembles determination of equilibrium prices and quantities in individual goods markets. Here, again, the price resulting from supply and demand does not enter, in any important way, into the shaping of those underlying forces. As Dobb expresses the point, "the marginal utility of income both to buyers and sellers can be regarded as unaffected by the price at which exchange takes place and by the volume of such transactions" [Dobb, 1955, 25]. This, however, ceases to be true in the case of the macroeconomic labor market. Dobb continues:

> When labor . . . is being sold, the marginal utility of income, at any rate to the seller, cannot be treated as constant. Since the labourer is propertyless, the sale of his labour will constitute his only source of income, and the terms of the sale will virtually affect his whole position, and will be the principal determinant of the labourer's subjective valuation of his own labour in terms of the income which he secures in return. In other words, a change in the price of labour in either direction is likely to produce a change in the supply-price of labour of a similar kind, thereby creating a tendency for any fall in wages to become cumulative, as in the classic case of sweated trades. If we have here an equilibrium at all, it is unstable rather than stable. [*Ibid*.]

FIGURE 2
Two Views of the Labor Market



The point can be expressed graphically. In Figure 2, panel *a* represents the usual view of labor market equilibrium, borrowed from microeconomics. The supply curve is vertical, reflecting the strong assumption $\pi = 0$ (relaxing this assumption does not change the results obtained below in any essential way). The demand curve is drawn in the conventional manner — downward sloping — although one must express serious doubts about basing this on choice of technique in a short-run context in which technical change and choice are presumably absent. Independence of the curves from their arguments determines the most crucial feature of competitive equilibrium: competition on each side of the market protects those on the other side, and $\bar{w}$ is a genuine, and unique, equilibrium wage rate.

Panel *b*, by contrast, represents the macro view, and shows the impact of changes in w on the supply curve. A sustained decrease in the wage rate below its accustomed level causes φ, and therefore L_s, to increase, and conversely for an increase in the wage rate. The outcome is essentially indeterminate; it depends on the strength of conflicting forces. In the case of a wage rate below the accustomed level there is upward pressure from excess demand — the conventional emphasis — but also downward pressure as the lowered wage results in drying up of personal savings, borrowing against insurance plans and pension funds, weakening of the financial position of trade unions and consequent deterioration of strike and social support funds, using up of government benefits (food stamps, for example), and increase in personal indebtedness — in a word, increase in the marginal utility of income and consequently in the supply of labor. I propose, with what I believe is due academic justice, to call this the *Dobb Effect*.

The key to the Dobb Effect is to grasp the impact of wage changes dynamically: they initiate a *process of change* in the conditions underlying the relative strength of labor and in the *customary standard of living* — the social-cultural construction of what is required to live in normal circumstances. It is important, in view of Dobb's formulation of the point in terms of utility theory, to note that the Dobb Effect is much more than merely the incorporation of the income effect into the labor supply curve, a factor that was only beginning to be understood (at least in the English-speaking world!) at the beginning of the 1930s. The elements of conflict and indeterminacy are at the heart of the concept. In Figure 2, panel *b*, the wage bargain shapes the evolution of φ and the position of the supply curve, incorporating both the relative social strength of labor and the set of socially shared customary expectations regarding the workers' standard of living. (Dobb also discusses its impact on the demand curve; I am focusing, for present purposes, on the supply side.)

To avoid the fallacy of composition in the construction of a core macroeconomic model, the microfoundation for macroeconomic reasoning must indeed be developed, but on the terrain of the labor market, rather than (as hitherto) solely at the level of the goods market. Writing in 1929, Dobb could not have foreseen the application of his insight to the macro policy problem, and for some reason did not return to this in later years. I believe the implications may be significant.

THE CANONICAL NEW CRITICAL ALTERNATIVE

In the New *Classical* view of the labor market, money wage and price dynamics are initiated by departure of real income Y from a critical, or pivotal, level, Y^*. The New *Critical* alternative has an opposite starting point, and is in fact in some sense a "dual" to the New Classical model. Dynamics in the supply of labor and therefore in real income emerge from departure of the real wage rate w from a critical, or pivotal, level, w^*. This is the real wage rate corresponding to the *customary standard of living*: the standard that, for cultural and historical reasons more than biological or physiological ones, is required if sellers of labor are to successfully reproduce their conditions of existence; literally, re-create; or, more colloquially, "make it," or "get by" [see Ehrenreich, 2001]. In the macroeconomic short run — i.e., outside of the context of growth and development — the level of w^* can be taken as given.

