Lecture 3 - Recommended Problems
Solutions

☆ Problem 7, Chapter 4

This problem examines the effect of introduction of ATMs and credit cards on money demand. For simplicity, let's examine a person's demand for money over a period of four days.

Suppose that before ATMs and credit cards, this person goes to the bank once at the beginning of each four-day period and withdraws from her savings account all the money she needs for four days. Assume that she needs $4 per day.

a. **How much does this person withdraw each time she goes to the bank? Compute this person's money holdings for days 1 through 4 (in the morning, before she needs any of the money she withdraws).**
Since she needs $4 per day and is withdrawing funds for 4 days, she will withdraw $16 in cash when she visits the bank. Each day, she will spend $4 so that at the start of the first day her cash holdings will be $16, then $12 at the start of the second day, then $8 at the start of the third day, and finally $4 at the start of the fourth day.

b. **What is the amount of money this person holds, on average?**
The average of her daily cash holdings is $\$10 = (16 + 12 + 8 + 4)/4$.

Suppose now that with the advent of ATMs, this person withdraws money once every two days.

c. **Recompute your answer to part (a).**
Now each time she goes to the ATM, she has withdraws $8. At the start of the first day, her cash holdings are $8, then $4 at the start of the second day. The same cycle repeats for days three and four, with cash holdings of $8 and $4 at the start of the respective day.

d. **Recompute your answer to part (b).**
The simple average of daily cash holdings is $\$6 = (8 + 4 + 8 + 4)/4$.

Finally, with the advent of credit cards, this person pays for all her purchases using her card. She withdraws no money until the fourth day, when she withdraws the whole amount necessary to pay for her credit card purchases over the previous four days.

e. **Recompute your answer to part a.**
Now, she only withdraws cash on the last day in order to pay off the credit card balance. Her cash holdings at the start of each day are zero except for the fourth day, when she withdraws \$16.

f. **Recompute your answer to part b.**
Her average daily cash holdings is $\$4 = (0 + 0 + 0 + 16)/4$.

g. **Based on your previous answers, what do you think has been the effect of ATMs and credit cards on money demand?**
As the above calculations show, ATMs and credit cards have reduced money demand. ATMs make it easier to get cash when needed. The ability to switch between your bank account and cash means you can leave more of your financial assets as bank wealth and use less cash. With credit cards, similarly, we do not need to access cash to make transactions and instead only need cash when we settle the credit card debt.