

June 4, 2004

On the sample question in Recap 2

Q Why is it stated in the question that one should maximize w.r.t. k_{t-1} ? Shouldn't one first do this when you have maximized w.r.t. c , m , and n .

A First a minor detail. In the question it is stated that maximization is over k . In this context this means the current period capital, and *not* k_{t-1} which is the state variable (and thus given by history).

Nevertheless, the household's choice variables in period t are c_t , n_t , k_t , and m_t . The constraints are the budget constraint and the definition of a . These constraints are substituted into the value function (to eliminate k_t and a_{t+1} , respectively), and one has an unconstrained maximization problem over c_t , n_t , and m_t . To eliminate the partial derivatives of the value function, one then differentiates it w.r.t. k_{t-1} and a_t and apply the envelope theorem to get rid of all terms involving $\partial c_t / \partial k_{t-1}$, $\partial n_t / \partial k_{t-1}$, $\partial m_t / \partial k_{t-1}$, $\partial c_t / \partial a_t$, $\partial n_t / \partial a_t$, and $\partial m_t / \partial a_t$. Look also at Walsh, pp. 81-82.