

**Reply to the Second Referee Report on  
Secular Stagnation  
Ms 1309, submitted to Economics (e- journal)**

Below is the Author's response to the comments by the Second Referee.

**Comment:** The paper allows the representative agent to hold an arbitrary set of assets and introduces some ad-hoc specification for the utility of holding any specific asset  $Q$ . Such a procedure seems to be unsatisfactory for the following reason: It seems completely arbitrary what feature might determine the specific pay-off of different types of assets. In standard micro-founded models, assets do not generate utility but rather are a means for re-allocating inter-temporal resources.

**Reply:** The choice of the set of assets is arbitrary as it is arbitrary in any model where you pick two, three or any number of assets that are meant to be representative of reality. The set that I have selected for the model is meant to represent assets featuring different degrees of liquidity, from money to bonds to productive capital. The assumption on asset utility is not ad-hoc and is not even an assumption. I go a great length to provide logical and formal arguments to show why and how assets provide utility to their bearers; they do so precisely by doing what the referee suggests: they reallocate inter-temporal resources. One can think of assets as "vehicles" to future consumption, each characterized by its own peculiar "speed" (that is, the immediacy and the cost of converting it into consumption) and "power" (that is, its capacity to accumulate and store wealth over time at some risk relating to asset price volatility). Greater speed would come at some power cost, and vice versa. Also, at each instant the agent would be faced with the likelihood of having to liquidate the asset to face a consumption shock: changes in likelihood (due to changes in expectations or market moods) affect differently the utility from assets with different speed and power load. The instantaneous utility of every asset is thus calculated through the agents' time-horizon as the expected value of the discounted summation of stochastic (uncertain) consumption utility, to which the asset gives access, net of the (uncertain) consumption utility lost to the asset liquidation cost. Other two fundamental building blocks of the model, supporting the asset utility framework above described, are the following:

1. **Variable cost of asset liquidation:** as a vehicle to future consumption, every asset is characterized by an optimal speed, defined as the shorter time-interval possible for the asset to be sold at the minimum liquidation cost possible. Asset optimal speeds are determined by the economy's level of institutional and technological development (all else equal, a more efficient and safe financial infrastructure allows asset liquidation to be effected more rapidly and at lower costs) and expectations on the state of the economy (see below). Some assets can be liquidated and converted into consumption immediately and at no cost, while others require longer time-intervals and involve positive costs. Having to liquidate an asset at a higher than optimal speed (owing, for instance, to immediate and unexpected consumption needs, or changes in market mood and expectations) results in higher liquidation costs or forces the agent to accept larger discounts on the asset sale price. Uncertainty affects asset utility also by influencing expected asset liquidation costs.
2. **Rational expectations and emotions.** Expectations are assumed to depend on the state of knowledge: better knowledge and information help the agents to form more precise expectations about future relevant variables, while lower quality knowledge and information cause their predictions to be less determinate. Expectations depend also on emotions: defining optimism (pessimism) as the state of mind that induces the agents to expect superior (inferior) outcomes of future events than would otherwise be reasonable for them to expect exclusively on the basis

of the given knowledge and information, optimistic (pessimistic) expectations derive from a “distortion” process. This process introduces a deviation between purely rational predictions and predictions that affected by emotional states of mind (e.g., “animal spirits”): optimism (pessimism) distorts the way agents process and interpret information.

**Comment: The pricing kernel of assets needs to be derived endogenously. In the absences of a complete set of markets, the utility of holding risky assets needs to be motivated by some kind of “indirect” utility out of first principles.**

**Reply:** In fact, the utility of holding risky assets is motivated by the indirect utility derived in the model out of first principles. In this context, money emerges as the asset that features the lower (or zero) liquidation cost and earns a very low (or zero) nominal return. My approach, therefore, seeks to go beyond both the "money-in-the-utility-function" and "cash-in-advance" literature, where money (or its utility) is simply assumed. In other words, the approach “explains” why money and other assets provide utility and formally “derives” their utility content. Also, as the utility of assets is explicitly derived, the approach makes all assets directly comparable with one another and with consumption.

**Comment: The paper argues that money as perfectly liquid asset has no nominal risk, but it does not model the risk underlying other types of assets. It is not clear how the prices of these risky assets derived endogenously. Neither is the transmission mechanism of monetary policy well specified.**

**Reply:** Assets with different degrees of liquidity (subject to different and variable liquidation costs, see above) require different equilibrium rates of return, in order to ensure that the amounts supplied are equal to those demanded within the agent’s portfolio, with less liquid assets featuring large liquidation costs and requiring higher equilibrium returns (and viceversa for liquid ones). An increase in the level of perceived uncertainty, or higher market volatility, or the rise of pessimistic market mood (which, in the model, “distorts” expectations) would all raise the equilibrium returns on less liquid assets through their impact on the marginal utility of each individual asset. Unlike less liquid assets, money in the model features zero liquidation costs and is not subject to asset price volatility. As I explained in my reply to the First Referee, equilibrium asset prices (returns) are determined by the agent’s liquidity preference as affected by expectations and market mood.

**Comment: The central bank’s loss function is completely ad-hoc and not motivated at all.**

**Reply:** Agree. In fact, the introduction of a loss function is inessential to the conclusion of the model, and I will eliminate it. The objective function of the central bank is sufficiently indicated in the text, and will specify it accordingly in the formal model.

**Comments: It seems strange that both in the transversality constraint and in the inter-temporal budget constraint, the authors aggregates income levels and government spending across time without any inter-temporal pricing.**

**Reply:** I am not quite clear to what the Referee refers to here. In fact, inter-temporal pricing seems to be there. I will make sure, however, that inter-temporal consumption pricing is correctly integrated in the optimal program.