$$PG: \quad \varphi^* = \arg\ \min_{\varphi} \sum_{s=1}^{S} D(p_s, r_s, V) \qquad (1a)$$

$$s.t. \qquad \sum_{s=1}^{S} b_s \le B(\cdot); \qquad (1b)$$

$$s = 1, 2, ..., S. \qquad (1c)$$