Vega Behavior

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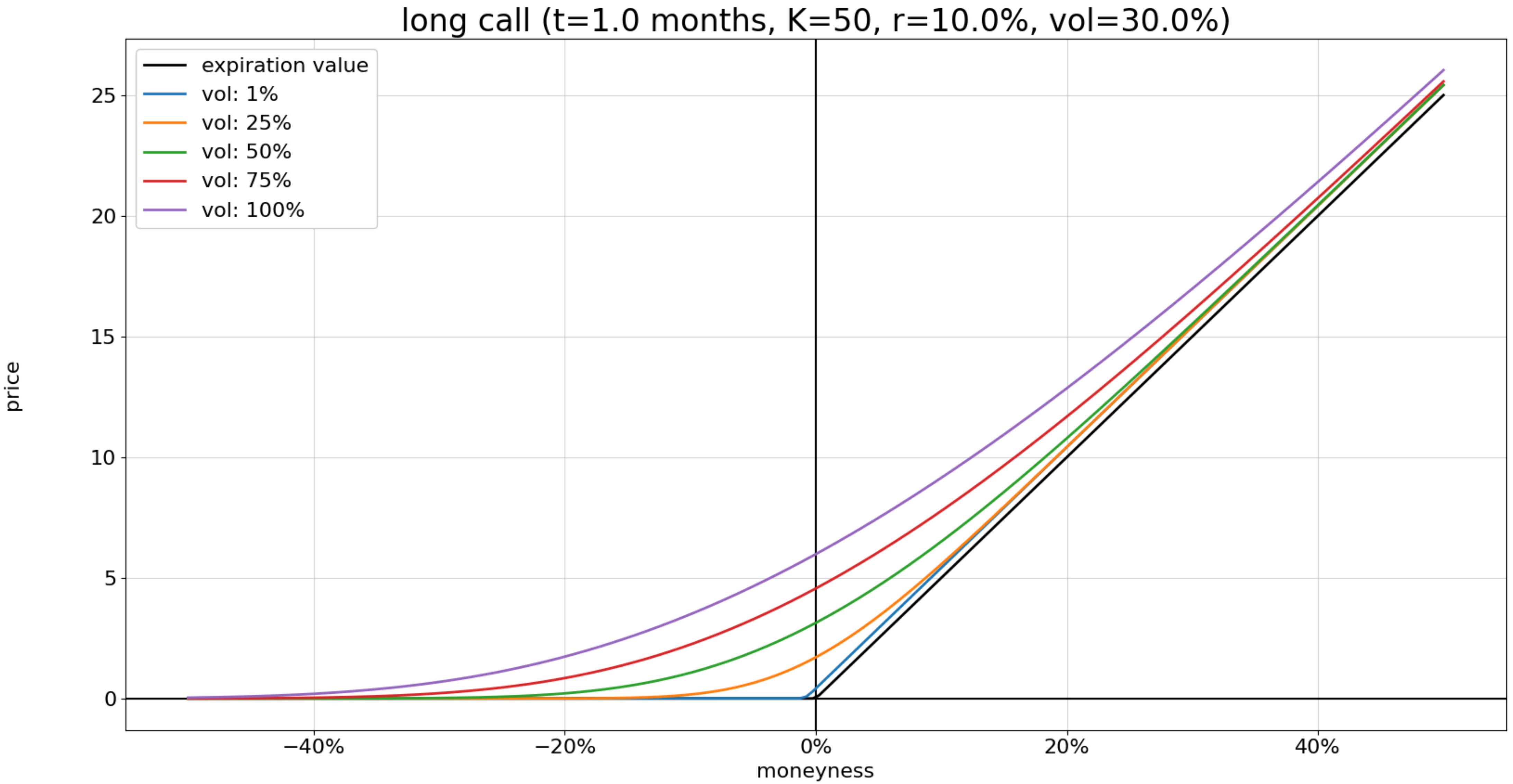
Vega

Call, Put

$$\nu = \frac{dC}{d\sigma} = \frac{dP}{d\sigma} = \frac{d\Delta}{dS_0} = S_0 n(d_1)\sqrt{T}$$