The dynamics of labor supply can then be represented, at the same intermediate formal level as price dynamics in the canonical New Classical model, as follows:

$$L_S = L_{S_{-1}} + \eta(w^* - w) \tag{7}$$

This is the Dobb Effect on the terrain of the New Critical model: deviation of the real wage rate from its customary, or pivotal, level causes the supply of labor to change from period to period. The demand curve for labor then determines w.

The production function is $Y = yL$, where y = the (constant) productivity of labor. Translation to the space of aggregate supply is then straightforward. Since the labor supply curve is vertical, output supplied is simply

$$Y = yL_S = yL_{S_{-1}} + y\eta(w^* - w) = Y_{-1} + \kappa(w^* - w). \tag{8}$$

The final step in the derivation of the New Critical AS curve involves the simple identity relating the real wage rate to the money wage rate and the price level:

$$w = \frac{w_m}{P} \qquad w^* = \frac{w_m}{P^*}. \tag{9}$$

Note that the pivotal wage rate, w^*, provided w_m is given, defines a pivotal price level, P^*.

In this presentation of the New Critical model, I will invoke a strong version of new-Keynesian coordination, or information asymmetries, or efficiency-wage theory, or long-term labor contracts [Dornbusch, Fischer and Startz, 2001, 111-116], and simply hold the money wage rate constant. This provides a sharp contrast with New Classical theory, in which the money wage rate is of course highly flexible but the underlying determinants of labor supply are (explicitly or implicitly) held constant.

Using equation (9), equation (8) can be further processed into

$$Y = Y_{-1} + \kappa w^* \left(\frac{P - P^*}{P} \right). \tag{10}$$

Since $\frac{\partial}{\partial P}\left(\frac{P - P^*}{P} \right) = \frac{P^*}{P^2} > 0,$ this expression can be re-linearized, to keep our tools manageable (as is so often done to create textbook versions of New Classical reasoning):

$$Y = Y_{-1} + \varepsilon(P - P^*) \tag{11}$$

and, in inverse form, to conform to the usual graphical representation:

$$P = P^* + \lambda(Y - Y_{-1}), \text{ where } \lambda = \frac{1}{\varepsilon}. \tag{11'}$$

Equations (11) and (11') are the New Critical AS curve we have been seeking, the counterparts to equations (1) and (1') for the New Classical case.

We proceed in exactly the same way as previously. Combine equation (11) with the AD curve, equation (2), to find the relation between this period's and last period's output:

$$Y = \frac{a - P^*}{\lambda + b} + \left(\frac{\lambda}{\lambda + b} \right) Y_{-1}, \tag{12}$$

an ordinary difference equation with solution

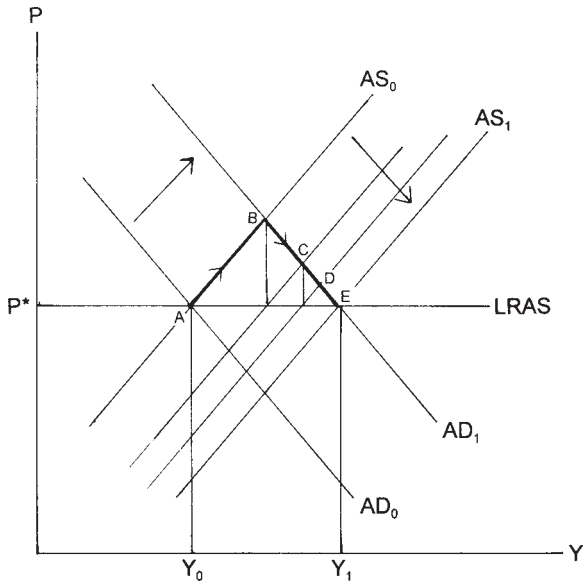
$$Y_t = \left(\frac{a}{b} - \frac{1}{b} P^* \right) \left[1 - \left(\frac{\lambda}{\lambda + b} \right)^t \right] + \left(\frac{\lambda}{\lambda + b} \right)^t Y_0. \tag{13}$$

As $t \to \infty$, Y approaches $Y_\infty = (a - P^*)/b$; output is determined by aggregate demand. The convergent price level, P_∞, is of course $a - bY_\infty = P^*$.

