

Vega Behavior

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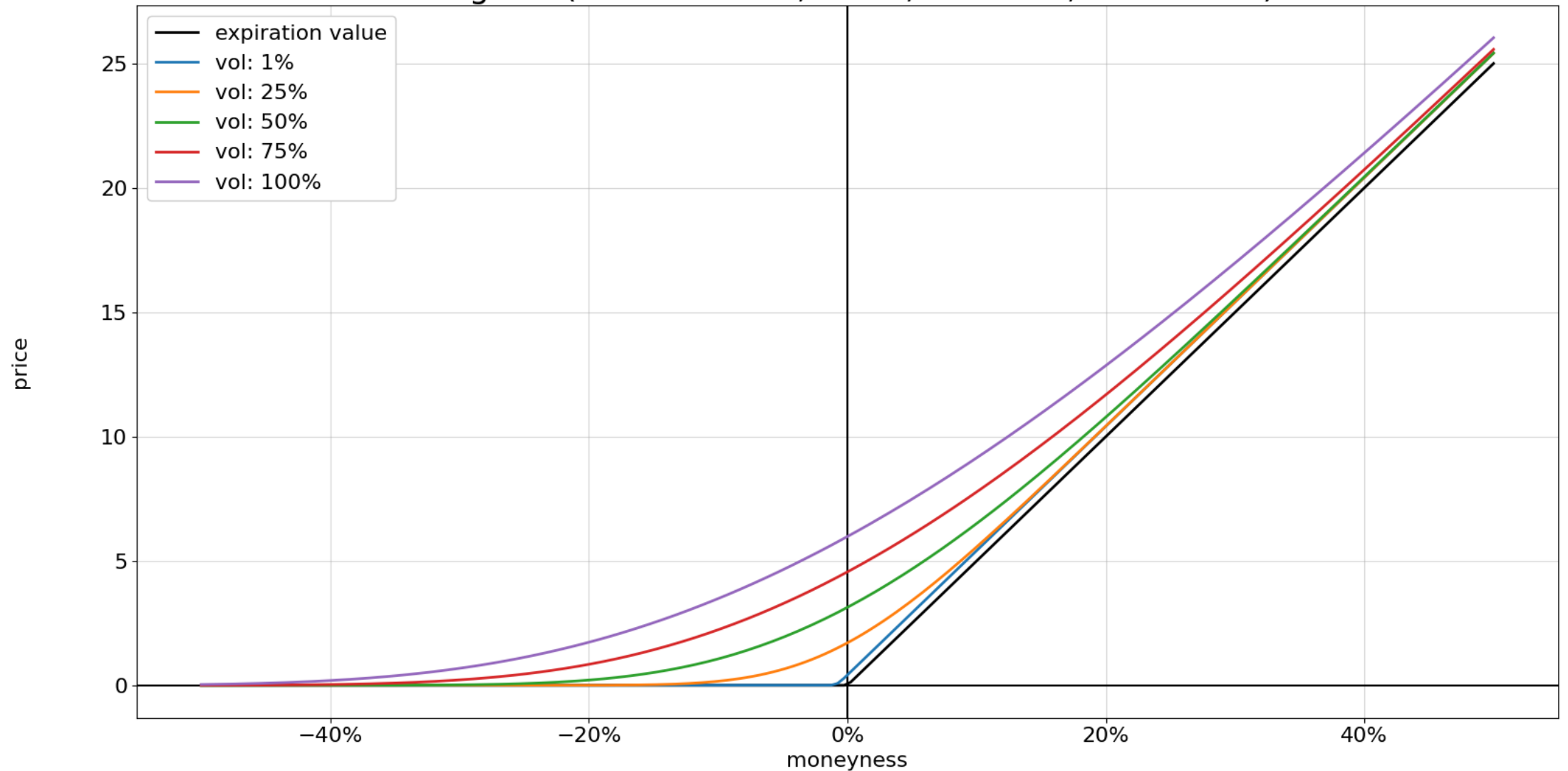
Vega

