Applying the discussion of the previous paragraph gives an extension.

$$0 \longrightarrow N \longrightarrow F \longrightarrow M \longrightarrow 0,$$

$$F = \frac{N \oplus E_0}{\mu(E_1/\partial E_2)}$$

We leave it as an exercise to check that the two mappings

$$\left\{ \begin{array}{l} \text{equivalent classes} \\ \text{of extension} \end{array} \right\} \rightleftarrows \operatorname{Ext}^1_{\mathcal{O}}(M, N)$$

are well-defined and inverse to one another. Q.E.D.

① independent of the choice of projective resolutions.

$$\begin{tikzcd}
E_2 \arrow[r] \arrow[d, "\phi_2"'] & E_1 \arrow[r] \arrow[d, "\phi_1"] & E_0 \arrow[r] \arrow[d, "\phi_0"] & M \arrow[r] \arrow[d, equal] & 0 \\
E_2' \arrow[r] & E_1' \arrow[r] & E_0' \arrow[r] & M \arrow[r] & 0
\end{tikzcd}$$

$$\Rightarrow \quad \begin{tikzcd}
0 \arrow[r] & N \arrow[r] \arrow[d, equal] & \dfrac{N \oplus E_0}{\mu(E_1/\partial E_2)} \arrow[r] \arrow[d, "?"] & M \arrow[r] \arrow[d, equal] & 0 \\
0 \arrow[r] & N \arrow[r] & \dfrac{N \oplus E_0'}{\mu'(E_1'/\partial E_2')} \arrow[r] & M \arrow[r] & 0
\end{tikzcd}$$