

Figure 1: Under the suggested weight decay scaling, the optimal learning rate is stable across training length. Similiar to the setting of Fig.1 in the main text, we trained the model for 100 epochs with different dataset sizes under a fixed batch size. Using a fixed weight decay (top row), the optimal learning rate (red marks) decreases with the dataset size. Under our suggested weight decay scaling, where  $\lambda \propto \frac{1}{\text{dataset size}}$ , the optimal learning rate becomes more stable across dataset sizes.