Bubble Necessity Theorem

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A rational asset price bubble is a situation in which the asset price (P) exceeds its fundamental value (V) defined by the present value of dividends (D). This paper asks whether asset price bubbles must arise, that is, the necessity of bubbles. This question is of fundamental importance. Economists have long held the view that bubbles are either not possible in rational equilibrium models or even if they are, a situation in which asset price bubbles occur is a special circumstance and hence fragile. If bubbles are inevitable, it would challenge the conventional wisdom and economic modeling. In this paper, we establish a theorem showing that there is a general plausible class of economic models with dividend-paying assets in which asset price bubbles arise in all equilibria, implying the necessity of bubbles.

Motivated by the examples in section 3, we establish the Bubble Necessity Theorem using workhorse models in macro-finance. In section 4, we provide it in a classical two-period overlapping generations (OLG) endowment economy under minimal assumptions on preferences, endowments, and dividends. In section 5, we establish the Theorem in the Diamond (1965) OLG model with capital accumulation and infinite-horizon heterogeneous-agent models in the tradition of Bewley (1977), one with idiosyncratic investment shocks and another with idiosyncratic preference shocks. We show that under some conditions on technological innovations that enhance the overall productivity, the conditions $R < G_d$ and $G_d < G$ are simultaneously satisfied, necessarily generating asset price bubbles. We emphasize that our result of the necessity of bubbles is economically relevant and can naturally arise in modern macro-finance models.