Multiplicative systematic measurement heterogeneity
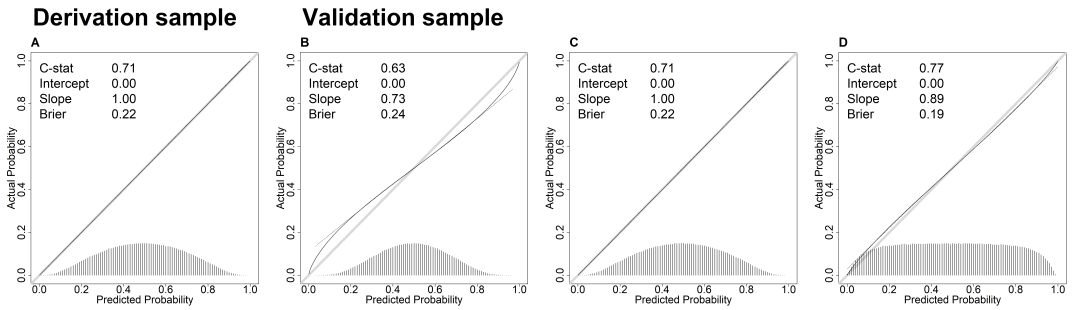
Derivation sample   **Validation sample**

FIGURE 7 Predictive performance of a single-predictor binary logistic regression model. The degree of multiplicative error in the validation predictor measurement W_V varies, while the degree of random error is consistent across settings, i.e. while $\sigma^2_{\epsilon(D)} = \sigma^2_{\epsilon(V)}$. The predictor measurement structure corresponds to:

A. $W_D = \theta_D X + \epsilon_D,$ where $\theta_D = 1.0$, $X \sim \mathcal{N}(0, 0.5)$ and $\epsilon_D \sim \mathcal{N}(0, 0.5)$.

B. $W_V = \theta_V X + \epsilon_V,$ where $\theta_V = 0.5$, $X \sim \mathcal{N}(0, 0.5)$ and $\epsilon_V \sim \mathcal{N}(0, 0.5)$.   The association X-W is weaker at validation.

C. $W_V = \theta_V X + \epsilon_V,$ where $\theta_V = 1.0$, $X \sim \mathcal{N}(0, 0.5)$ and $\epsilon_V \sim \mathcal{N}(0, 0.5)$.   The association X-W is equal across settings.

D. $W_V = \theta_V X + \epsilon_V,$ where $\theta_V = 2.0$, $X \sim \mathcal{N}(0, 0.5)$ and $\epsilon_V \sim \mathcal{N}(0, 0.5)$.   The association X-W is stronger at validation.