The Great Moderation and "Falling Off a Cliff": neo-Kaldorian dynamics

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James G. Devine
Professor of Economics
Loyola Marymount University
Los Angeles, CA 90045-2659 USA
e-mail: jdevine@lmu.edu

"The economy fell off the cliff." – George Soros (11/24/2008).

In an effort to explain the (potential or actual) "Fall off a cliff" during 2008-2009, this paper's model combines two main elements:

1. Nicholas Kaldor's simple Keynesian model of the business cycle (1940), involving non-convexity with three equilibria, two of which are stable. This says that there are two possible general states of the macroeconomy: high employment and stagnation, characterized by different behaviors. A "Fall" would be a downward leap between these.
2. Hyman Minsky and Michal Kalecki's dynamic analysis, helping to cause this Fall endogenously. This process may have occurred due to the often-heralded "Great Moderation" (1984-2006), a period during which financial crises and business-cycle recessions were *short-circuited*, so that they could not purge the economy of Minsky/Kalecki imbalances.

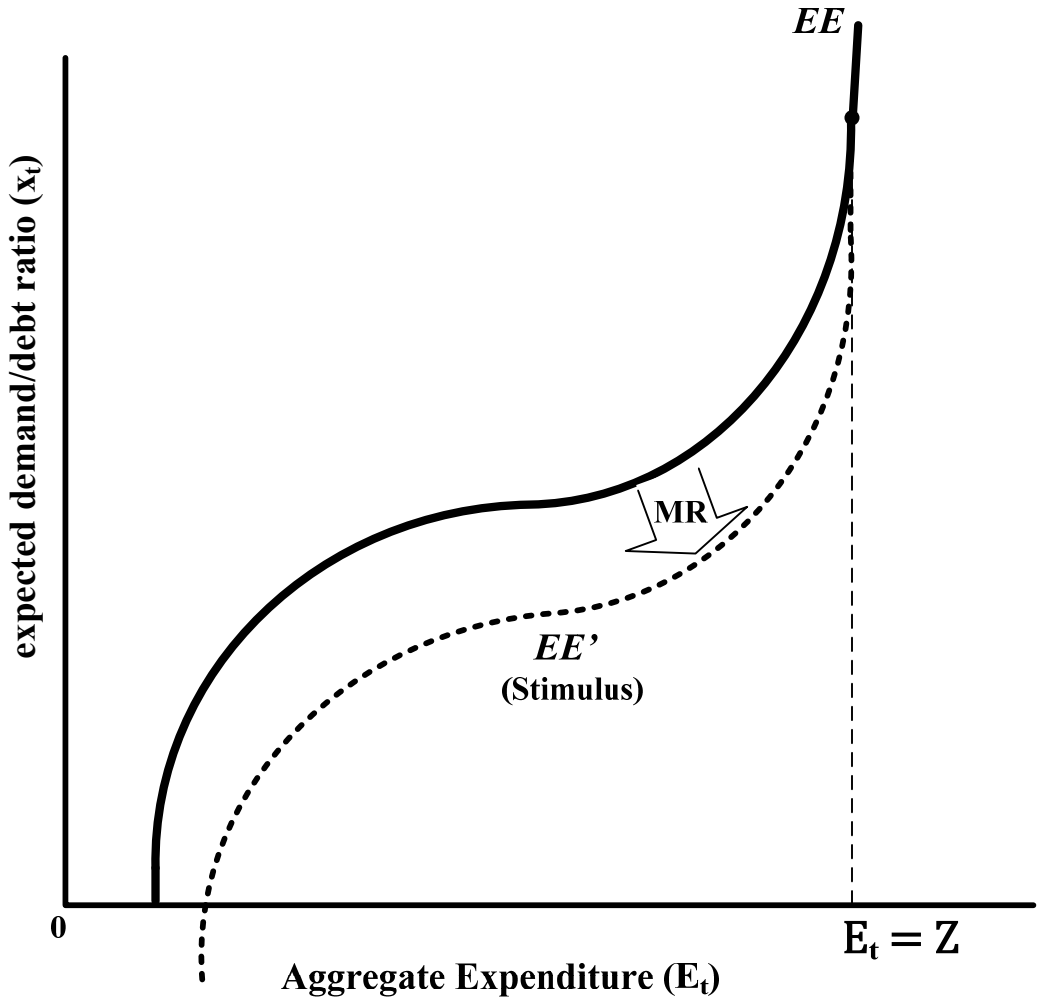
The model has two main policy implications:

1. In a capitalist economy subject to Minsky/Kalecki dynamics, keeping the economy near high employment for a long time encourages such a Fall. This might be seen as akin to the critique of Keynesian policy from both Marxists and "Austrians."
2. But after the Fall, government stimulus can play a positive role. This accepts the basic conclusion of Keynesianism: the government can help fight stagnation.