The diagrammatic version is a straightforward dual to the New Classical adjustment story. Refer to Figure 3. We begin in equilibrium at A, where $P = P^*$ ensures that Y is stable (equation (11)), and then impose an expansionary rightward shift in aggregate demand, to AD_1. The movement is from A to B. The increase in price, with a given money wage rate, pulls w down below w^*, and the Dobb Effect kicks in. The supply of labor increases, and output rises; the falling price level ensures that the higher output level is consistent with the now-given level of monetary aggregate de-

mand. The intercept of the AS curve is $P^* - \lambda Y_{-1}$, and as Y (and consequently Y_{-1}) rises, this intercept falls; the AS curve shifts outward and to the right. In each period its position is established at the stable point where $P = P^*$, as shown. The adjustment process therefore proceeds, until the price level has fallen back to P^*, and w has risen back to w^*. At this point, E, output has risen, from Y_0 to Y_1. In this view of the labor market, then, it appears as though the Keynesian fiscal and monetary policy multipliers are vindicated! The long-run AS curve is horizontal, as in what is presumed to be the "naive" Keynesian model.[6]

FIGURE 3
New Critical Adjustment to a Demand Expansion



The new equilibrium at E is stable; the balance of power in the labor market is consistent with equilibrium in the goods and assets markets, given the level of autonomous demand. It might seem at first that since the real wage rate is once again at its pivotal level, w^*, savings would once again rise, debt levels fall, and so on, until both φ and L_s fall back toward their original levels. However, any leftward shift of AS from AS_1 would immediately drive the price level back up and w back down. AS_1 is thus a stable position of the AS curve. The heart of the matter, I think, is that the Dobb Effect does not posit a stable and reversible functional relationship between levels of the real wage rate and positions of the AS curve; it is, as noted above, a dynamic process and much depends upon the embodiment of recent experience in assumptions about the normal, conventional requirements of life. Once a cycle of

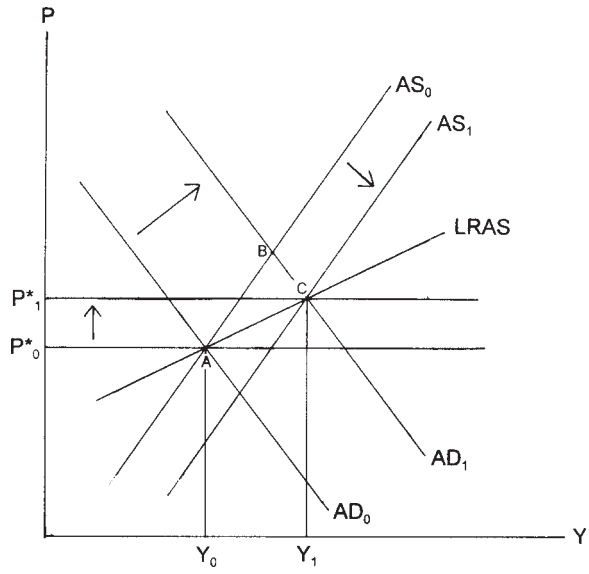
wage depression, following the chain $AD \uparrow \Rightarrow P \uparrow \Rightarrow w \downarrow$ & $(w < w^*)$, has been established, it would require a powerful social movement to reverse the *fait accompli* of "sweated trades," high employment, etc. Referring to both the demand curve for and the supply curve of labor, Dobb summarizes:

> Neither the "will to work" nor the "will to save" are independent of subjective valuations of income by the parties concerned and of conventional standards; and these in turn are not independent of the way in which income has been distributed by the wage bargains of the immediate past. (*Ibid.*, 29.)

TOWARD A SYNTHESIS

The assumption of a constant money wage rate is clearly untenable, and the simple New Critical story described in the last section rests upon it. Can we do better? In a "Sophisticated New Critical" model of a demand expansion, the money wage rate rises as unemployment falls and output increases (Figure 4). With a higher money wage rate, the pivotal price level P^* will also be higher; this results in a new equilibrium at C, and (by inference) a rising long-run aggregate supply curve instead of a horizontal one, and a reduced multiplier. The problem with this, of course, is that the degree of increase in w_m is completely arbitrary, and the question arises, is there any way to

FIGURE 4
"Sophisticated" New Critical Expansion



derive it? Put another way, the Y^*-Y dynamics are presumably as valid and important as the P^*-P dynamics, and vice versa. Can a model be constructed that incorporates both the New Classical and the New Critical properties? This is essential if we are to know whether the Dobb Effect persists in a model where the money wage rate is flexible, to *any* degree; whether, in other words, either adjustment mechanism dominates the other.

