$$\begin{CD}
\operatorname{Hom}_C(a,b) \otimes \operatorname{Hom}_C(b,c) @>{\circ_{a,b,c}}>> \operatorname{Hom}_C(a,c) \\
@V{F_{a,b} \otimes F_{b,c}}VV @VV{F_{a,c}}V \\
\operatorname{Hom}_D(F(b),F(c)) \otimes \operatorname{Hom}_D(F(a),F(b)) @>>{\circ_{F(a),F(b),F(c)}}> \operatorname{Hom}_D(F(a),F(c))
\end{CD}$$