

**Lemma** ( $\varphi$  is monotone in the valuation). Suppose that  $\boldsymbol{v}_1, \boldsymbol{v}_2 : \mathcal{A} \rightarrow \mathbf{DP}$  are two valuations for which it holds that  $\boldsymbol{v}_1(a) \leq_{\mathbf{DP}} \boldsymbol{v}_2(a)$ . Then  $\varphi[\langle \mathcal{A}, \mathbf{T}, \boldsymbol{v}_1 \rangle] \leq_{\mathbf{DP}} \varphi[\langle \mathcal{A}, \mathbf{T}, \boldsymbol{v}_2 \rangle]$ .