In anticipation of a model that rigorously combines the Dobb Effect and the Phillips Curve, I propose the following. The two AS curves coexist; following a demand expansion, the economy behaves New Classically in the first period, New Critically in the second, and so on, with the two behaviors alternating. While this seems arbitrary, it may not be a bad first approximation to a story in which both New Classical and New Critical adjustment mechanisms are in effect simultaneously: as the length of the time period approaches zero, the separation of the two behaviors progressively disappears.

Bringing together the difference equations (3) and (12), for the New Classical and New Critical cases respectively, we have (using P_t and P_{t-1} instead of P and P_{-1}):

$$P_t = (\alpha b)P^* + (\alpha\lambda)P_{t-1} \qquad \alpha \equiv \frac{1}{\lambda + b} \qquad \text{New Critical} \tag{14}$$

$$P_t = (\beta)\bar{P} + (\beta b\mu)P_{t-1} \qquad \beta \equiv \frac{1}{b\mu + 1} \qquad \text{New Classical} \tag{15}$$

where $\bar{P} = a - bY^*$, the demand-determined price level corresponding to Y^* in the New Classical case. All coefficients (in parentheses) are in the unit interval. I will trace the dynamics of the price level, rather than output; since P and Y are always related by the AD curve, determining either determines the other. Equation (15), the New Classical adjustment mechanism, determines the price in odd years (t is odd), while equation (14), the New Critical mechanism, governs in even years (t is even). Iterating from $t = 0$, the sequence begins as follows:

$$P_0$$

$$P_1 = \beta\bar{P} + \beta b\mu P_0$$

$$P_2 = \alpha b P^* + \alpha\beta\lambda\bar{P} + \alpha\beta b\lambda\mu P_0$$

$$\cdots$$

Continuing, simplifying, and taking limits as $t \to \infty$, we obtain this result:

$$P_{t\to\infty}^{EVEN} = \left(\frac{\alpha\beta\lambda}{1 - \alpha\beta b\lambda\mu}\right)\bar{P} + \left(\frac{\alpha b}{1 - \alpha\beta b\lambda\mu}\right)P^* \tag{16}$$

$$P_{t\to\infty}^{ODD} = \left(\frac{\beta}{1 - \alpha\beta b\lambda\mu}\right)\bar{P} + \left(\frac{\alpha\beta b^2\mu}{1 - \alpha\beta b\lambda\mu}\right)P^* \tag{17}$$

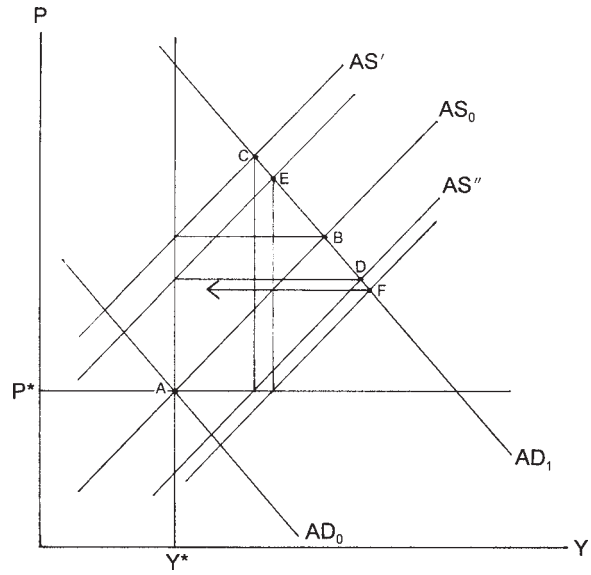
The coefficients of $\bar{P}$ and P^* in equations (16) and (17) can be simplified, removing the temporary constructs α and β:

$$P_{t\to\infty}^{EVEN} = \left(\frac{\lambda}{\lambda + b + b^2\mu}\right)\bar{P} + \left(\frac{b + b^2\mu}{\lambda + b + b^2\mu}\right)P^* \tag{16'}$$

$$P_{t\to\infty}^{ODD} = \left(\frac{\lambda + b}{\lambda + b + b^2\mu}\right)\bar{P} + \left(\frac{b^2\mu}{\lambda + b + b^2\mu}\right)P^* \tag{17'}$$

The convergent values of the price level in odd (New Classical) and even (New Critical) years are revealed to be weighted averages of $\bar{P}$ and P^*. Comparison of the coefficients will show that in odd years, when the New Classical mechanism is operating, P_∞ is closer to $\bar{P}$, and that in even years, when the New Critical mechanism is in effect, P_∞ is closer to P^* (as we would expect). The economy thus approaches a constant oscillation, with P alternating between high and low values — both of which are greater than $P_{0,}$ assuming the AD curve is to the right of AD_0, which passes through the point (Y^*, P^*) — and Y alternating in corresponding fashion between low and high values — both of which are greater than Y_0.