There are three main equations in the model, focusing on the (total demand)/(total debt) ratio for the private nonfinancial business sector:

1. Diagram 1: The ***EE*** (expenditure) curve relating the demand for GDP (**E**) to the *expected* demand/debt ratio (**x**);
2. Diagram 2: The ***AA*** line, determining the *actual* demand/debt ratio (**a**) at each level of demand; and
3. Expectations adjustment, so that the expected and actual demand/debt ratios are equal in short-term equilibrium. This equation is left implicit here: it's treated as merely a matter of partial adjustment of expectations in light of reality.

Diagram 1. the Aggregate Expenditure Curve (*EE*).

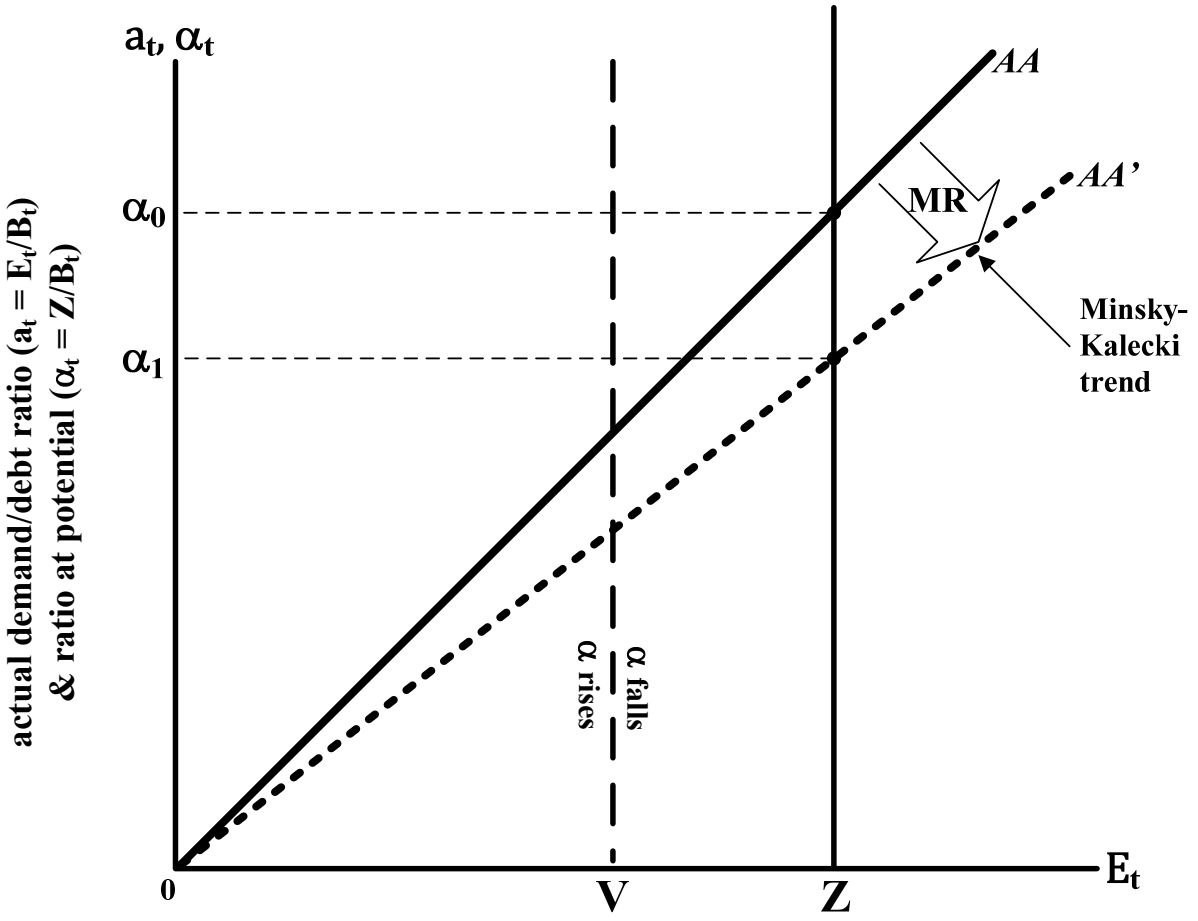


$$\mathbf{E_t} = EE(\mathbf{x_t}, \mathbf{S_t});\ EE_1 \geq 0;\ EE_2 \geq 0 \qquad (1)$$

