$$softmax(x + c)_i = \frac{e^{x_i + c}}{\sum_j e^{x_j + c}}$$

$$= \frac{e^{x_i} e^c}{\sum_j e^{x_j} e^c}$$

$$= \frac{e^{x_i}}{\sum_j e^{x_j}}$$

$$= softmax(x)_i$$