Combining () and () yields,

$$h(1,1,1,h^{-1}(1,1,0;y)) = F^{-1}_{Y_1(1,1)|D=0,M=1} \circ F_{Y_0(1,1)|D=0,M=1}(y). \tag{1}$$

Note that $h(1,1,1,h^{-1}(1,1,0;y))$ maps the period 1 (potential) outcome of an individual with the outcome y in period 0 under treatment with the mediator. Accordingly, $E[F^{-1}_{Y_1(1,1)|D=0,M=1} \circ F_{Y_0(1,1)|D=0,M=1}(Y_0)|D=0,M=1] = E[Y_1(1,1)|D=0,M=1]$. We can identify $F_{Y_0(1,1)|D=0,M=1}(y) = F_{Y_0|D=0,M=1}(y)$ under Assumption 2, but we cannot identify $F_{Y_1(1,1)|D=0,M=1}(y)$. However, we show in the following that we can identify the overall quantile-quantile transform $F^{-1}_{Y_1(1,1)|D=0,M=1} \circ F_{Y_0(1,1)|D=0,M=1}(y)$ under the additional Assumption 5b. Under Assumptions 1 and 5b, the conditional potential outcome distribution function equals

$$\begin{aligned} F_{Y_t(d,1)|D=1,M=1}(y) &\overset{A1}{=} \Pr(h(d,m,t,U) \leq y|D=1,M=1,T=t), \\ &= \Pr(U \leq h^{-1}(d,m,t;y)|D=1,M=1,T=t), \\ &\overset{A5b}{=} \Pr(U \leq h^{-1}(d,m,t;y)|D=1,M=1), \\ &= F_{U|11}(h^{-1}(d,m,t;y)), \end{aligned} \tag{2}$$

for $d, d' \in \{0,1\}$. We repeat similar steps as above. First, evaluating $F_{Y_1(1,1)|D=1,M=1}(y)$ at $h(1,1,1,u)$ gives

$$F_{Y_1(1,1)|D=1,M=1}(h(1,1,1,u)) = F_{U|11}(h^{-1}(1,1,1;h(1,1,1,u))) = F_{U|11}(u).$$

Applying $F^{-1}_{Y_1(1,1)|D=1,M=1}(q)$ to both sides, we have

$$h(1,1,1,u) = F^{-1}_{Y_1(1,1)|D=1,M=1}(F_{U|11}(u)). \tag{3}$$

Second, for $F_{Y_0(1,1)|D=1,M=1}(y)$ we have

$$F^{-1}_{U|11}(F_{Y_0(1,1)|D=1,M=1}(y)) = h^{-1}(1,1,1;y). \tag{4}$$