Short Run: the Shift Factor ($\mathbf{S_t}$) is constant in the short run. The sigmoid shape of the ***EE*** curve reflects zero responsiveness of investment spending to $\mathbf{x_t}$ at low demand (due to sales constraints) and high demand (due to bottlenecks). This shape is the basis for the existence of two stable equilibria and one unstable one (see diagram 3).

Medium Run: $\mathbf{S_t}$ can change due to fiscal and/or monetary policy, changes in expected inflation, and/or changes in long-term profit expectations. Stimulus (as with the shift to ***EE'***) means that a lower **x** than before can be associated with the same amount of expenditure. Near **Z** (labor-constrained output, assumed constant and unique in our trend-free model), the curve cannot shift to the right (only downward). Also at this level of production, demand-side stimulus can only be temporary (since only inflation results in the end). Thus, $\mathbf{S_t}$ is held constant in our description of the "Great Moderation" in order to capture the effects of trends underlying demand fluctuations.

Diagram 2. the Actual Demand/Debt Line (*AA*).



The actual demand/debt (**a**) and the potential demand/debt ratios (**α**):

$$\mathbf{a_t \equiv E_t/B_t \equiv (E_t/Z)(Z/B_t) \equiv e_t \cdot \rho_t}$$
$$\mathbf{\equiv (E_t/Z)(Z/K_t)/(B_t/K_t) \equiv e_t \cdot \lambda_t \cdot \rho_t} \qquad (2)$$

Short run: $\mathbf{B_t}$ and $\mathbf{K_t}$ held constant, and with them $\mathbf{B_t/K_t = \lambda_t}$ (the leverage ratio) and $\mathbf{Z/K_t = \rho_t}$ (potential output/capital ratio). Together **λ** and **ρ** determine $\mathbf{Z/B_t = \alpha_t}$, the potential or trend demand/debt ratio. In the short run, the actual demand/debt ratio varies only with the degree of utilization of labor-power ($\mathbf{e_t}$).