Volatility is more impactful on at the money option prices



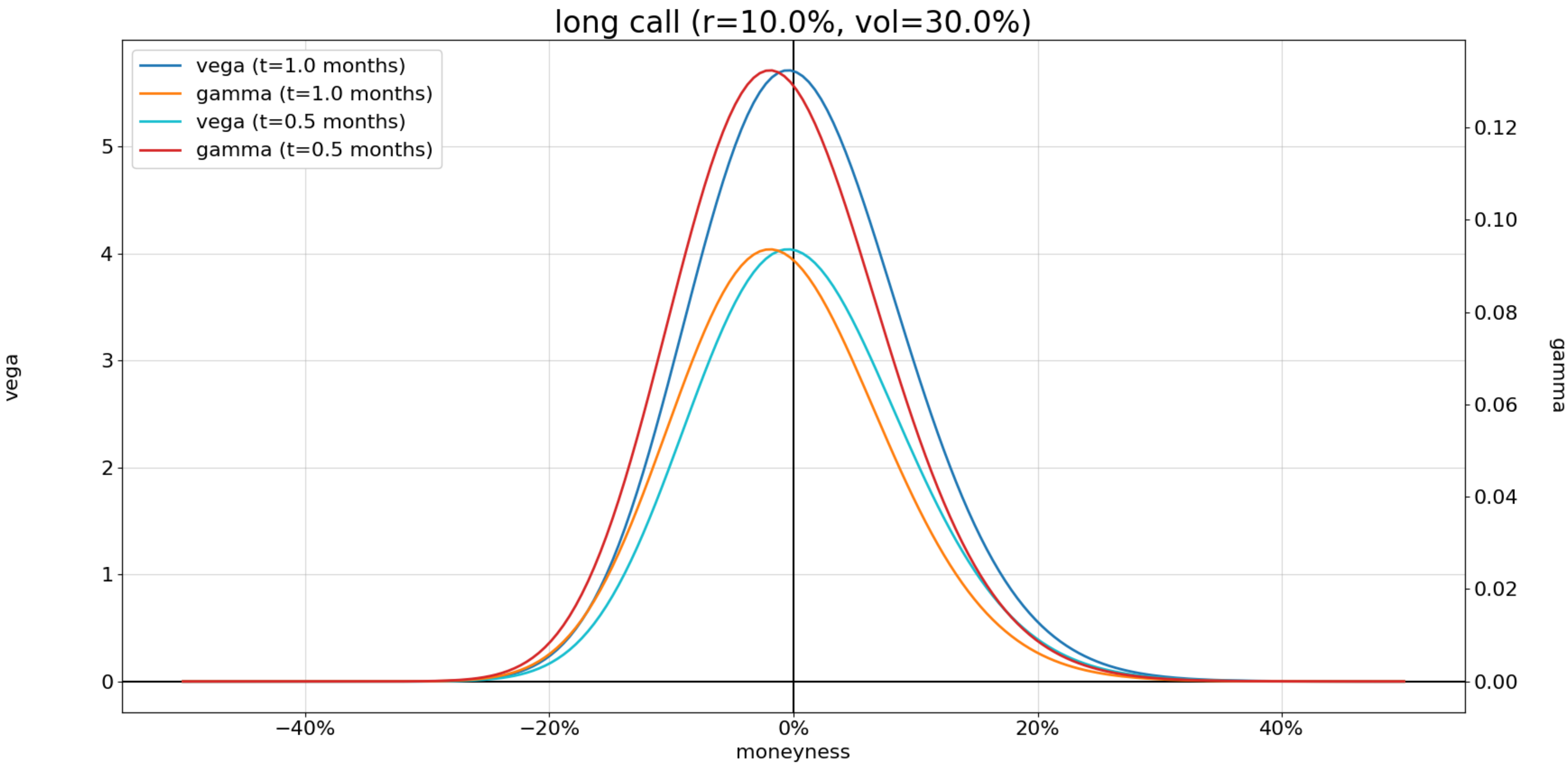
Gamma and Vega Relationship

Given $\nu = S_0 n(d_1)\sqrt{T}$ and $\Gamma = \frac{n(d_1)}{S_0 \sigma \sqrt{T}}$ then

$$\nu = \frac{\Gamma}{{S_0}^2 \sigma T}$$

Which shows that gamma and vega are inversely related in respect to time. What about volatility?

Gamma and Vega diverge in relation to time



Vega decays as time passes