Macro Problem Set 4

Q1

a. Is money created when you use an Overseas Chinese Bank Corporation (OCBC) credit card to pay for a $100 family meal at a restaurant?
b. If a bank can create money, why can't its owners use this ability to buy up trillions of dollars of goods, services, and assets?

Q2

Refer to *Tim Harford's The Undercover Economist Strikes Back* Chapter 3 excerpt, available as lecture reading on LumiNUS. You will also need to use your Google-fu.

a. Summarize Harford's explanation for the unit of account function of money.
b. Harford wrote that Bitcoin (see http://money.cnn.com/infographic/technology/what-is-bitcoin/) was too volatile in value to function as a unit of account. How has Bitcoin's nominal value (measured in US dollars) fluctuated since the publication of his book in January 2014? Is today's Bitcoin suitable as a unit of account?

Q3

The *required* reserve ratio for an economy's banking system is 10 percent. The central bank buys $100,000 of short-term government bonds (this is known as an "open market purchase") from Bank A. The central bank pays Bank A by adding $100,000 to Bank A's reserve account. Banks do not want to hold excess reserves. People hold all money in the form of deposits, i.e., this is a cashless economy.

a. We start by examining Bank A.
   i. Using a T-account, describe the immediate changes to Bank A's balance sheet due to the central bank's open market purchase. In what way is this different from the "Step 0" in the Macro 4 lecture video? In what way is this similar?
   ii. By adding entries to the T-account constructed in part a, describe the further changes to Bank A's balance sheet as the deposit creation process unfolds. Then, write a new T-account that consolidates all of Bank A's balance sheet changes.
b. Describe the changes in the balance sheet of the next bank (say, Bank B) in the deposit creation process. Then, write a T-account that consolidate all of Bank B's balance sheet changes.
c. Extrapolating from Bank B to other banks in the system, find the total quantity of deposits created as the result of the central bank's bond purchase.

Q4

This is a follow-up to Q3 that modifies some of the assumptions in the deposit-creation model. We explore two modifications (a) that banks choose to keep excess reserves, and (b) that people want to hold some of their money in the form of cash in their wallets.

a. Suppose instead that banks keep excess reserves equal to 10 percent of deposits, so that the *actual* reserve ratio (required + excess) for each bank is 20 percent.
   i. Verify that Bank A's balance sheet changes are the same as in Q3a.
   ii. Explain how Bank B's balance sheet change are different from that in Q3b.
   iii. Find the total quantity of deposits created as the result of the central bank's bond purchase. Compare your result against that found in Q3c.
b. Suppose banks do not want to hold excess reserves. Also suppose that people choose to hold 80 percent of their money in deposits, and 20 percent in cash.
   i. Verify that Bank A's balance sheet changes are the same as in Q3a.
   ii. Explain how Bank B's balance sheet changes differ from that in Q3b.
   iii. Find the total quantity of deposits plus cash in circulation created as the result of the central bank's bond purchase. Compare your result against that found in Q3c.
c. Suppose instead that banks keep excess reserves equal to 10 percent of deposits. Also suppose that people choose to hold 80 percent of their money in the form of deposits and 20 percent in the form of cash. Find the total quantity of deposits plus cash in circulation created as the result of the central bank's bond purchase. Compare your result against that found in Q3c, Q4a and Q4b.

Q5

The table below shows Southern Rock Bank's balance sheet in the form of a T-account:

ASSETS		**LIABILITIES and BANK CAPITAL**	
Government bonds	$200 million	Deposits	$550 million
Loans	$620 million	Bonds payable	$350 million
Deposits with central bank	$65 million		
Cash in vault	$15 million		
Other assets	$100 million		
		Bank capital	
Total assets		Total liabilities and bank capital	

a. Complete the T-account.
b. "Bonds" and "deposits" appear on both the assets side and the liabilities side. Explain what the entries mean and why this is not an error.
c. Suppose the capital requirement is 10%. Verify that Southern Rock Bank currently meets the capital requirement.

d. If borrowers declare that they cannot pay $120 million of loans, the value of Southern Rock Bank's assets falls by 12 percent. In this scenario, is Southern Rock Bank insolvent?
e. Suppose the central bank raises the capital requirement to 15%. Southern Rock Bank can meet the new capital requirement in a few ways. One way is to **deleverage**, i.e., sell assets to pay off liabilities. By how much must Southern Rock Bank's assets and liabilities be reduced to meet the new capital requirement?
f. Another way is for Southern Rock Bank to **recapitalize**, i.e., get investors to add their own funds to bank capital, in return for getting a share of the bank's ownership. Suppose it uses the proceeds of its new shares issue to pay down liabilities. How many dollars must it raise from its new shares issue to meet the new 15% capital requirement?

Q6

Read John Henley's "Sweden leads the race to become cashless society", in *The Guardian*, 4 June 2016. The article can be downloaded from LumiNUS. Alternatively the public link is available here: https://www.theguardian.com/business/2016/jun/04/sweden-cashless-society-cards-phone-apps-leading-europe

a. Based on your own observations, how far away is Singapore from Sweden in going cashless?
b. What benefits do societies obtain by going cashless?
c. What problems may arise as societies move towards becoming cashless?