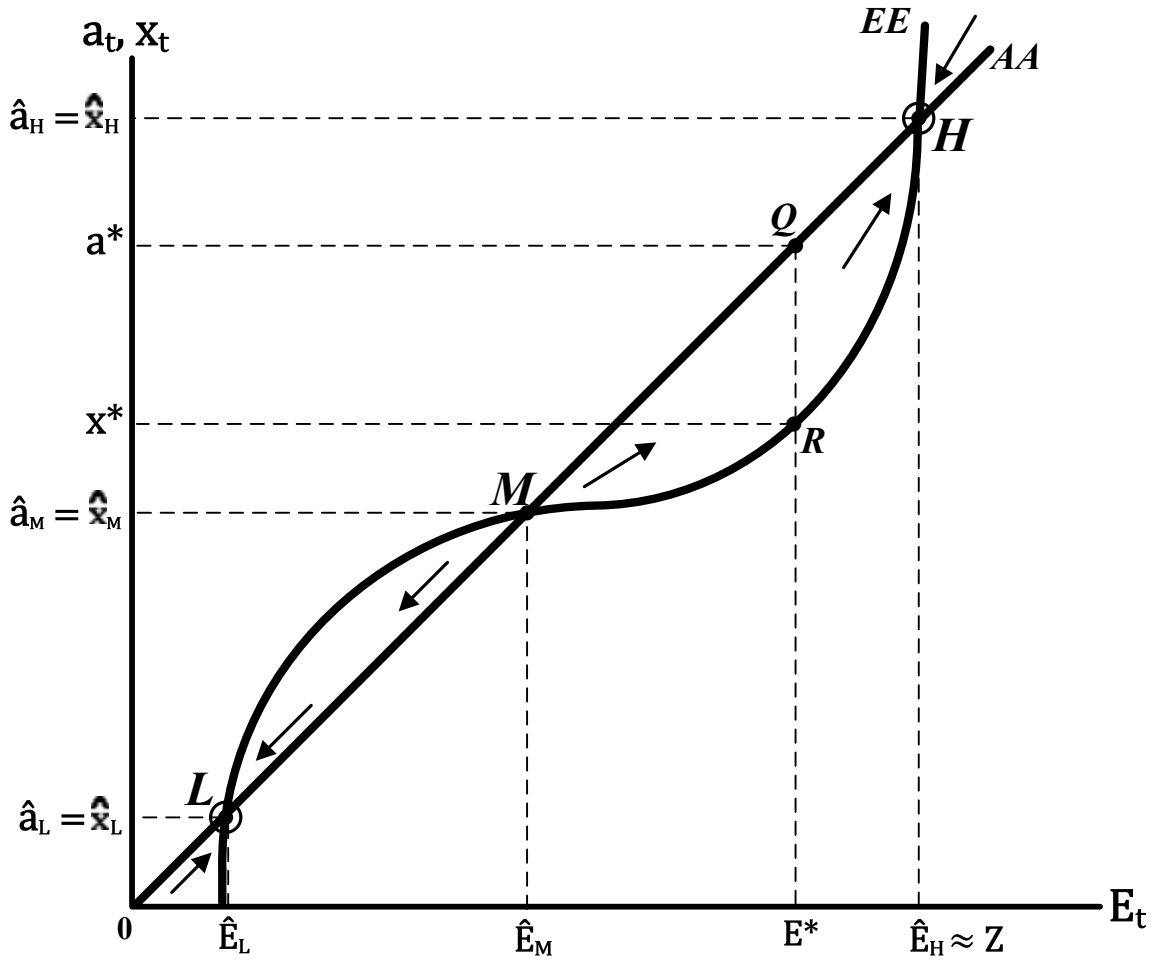
Medium Run Dynamics:

$$\mathbf{\alpha_t = -M(E_t - V)};\ \mathbf{M}\ (\text{a constant}) > 0 \qquad (3)$$

The trend demand/debt ratio ($\mathbf{\alpha_t}$) falls (flattening ***AA***) due to $\mathbf{E_t}$ being persistently above the Minsky/Kalecki threshold **V**, which is assumed to be constant and unique. This occurs because leverage ($\mathbf{B_t/K_t \equiv \lambda_t}$) rises (Minsky) and/or the potential-capital ratio ($\mathbf{Z/K_t \equiv \rho_t}$) falls (Kalecki). This process works going in the other direction when $\mathbf{E_t < V}$, rotating ***AA*** counterclockwise.

In theory, medium-run equilibrium is where $\mathbf{E_t = V}$ (with constant **α**). But can it be attained?

Diagram 3. Short-Run Equilibria.



Short-run equilibria:

