

4. Two salient facts about aggregate real wages and per capita labor hours in the US are: (1) in the long run, wages, per capita output and per capita consumption exhibit steady growth at roughly the same rate, while per capita hours worked does not exhibit long run growth; (2) in the short run, wages, per capita output, per capita consumption and per capita hours worked all rise during booms and fall during recessions.

Consider the following utility function:

$$(*) \quad U(C,L) = C^{1-a}/(1-a) - bL^{1+v}/(1+v)$$

where C is consumption; L is hours worked; and a, b and v are all strictly positive.

(a) Derive the conditions under which the utility function (\*) is consistent with the long run neutrality of labor supply with respect to steady growth in wages and consumption. Assume that markets are competitive and that there are no taxes, preference shocks or any other wedges affecting labor supply.

(b) Assuming that the conditions in (a) are satisfied and that (\*) is the utility function, what condition on the relative short-run volatility of wages and consumption must hold for labor hours to be procyclical? Explain intuitively why this condition is likely to hold.

Now suppose the utility function is of the form

$$(**) \quad U(C,L) = [(C/X)^{1-a}/(1-a) - bL^{1+v}/(1+v)]^{1-s} / (1-s)$$

where (a, v, s) are all strictly positive. X is an exogenously growing "living standard" that affects consumer's utility of consumption. According to (\*\*), consumers only care about their consumption relative to X. Intuitively, this captures the idea that consumers care about "keeping up with the Joneses", and are less happy when their consumption falls below the living standard of other people in the community, even if their own absolute level of consumption is constant (or rising more slowly than X).

(c) Assuming that X grows at the same long run rate as wages and consumption, derive the conditions under which the utility function (\*\*) is consistent with constant labor supply in the long run. Assuming that this condition is satisfied, explain what must be true about the relative short-run volatility of wages, consumption and X in order for labor hours to be procyclical.

Another interesting fact about wages and hour in the US is that, over the "medium run", wages and consumption tend to move together, while hours move in the opposite direction. From the period 1950-1973, for instance, wages and consumption grew more quickly than average while hours per capita fell. From 1973 through 1993, wages and consumption grew more slowly than average, while hours per capita rose. From 1993 through today, wages and consumption have grown rapidly, while hours per capita have fallen.

(d) Show that (\*) is inconsistent with this fact, assuming that the conditions in part (a) hold and that consumption and wages are equally volatile over the medium run. Show that (\*\*) is consistent with this fact if and only if the living standard X rises more quickly than wages and consumption during "good decades" and falls more quickly than wages and consumption during "bad decades".