Base the estimate $m_i^\alpha$ on $p_j, j \neq i$ then

$$\mathbb{E}\left[\mathbb{P}\left( p_i \le \frac{\alpha r}{m_i^*}, R_i = r-1 \,\middle|\, p_j, j \neq i \right)\right]$$

as $\frac{\alpha r}{m^\alpha} \le \frac{\alpha r}{m_i^*}$

$$= \mathbb{E}\left[ \mathbb{P}\left( p_i \le \frac{\alpha r}{m_i^*} \,\middle|\, p_j, j \neq i \right) \mathbb{1}(R_i = r-1) \right]$$

$$\le \mathbb{E}\left[ \frac{\alpha r}{m_i^*} \mathbb{1}[R_i = r-1] \right]$$

So get $\sum_{i \in I_0} \frac{1}{r} \sum_{r=1}^{m} \mathbb{E}\left[ \frac{\alpha r}{m_i^*} \mathbb{1}[R_i = r-1] \right]$

$$= \alpha \sum_{i \in I_0} \mathbb{E}\left[ \frac{1}{m_i^*} \underbrace{\sum_{r=1}^{m} \mathbb{1}[R_i = r-1]}_{=1} \right]$$

$$= \alpha \sum_{i \in I_0} \mathbb{E}\left[ \frac{1}{m_i^*} \right]$$