Convolution of Zeta Functions

11585 [2011, 558]. *Proposed by Bruce Burdick, Roger Williams University, Bristol, RI.* Show that

$$\sum_{k=3}^{\infty} \frac{1}{k} \left(\sum_{m=1}^{k-2} \zeta(k-m)\zeta(m+1) - k \right) = 3 + \gamma^2 + 2\gamma_1 - \frac{\pi^2}{3}.$$