Consider the following information for two zero-coupon bonds, Bond A and Bond B:

<table>
<thead>
<tr>
<th>Bond</th>
<th>Face Value</th>
<th>Price</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$1,000</td>
<td>$943.40</td>
<td>1 year</td>
</tr>
<tr>
<td>B</td>
<td>$1,000</td>
<td>$857.34</td>
<td>2 years</td>
</tr>
</tbody>
</table>

Calculate the forward rate for the second year. Pick the answer choice that is the closest to the exact value.

A. 6.00%  B. 8.00%  C. 10.00%  D. 12.00%  E. 14.00%

Solution.
Let us write $s_1$ for the spot rate for the first year, $s_2$ for the spot rate for year two, and $f_{1,2}$ for the forward rate from time 1 to time 2, i.e., the forward rate for the second rate.

We have $943.40 \cdot (1 + s_1) = 1000$, $857.34 \cdot (1 + s_2)^2 = 1000$, and

$\left(1 + s_1\right) \cdot \left(1 + f_{1,2}\right) = \left(1 + s_2\right)^2$.

Therefore

$1 + f_{1,2} = \frac{(1 + s_2)^2}{1 + s_1} = \frac{1000}{857.34} = \frac{943.40}{857.34} \approx 1.100380$.

This gives $f_{1,2} \approx 10.0380\%$.

Answer C.

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