FIGURE 5
New Critical/New Classical Synthesis



The alternating process is illustrated in Figure 5, which is accessible to undergraduates (even, I think, somewhat fun to draw!). In this illustration, I have used the simplifying assumption that the slopes of the New Critical and New Classical AS curves are the same ($\lambda = 1/\mu$); the more general case in which they differ, aside from its greater visual complexity, does not present any additional problems. Begin, as always, at A. The aggregate demand curve shifts from AD_0 to AD_1, and the economy moves to B. In this first (odd) period, the increase in the price level is immediately followed by a money wage increase; aggregate supply shifts, New Classically, to AS' and the economy moves to C. But now the money wage is sticky; the fall in the real wage weakens the position of labor, and aggregate supply increases, New Critically, to AS", with corresponding equilibrium at D. Graph paper, a fine-pointed pencil and some patience will confirm that in each subsequent iteration the equilibrium points E, F, etc. cluster ever more closely around two centers close to E and F along AD_1, as suggested by equations (16') and (17').

The alternation experiment thus provides us with a very preliminary presumption that, when both New Classical and New Critical adjustment mechanisms are operating, a one-time demand expansion results in a permanently higher level of output and a higher price level. The long-run aggregate supply curve slopes upward after all, and the multiplier is greater than zero. It is even possible to give this multiplier an algebraic form. First, find the arithmetic mean of the two convergent values of the price level:

$$P_{\infty} = \frac{1}{2}(P_{\infty}^{EVEN} + P_{\infty}^{ODD}) = \left(\frac{\lambda + b/2}{\lambda + b + b^2\mu}\right)\bar{P} + \left(\frac{b/2 + b^2\mu}{\lambda + b + b^2\mu}\right)P^*. \tag{18}$$

Next, combine equation (18) with equation (2) to find the average level of output following the demand expansion Y_{∞}, also replacing $\bar{P}$ with $a - bY^*$ so that constant terms are separated from variable ones (those dependent on the position of the AD curve, represented by a). This gives us

$$Y_{\infty} = \frac{a}{b} - \frac{1}{b}P_{\infty} = a\left(\frac{b\mu + 1/2}{\lambda + b + b^2\mu}\right) + B, \tag{19}$$

where $B = -\left(\frac{\lambda + b/2}{\lambda + b + b^2\mu}\right)Y^* + \left(\frac{1/2 + b\mu}{\lambda + b + b^2\mu}\right)P^*$. We can express the horizontal shift in AD, for a fiscal expansion, in the standard fashion, as $\gamma\Delta G$ where γ is the "fiscal policy multiplier" [Dornbusch, Fischer and Startz, 236]. This horizontal shift is also $(1/b)\Delta a$ from which $\Delta a = b\gamma\Delta G$. Finally, take the difference of equation (19) to find

$$\Delta Y = \left[\left(\frac{b\mu + 1/2}{\lambda + b + b^2\mu}\right)b\gamma\right]\Delta G. \tag{20}$$

The term in square brackets is the multiplier we are seeking. It has intuitive properties, varying directly with b (a steeper, more "Keynesian" AD curve), and inversely with both λ and $1/\mu$ the slopes of the New Critical and New Classical AS curves, respectively.

I conclude this section by noting that the existence of two models with contrary tendencies casts a rather large pall over rational expectations theorizing. No matter how smart people are, once they are deprived of the "one true model" their theoretical anticipations of government policy must depend crucially on the model chosen, and on assumptions regarding which model prevails in policy-makers' thinking, and so on. Even if everyone miraculously came to agree on the multiplier represented by equation (20), the relative magnitudes of the coefficients comprising it would be open to dispute, and anticipated outcomes accordingly. The only consensual multiplier value about which no controversy is possible is zero.

CONCLUSION

The New Critical proposal is little more than a call to bring into focus the relation between macroeconomic policy and the real supply curve of labor. The Dobb Effect is an assertion: relative flexibility of prices over money wages means that demand expansion is likely to erode the real wage rate, and this erosion increases labor supply and therefore output.

