

## **Problem Set #1: National Income and Product Accounts**

### **1. NIPA and Economic Equilibrium**

Consider a closed economy with one good,  $X$ .  $X$  is produced with one production factor,  $L$ , using technology:

$$X = f(L)$$

Where  $f(0) = 0$ ,  $f' > 0$ , and  $f'' < 0$ . The demand for  $X$  is given by:

$$P_X = 110 - 0.8X^d$$

Supply of  $X$  is:

$$P_X = 0.2X^s$$

- (a) Suppose there are no taxes. Find the equilibrium price and quantity of  $X$ . Calculate labor income, firms' profits, GDP, and national income. Illustrate your answer in a diagram.
- (b) Now assume that there is a sales-tax of 50 percent. The government collects the tax and then burns the proceeds (there is no government consumption). Repeat part (a).
- (c) For the case with sales-tax, draw a schematic diagram of the labor market. Be specific about the formula of labor demand. In that diagram show labor income, firms' profits, GDP, and national income. Hint: you need to draw two labor demands; one that reflects the value of marginal product using the consumer price and the other using the producer price.

## 2. National Accounting

There are three goods in the world economy: two consumption goods,  $X$  and  $Y$ , and an investment good (i.e. capital),  $K$ . The world's prices are  $P_X = 10$  and  $P_K = 5$ . Consider an open economy with following statistics:

$C = \$600$ , this includes consumption of 20 units of  $X$

The government consumes 10 units of  $X$  and 5 units of  $Y$ . It does not invest.

The economy uses 40 units of  $K$  for investment.

The economy produces 10 units of  $Y$  and 60 units of  $K$  (it may also produce  $X$ )

The economy exports 10 units of  $X$

These data are summarized in the following table:

	Quantity			Monetary Value
	$X$	$Y$	$K$	
Price	\$10		\$5	
Consumption	20		0	\$600
Investment	0	0	40	
Government	10	5	0	
Production		10	60	
Net Export	10			

In addition:

$T = \$100$ , which includes only income tax

$Y^d = \$800$

$B_{-1}^* = 0$

Calculate the following variables using the NIPA identities: Government purchases, investment, GDP, Net Export,  $S_P$ , and  $S_G$ .

In your answer make use of the simplifying assumptions as presented in handout 1.