undercollateralized debt leads to default in state D. This means the borrower pays the lender back more in state U than in state D. But the borrower is more optimistic than the lender so he thinks state U is relatively more likely while the lender thinks state D is relatively more likely. Therefore gains from trade in borrowing collateralized by the asset are maximized with default-free debt. Optimists would like to promise pessimists relatively more in the bad state D but given the payoff of the only available collateral, the closest they can get is promising equal amounts in both states.

Since this debt is default-free it carries a zero interest rate. This means that against each unit of the asset an agent can borrow 0.2 units of the consumption good. The marginal buyer is again given by

$$h + (1 - h)\, 0.2 = p,$$

but with collateralized borrowing the market clearing condition becomes

$$(1 - h) + 0.2 = ph.$$

Now in addition to their endowment of the consumption good, the buyers can raise an additional 0.2 by borrowing against the assets they are buying. Combining the two equations we get

$$h = 0.69, \quad p = 0.75$$

Compared to the case without borrowing, the smaller group of the 31% most optimistic agents can buy the assets and the marginal buyer has a higher valuation, driving the price up to 0.75.

Dynamic Margins Now consider a dynamic setting with three periods $t = 0, 1, 2$. Uncertainty resolves following a binomial tree: Two states in period 1, U and D, and four states in period 2, UU, UD, DU and DD. SEE FIGURE X

[FIGURE]

The physical asset pays off one in all final states except in state DD, where it only pays 0.2. Similar to before, agent h thinks the probability of an up move in the tree is h. Only one-period borrowing is allowed which will be fully collateralized by same intuition as before.