

## Key Variables and Their Measurement, Part I: Problems

The following data show all goods and services purchased in Pennsylvania in 2011 and 2012. Pennsylvania is completely isolated and unapproachable, and thus does not engage in any international trade:

Item	$Q_{11}$	$P_{11}$	$Q_{12}$	$P_{12}$
Sock Puppets	100	\$150	120	\$200
New Housing	10	\$1000	5	\$1000
Old Housing	10	\$100	15	\$300
Tractors	20	\$300	25	\$280
Dr. Pepper	80	\$100	40	\$50

1. Old housing is excluded from GDP. There are two consumption goods, Dr. Pepper and Sock Puppets. In 2011, their market values were \$15,000 and \$8,000 so total consumption equaled \$23,000. For 2012, these figures were \$24,000 and \$2,000 for a total of \$26,000.

There are two investment goods, New Housing and Tractors. In 2011, their market values were \$10,000 and \$6,000 so total investment equaled \$16,000. For 2012, these figures were \$5,000 and \$7,000 for a total of \$12,000.

Because there are no government expenditures, imports, or exports, total GDP is just  $C + I$ . It was thus \$39,000 in 2011 and \$38,000 in 2012.

2. For the base year of 2011, real and nominal GDP are the same and equal \$39,000. To calculate real GDP for 2012, we multiply 2012 quantities by 2011 prices. It thus equals  $\$(150 \cdot 120 + 1000 \cdot 5 + 200 \cdot 25 + 100 \cdot 40) = \$32,000$ . GDP growth thus equals:

$$\frac{32 - 39}{39} = -17.9\% \quad (1)$$

3. For the base year of 2012, real and nominal GDP are the same and equal \$38,000. To calculate real GDP for 2011, we multiply 2011 quantities by 2012 prices. It thus equals  $\$(100 \cdot 200 + 10 \cdot 1000 + 20 \cdot 280 + 80 \cdot 50) = \$39,600$ . GDP growth thus equals:

$$\frac{38 - 39.6}{39.6} = -4.0\% \quad (2)$$

4. The price index equals nominal GDP for the base year and is thus \$39,000 for 2011. For 2012, we multiply 2012 prices by 2011 quantities which yields  $\$(100*200+10*1000+20*280+80*50)=\$39,600$ . Inflation is then:

$$\frac{39.6 - 39}{39} = 1.5\% \quad (3)$$

5. Price indices differ only in the basket of goods they use. The major difference is that a consumer price index, the new index is likely to exclude investment goods such as housing and tractors.

6. False. Imports are included in consumption, government spending, and government spending. If a household buys imported beer, that is consumption. If the government does it, that is government expenditures. Subtracting it from GDP then offsets these effects so that imports do not impact GDP.

Negative GDP suggests that a geographic region produces negative output in a given period. This does not make economic sense.

7. False. As we saw in class, if inflation is expected and uniform, then it causes no problems. Likewise more inflation includes the case where we go from deflation to stable prices. Remember that deflation is as bad, or worse, than inflation.

8. False. In factor markets, households supply and firms demand.