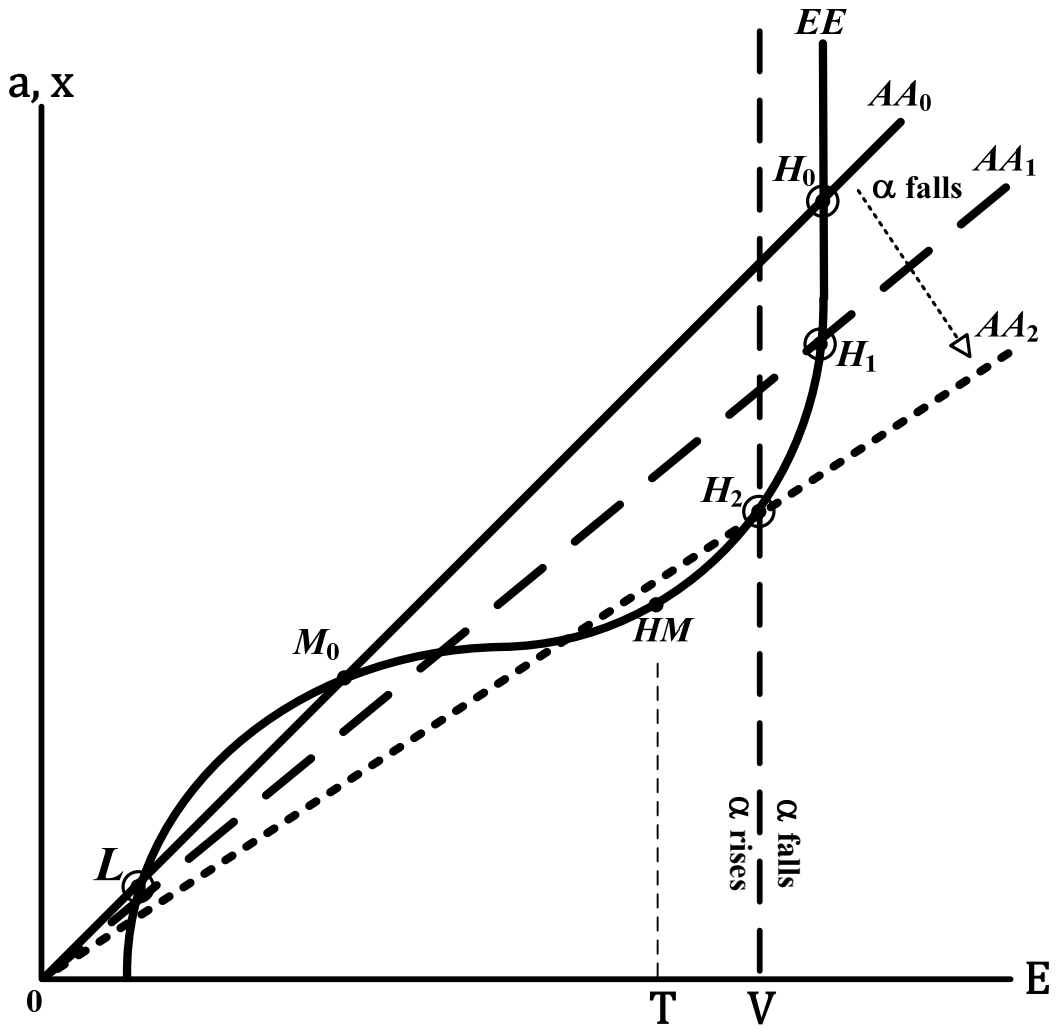
$$\mathbf{a_t} = \mathbf{x_t} \text{ (expectational equilibrium) } \textit{and}$$
$$\mathbf{E_t(a_t, S_t) = E_t(x_t, S_t)} \qquad (3)$$

The process of adjustment of expectations ($\mathbf{x_t}$) to actual values ($\mathbf{a_t}$) indicates that equilibria ***L*** and ***H*** are stable, while ***M*** is unstable.

Example: for an expected demand/debt ratio **x***, expenditure **E*** results at point ***R***. At that level of expenditure, the actual demand/debt ratio **a*** (at point ***Q***) exceeds **x***. Adjustment of expectations means that **x** rises toward **a** (which rises less). So the model converges to point ***H***. Arrows show the direction of equilibration changes of **x** and **a**.

Exogenous Disequilibration: However, the trend changes in **α** due to persistently-high spending (a "Great Moderation") lead to endogenous disturbance of any short-run equilibria attained, leading to either a "typical" or "mild" recession or a "Fall off a Cliff."