Call, Put

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

Volatility is more impactful on at the money option prices

long call (t=1.0 months, K=50, r=10.0%, vol=30.0%)



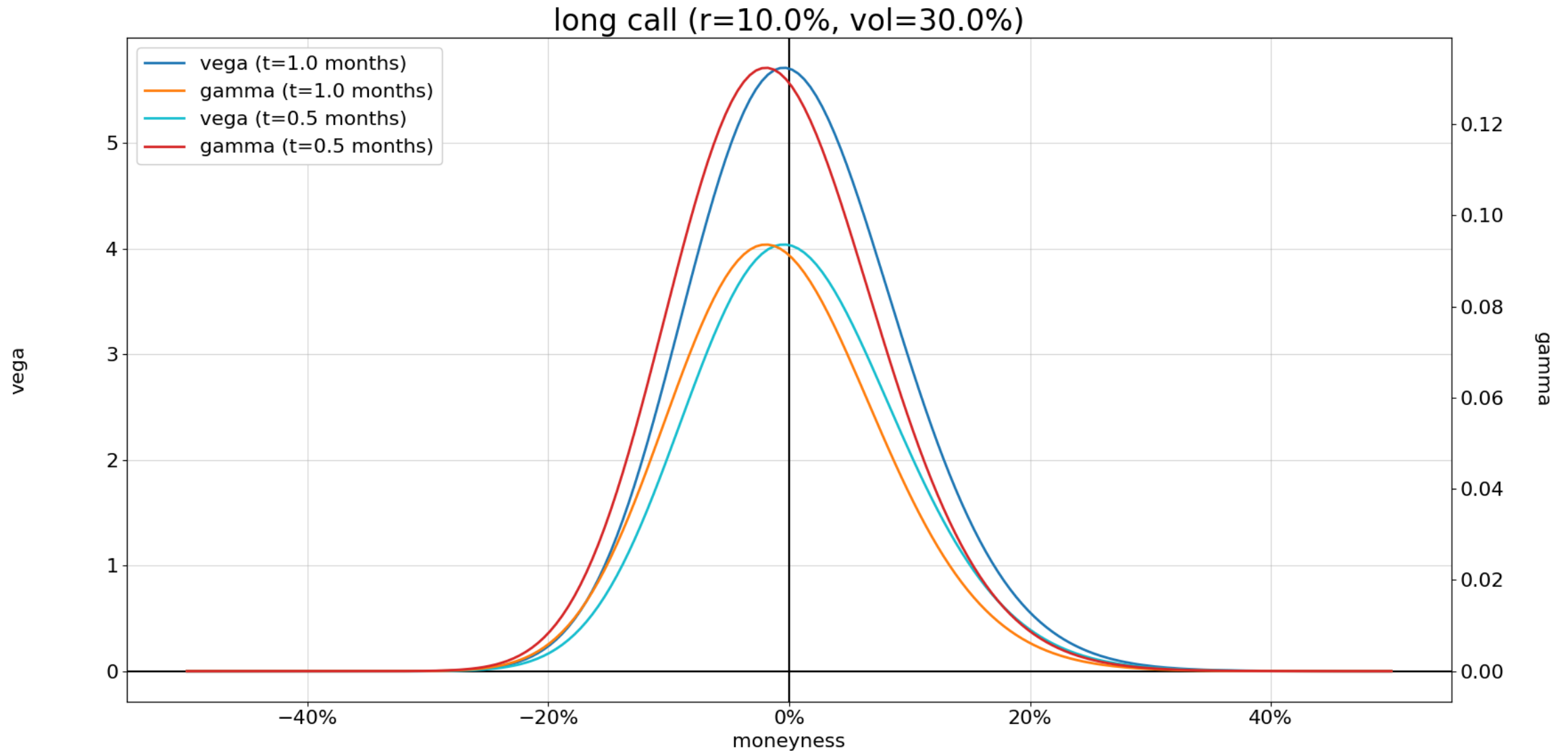
Gamma and Vega Relationship

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

