



**College of Business Administration**  
**Department of Economics**  
**Aggregate Economic Conditions & Analysis**  
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**ECO 6206-0001**  
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### **Assignment V**

**Due February 28, 2001**

#### **Question I:**

#### **A Simple Transactions Model of Money Demand.**

Consider the following model of money demand. An individual consumes  $C$  dollars worth of goods every month. Bank deposits earn interest at a monthly rate of  $r$ . We assume that the individual consumes (and therefore spends the money) at an even rate throughout the month. Each time a withdrawal is made the individual incurs a *real* cost equal to  $\phi$ . His optimization problem is to select  $N$ , the number of evenly spaced withdrawals from the bank during the month, that minimize his total (monthly) costs.

- a) Do you think the above description of an individual's optimization problem is very realistic? Is the model missing any *significant* aspect of reality? Explain.
- b) Set up the individual's optimization problem and solve it. For simplicity, treat  $N$  as a continuous variable. You will find that the optimal  $N$  satisfies what is called the "square root rule".
- c) It actually doesn't make much sense for  $N$  to be a continuous variable. So, suppose now that  $N$  is constrained to be an integer. Also, suppose that  $C = \$1000$ ,  $r = 1\%$ , and  $\phi = \$4$ . What is the optimal value of  $N$  now?

## Question II:

### The Work-Leisure Decision of Robinson Crusoe

Consider the Robinson Crusoe (RC) economy. There is a single good (coconuts) which can be produced with labor. RC's production function is

$$y = f(n) = \alpha + \beta n^\gamma$$

where  $\alpha$  and  $\beta$  are positive constant and  $\gamma$  is in the open interval  $(0,1)$ .

RC's preferences over leisure ( $l$ ) and the consumption of coconuts ( $c$ ) are presented by the utility function

$$U(c,l) = c^\delta l$$

where  $\delta$  is a positive constant in  $(0,1)$ .

Finally, RC has a limited amount of time per period, normalized to 1, so that

$$n + l = 1$$

- a) What is the economic interpretation of  $\alpha$  and  $\beta$ ? Graph the production function in  $(y,n)$  space. Does this production display a falling marginal product of labor? How is it affected by the value of  $\gamma$ ?
- b) Give an expression for the marginal rate of substitution (MRS) between consumption and leisure. Are RC's preferences over  $c$  and  $l$  convex? What is the meaning of  $\delta$ ? Explain the intuition of why changes in  $\delta$  affect the MRS.