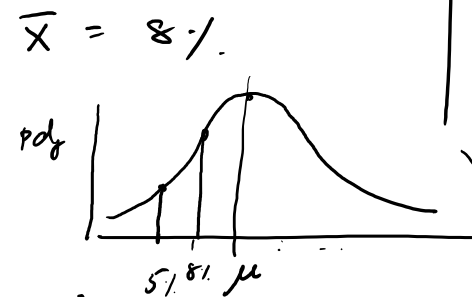## LGD example

Parameter: $\mu$ = Mean LGD

(1) Prior on $\mu$: $\Pi(\mu) = \begin{pmatrix} 5\% & 10\% & 40\% & 50\% & 60\% \\ \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} & \frac{1}{5} \end{pmatrix}$

(2) Data: 

$$x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \qquad \bar{x} = 8\%$$
$$5\% \quad 8\% \quad 10\% \quad 12\% \quad 5\%$$

$$x_1 \ldots x_5 \overset{iid}{\sim} N(\mu, \sigma_{\shortmid\shortmid}^2)$$

2% known

$$L\left(\underset{\sim}{x}\Big|\mu\right) = \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x_1-\mu)^2}{2\sigma^2}} \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x_2-\mu)^2}{2\sigma^2}} \cdots \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x_5-\mu)^2}{2\sigma^2}}$$

$$= dnorm(x_1, \mu, \sigma)\, dnorm(x_4, \mu, \sigma) \cdots dnorm(x_5, \mu, \sigma)$$

pdf



5, 8% $\mu$

(3) <u>Posterior</u>: $\Pi\left(\mu\Big|\underset{\sim}{x}\right) \propto L\left(x\Big|\mu\right)\Pi(\mu)$, $\mu \in \{5\%, 10\%, 40\%, 50\%, 60\%\}$

$$\Pi\left(\mu\Big|\underset{\sim}{x}\right) = \begin{pmatrix} 5\% & 10\% & 40\% & 50\% & 60\% \\ & & & & \end{pmatrix}$$

$\Pi\left(\mu = .05 \Big| \underset{\sim}{x}\right)$

$\propto \prod\limits_{i=1}^{5} dnorm\left(x_i, .05, .02\right) \times \underset{\frac{1}{5}}{\underbrace{\Pi(.05)}}$

Similarly

$\Pi\left(\mu = .1 \Big| \underset{\sim}{x}\right) \propto \underline{\quad}$

$\Pi\left(\mu = .4 \Big| \underset{\sim}{x}\right) \propto \underline{\quad}$

$\Pi\left(\mu = .5 \Big| \underset{\sim}{x}\right) \propto \underline{\quad}$

$\Pi\left(\mu = .6 \Big| \underset{\sim}{x}\right) \propto \underline{\quad}$

then normalize