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

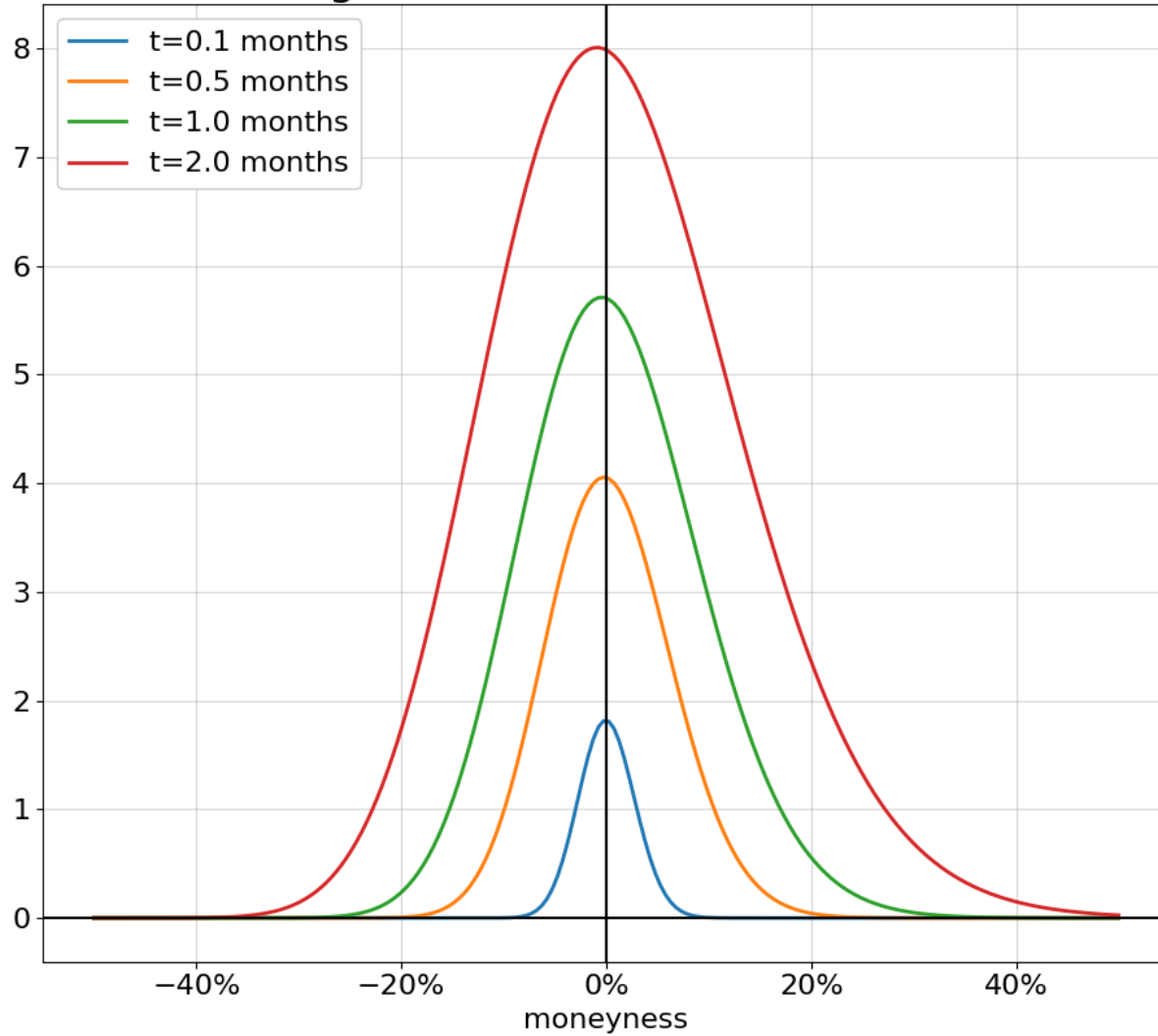
Which shows that gamma and vega are inversely related in respect to time. **What about volatility?**

Gamma and Vega diverge in relation to time



Vega decays as time passes

long call (r=10.0%, vol=30.0%)



call vega accross time

