Econ 1A: Chapter 7 (Study Plan: Section 7Q: multiple choice quiz – Quiz 6, 7 and 8.)

**Quiz 6:** If NGDP increases by 5% a year and the GDP price index (GDP deflator) rises by 2% a year, then RGDP increased by ______________.

**Quiz 7:** When CPI increases from 200 in 2010 to 210 in 2011 and the nominal wage rate (W) is constant at $10 an hour, the real wage rate (w) (increases or decreases) by ____________.

**Quiz 8:** When the price level is rising (π) at ____________ and the real interest rate (r) is 1% a year, the nominal interest rate (i) is 3% a year.

Answer:

1. Since \((\text{NGDP}/\text{GDP price index}) \times 100 = \text{RGDP}\), we can find that
   \[
   \% \text{ change in } \text{NGDP} - \% \text{ change in GDP price index} = \% \text{ change in RGDP}.
   \]
   For example,

<table>
<thead>
<tr>
<th>Year</th>
<th>NGDP</th>
<th>GDP price index</th>
<th>RGDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2011</td>
<td>105</td>
<td>102</td>
<td>103</td>
</tr>
</tbody>
</table>

   \[
   \% \text{ change in NGDP} = \left(\frac{\text{NGDP}(2011) - \text{NGDP}(2010)}{\text{NGDP}(2010)}\right) \times 100\% = \left(\frac{105-100}{100}\right) \times 100\% = 5\%.
   \]
   \[
   \% \text{ change in GDP Price index} = \left(\frac{\text{GDP price index (2011)} - \text{GDP Price index (2010)}}{\text{GDP price index (2010)}}\right) \times 100\% = \left(\frac{102 - 100}{100}\right) \times 100\% = 2\% .
   \]
   \[
   \% \text{ change in RGDP} = \left(\frac{\text{RGDP}(2011) - \text{RGDP}(2010)}{\text{RGDP}(2010)}\right) \times 100\% = \left(\frac{103-100}{100}\right) \times 100\% = 3\%.
   \]
   It is easy to see that the answer will be \(5\% - 2\% = 3\%\).

2. Since \([\text{nominal wage (W)}/\text{CPI}] \times 100 = \text{real wage (w)}\), we can find that
   \[
   \% \text{ change in } \text{W} - \% \text{ change in } \text{CPI} (\pi) = \% \text{ change in } \text{w}.
   \]
   According to Quiz 7, \(\pi = \left(\frac{210 - 200}{200}\right) \times 100\% = 5\%\) and \% change in W = \left(\frac{10-10}{10}\right) \times 100\% = 0\%,
   therefore, we can find that
   \[
   \% \text{ change in } \text{w} = \% \text{ change in } \text{W} - \% \text{ change in } \text{CPI} (\pi) = 0\% - 5\% = -5\%\]
   and conclude that the real wage decreases by \(5\%\).

   For example,

<table>
<thead>
<tr>
<th>Year</th>
<th>W</th>
<th>CPI</th>
<th>(w = (W/\text{CPI})\times 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$10</td>
<td>200</td>
<td>($10/200) \times 100 = $5)</td>
</tr>
<tr>
<td>2011</td>
<td>$10</td>
<td>210</td>
<td>($10/210) \times 100 = $4.76)</td>
</tr>
</tbody>
</table>

   \[
   \% \text{ change in } \text{W} = \left(\frac{\text{W(2011)} - \text{W(2010)}}{\text{W(2010)}}\right) \times 100\% = \left(\frac{(10-10)}{10}\right) \times 100\% = 0\%.
   \]
   \[
   \% \text{ change in } \text{CPI} (\pi) = \left(\frac{\text{CPI(2011)} - \text{CPI(2010)}}{\text{CPI(2010)}}\right) \times 100\% = \left(\frac{210 - 200}{200}\right) \times 100\% = 5\%.
   \]
   \[
   \% \text{ change in } \text{w} = \left(\frac{\text{w(2011)} - \text{w(2010)}}{\text{w(2010)}}\right) \times 100\% = \left(\frac{4.76 - 5}{5}\right) \times 100\% \approx -5\%.
   \]

3. Applying \(i - \pi = r\), we at once obtain that \(\pi = i - r = 3\% - 1\% = 2\%\).