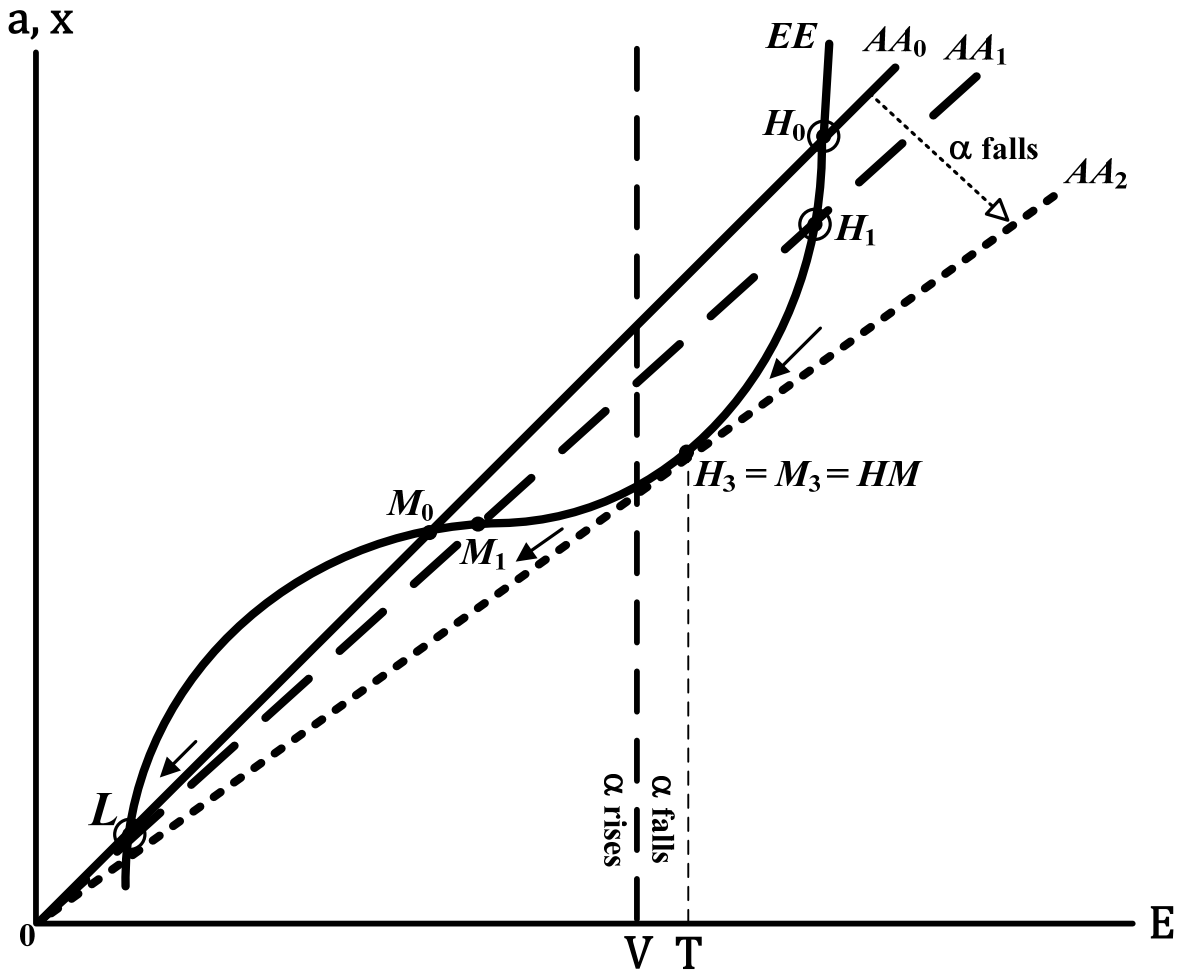
Diagram 4. A "Mild" Recession.



Case #1. Holding ***EE*** constant, falling **α** (a trend decline of **a**) leads to clockwise rotation of the ***AA*** line to AA_2. Because the ***AA***/***EE*** tangency point ***HM*** at **E** = **T** is below the threshold **V**, the recession (declining **E**) leads to an endogenous reversal of the decline in **α** when $\mathbf{E_t} < \mathbf{V}$. Thus, the economy recovers (as ***AA*** rotates counterclockwise). The "typical" cycle involves repeated clockwise and counterclockwise rotation of the ***AA*** line (along with a lot of real-world considerations such as the inventory cycle).

Attainment of a medium-run equilibrium can occur (at H_2). Here, **α** is constant and short-run equilibrium is also attained. Relatively high unemployment of labor-power must be maintained in order to prevent the Minsky trend toward increased leverage (rising **λ**) and the Kalecki trend toward falling **Z** compared to invested capital goods (falling **ρ**). This is a "reserve army of labor" theory: the existence of unemployed labor is needed to keep capitalism healthy. Standard business cycle theory suggests reasons why the economy might oscillate around this equilibrium.