How does this square with the stylized facts of macroeconomic life? While empirical issues are beyond the scope of this paper, something might be said about the widely observed procyclical behavior of the real wage rate, and its implications. Rising real wages in expansions may be problematic for both the New Critical and the New Classical stories, in which the money wage rate initially lags behind the price level. However, policy-induced expansions are always superimposed upon a real cycle, and it is difficult to disentangle spontaneous effects from policy effects. Similarly, the Dobb Effect may appear to contradict evidence for an upward sloping supply curve of labor. This evidence, however, is drawn — as it must be — from a large enough number of time periods for us to imagine that w^* is itself shifting, and very likely, in normal times, in an upward direction. Without downplaying the importance of empirical investigation, one may doubt whether any single test can adjudicate between the New Classical and New Critical models, or unambiguously separate the effects of macro policy from underlying forces at work in the economy.

The multiplier in equation (20) appears to represent a return of Keynesian full-employment stabilization policy. Despite the wide range of theoretical developments that question this policy framework — crowding out, price flexibility, competitive labor markets, rational expectations, Ricardian equivalence, learning theory,[7] etc. — it seems to re-emerge, once a fuller view of the labor market is embraced. It is not my intention, however, to re-invent fine-tuning, or to suggest that "hydraulic" Keynesianism has been somehow vindicated. It is enough to point out that even though the real wage rate and the wage share of income return to their previous levels in the New Critical adjustment to an increase in AD, this is accomplished by a weakening of the savings and debt positions of workers, with, one must assume, a corresponding

increase in social tension and potential for instability. My sole objective has been to provide a corrective to simplistic policy-ineffectiveness thinking, not to revert to an equally unconvincing fine-tuning triumphalism.[8]

It remains to be seen whether the Dobb Effect has significant empirical plausibility, and whether better methods of combining it with the money wage dynamics of the New Classical story can be found.

NOTES

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1. A useful survey of the New Classical-New Keynesian debate and the search for microfoundations for the New Keynesian models will be found in Dixon and Rankin, eds. [1995].
2. For example, a leading textbook [Dornbusch, Fischer and Startz, 2001] states, with particular regard to the rational expectations position: ". . . the intellectual appeal of rational expectations is completely irresistible. The only really good argument against the notion that monetary policy is ineffective lies in the data" [110-111]. I will use this text in what follows to represent the mainstream consensus; it would be tedious and arbitrary, given the limited purposes of this paper, to refer to multiple texts containing essentially the same material. On the effectiveness of monetary policy, see Romer and Romer [1989].
3. In Dornbusch, Fischer and Startz [2001], refer to chapter 6.
4. For the distinction between "hydraulic" and "fundamentalist" Keynesianism, see Coddington [1976].
5. In their eighth edition [117], Dornbusch, Fischer and Startz use an expectations-augmented Phillips curve and derive a relation like equation (1) between the current price level P and the expected value of the current price level P^e. The earlier editions use a more adaptive-expectations-oriented formulation relating P to P_{-1}. The change does not alter the central New Classical point about the shifting of short-run AS until $Y = Y^*$. Their derivation of AS also has P^e (or P_{-1}) in both intercept and slope; in adjustment to a given level of aggregate demand, the curve should thus rotate around a constant point on the Y-axis, rather than shifting parallel to itself, as in their graphical illustrations. In my canonical equation (1) I have removed this complication and written AS in a simple version with a given slope, δ. Nothing in what follows depends on these simplifying assumptions.
6. I note in passing that the New Critical model is robust with respect to the spectral qualities of the goods and assets markets, *i.e.*, whether either or both of these is Pure Classical, Pure Keynesian, or intermediate. In particular, no problems arise if the interest-sensitivity of investment is zero, or asset demand for money is infinitely elastic (the liquidity trap), and the AD curve is vertical. By contrast, of course, a vertical AD curve in the New Classical case renders the price level indeterminate, or suggests perpetual inflation/deflation.
7. For work at this particular frontier, see Evans and Honkapohja [2001].
8. Rational expectations can be enlisted in the service of a temporary but huge multiplier effect. An anticipated increase in government spending — perhaps military spending might serve as an example — may occasion a surge in investment as firms rush to acquire the capacity to bid for government orders. It goes without saying that this anticipation refers to political events as well as the "true" outcomes of macroeconomic processes. No one has yet proposed the single "true" *political-economic* model.

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