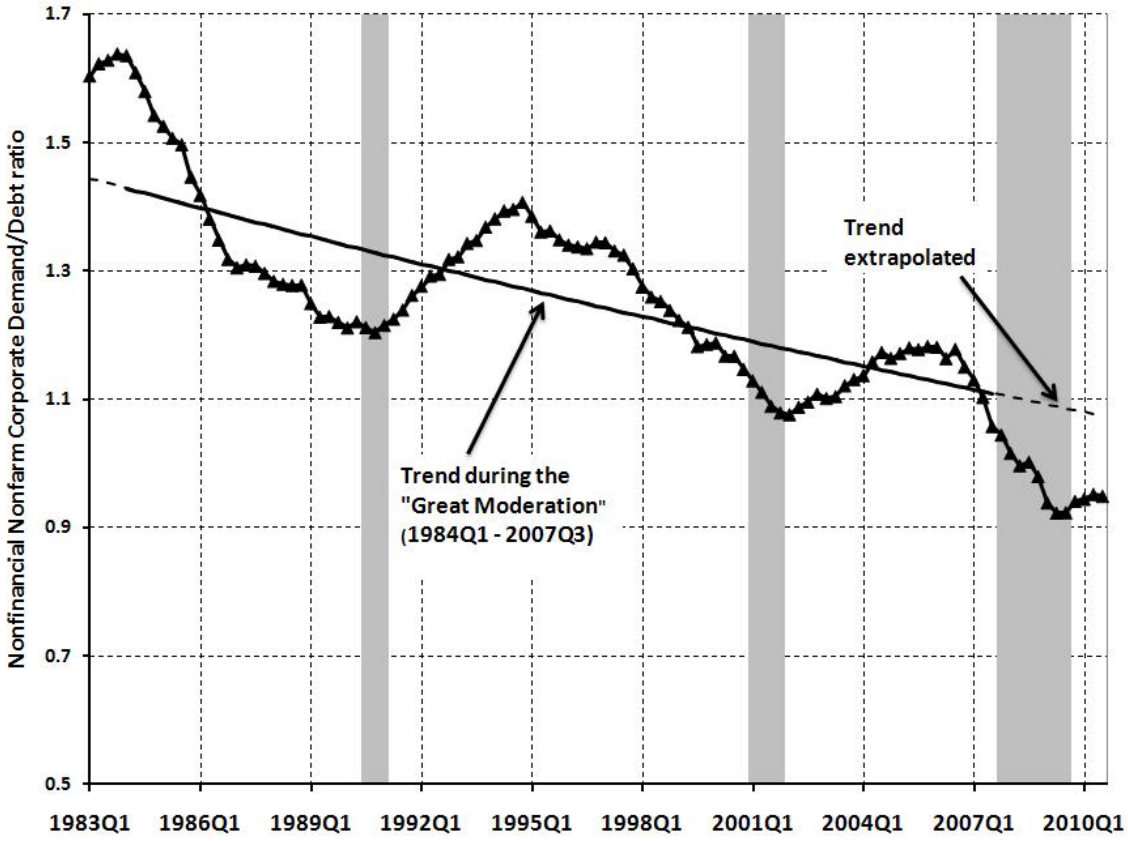
Diagram 5. Falling Off A Cliff.



Case #2: Again holding ***EE*** constant, falling ***α*** (a trend decline of **a**) leads to clockwise rotation of the ***AA*** line to AA_2. In this case, the tangency point **T** is above the threshold **V**. Therefore, the recession causes points ***H*** and ***M*** to converge to the tangency point ***HM***, which is unstable downward. Because **V** is low, **α** continues to Fall. Thus, even if the equilibrium at ***HM*** is maintained, the short-run equilibrium point disappears entirely (as in Kaldor's original model). The medium-run equilibrium at **E** = **V** cannot be attained because it does not correspond to a stable short-run equilibrium. The model instead implies a Fall to point **L** (stagnation).

Though we cannot say *a priori* what the relationship between points **T** and **V** is, **T** is likely to be relatively high due to extended periods of relative prosperity (such as the "Great Moderation") which allows imbalances to accumulate, lowering **α** for long periods, which moves **T** to a higher level of **E**. This makes a "Fall off of a cliff" more likely. This kind of trend is seen in the next diagram, even though the "Moderation" was anemic from labor's perspective.

Diagram 6. The Great Moderation and Falling α.

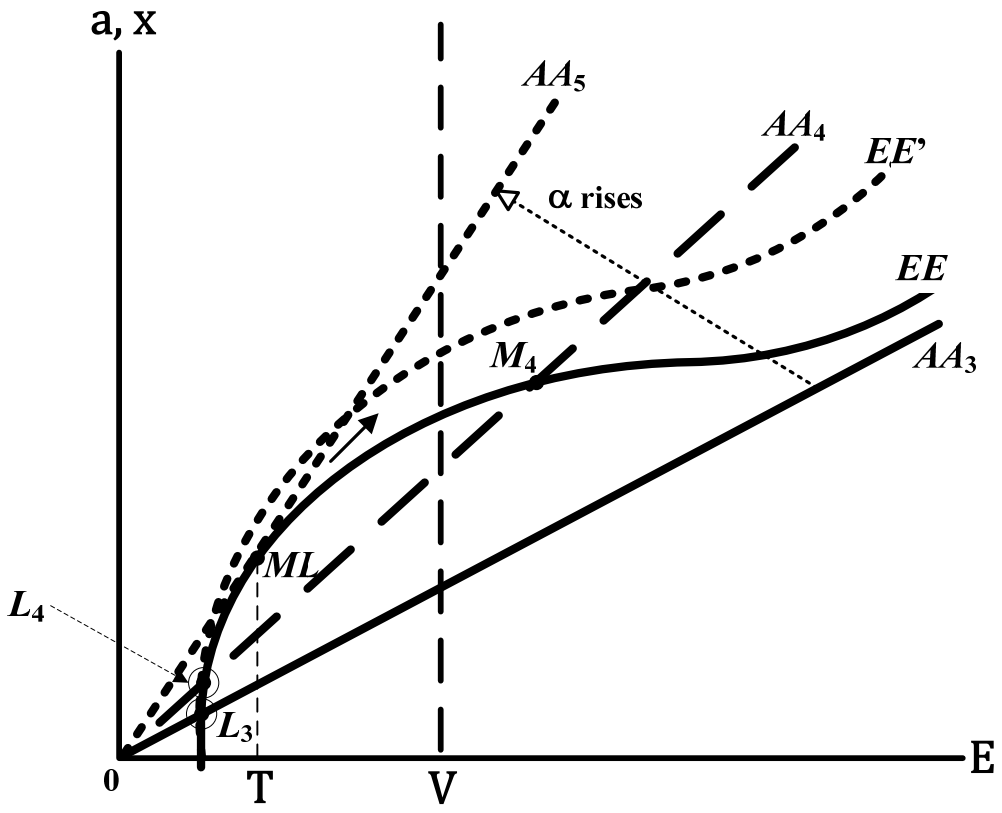


Shaded areas are NBER recessions. The following regression defines the trend line.

$$\ln(\mathbf{a}) = 0.3704 - 0.0027 \cdot (\mathbf{time\ index})$$

Regression Statistics		
Multiple R	0.7676	
R^2	0.5892	
Adjusted R^2	0.5848	
Standard Error	0.0623	
Observations	95	(GM only)
	Coefficients	t-stat
Constant	0.3704	27.0460
Time coefficient	–0.0027	–11.5499
Annual % change	–1.08%	

Diagram 7. Recovery or Stagnation?



Possible Recovery: In the diagram, because point $\mathbf{L_3}$ is to the left of **E** = **T**, there exists an automatic tendency for recovery due to deleveraging ($\lambda\downarrow$) and purging of unused capacity **(ρ ↑)**. These raise **α** and rotate ***AA*** counterclockwise. Equilibria ***L*** and ***M*** converge to ***ML***, which is unstable upward, so the economy can leap *up* the cliff, though this process may take a long time.

Possible Stagnation: Unfortunately, ***L*** may be to the right of ***T***, so that the Minsky/Kalecki trend continues (as when the accumulation of imbalances during the prosperity phase was prolonged). More importantly, perhaps, recovery can be counteracted by the results of excessive unused capacity, indebtedness, and pessimism, which encourages waves of deflation, default, and deepening despair. These phenomena shift the ***EE*** up and to the left to ***EE'*** so that a higher **x** than before is required to cause the same amount of expenditure. This implies continued stagnation.

Policy's Role: Though policymakers can be "villains" by maintaining high demand (and encouraging the accumulation of imbalances as in a Great Moderation), in this latter situation they may become "heroes" by stimulating demand. Fiscal policy (if it's politically possible) and monetary policy (if it actually works) can "prime the pump," stimulating recovery by shifting the ***EE*** curve downward, moving the tangency point to the left, making an explosive recovery more likely.