$<$ [5.8] $-$ [8.0] < 1.5 mag, thus avoiding AGNs. We then compute the structure function as

$$S(\tau) = \left[\frac{1}{N_{\rm qso}(\tau)} \sum_{i<j} (m(t_i) - m(t_j))^2_{\rm qso} - \frac{1}{N_{\rm gal}(\tau)} \sum_{i<j} (m(t_i) - m(t_j))^2_{\rm gal} \right]^{1/2} . \tag{5}$$

In addition to the simple calculation over the 160, 690, and 1100 AGNs with [3.6]$<$ 16, 17, and 18 mag, we also calculated the structure functions for 1000 bootstrap resamplings of both the AGN and galaxy lists. These give consistent results, and we generally report the median result of the bootstrap samples and the region encompassing 68.3% of the samples about the median. The small values at short lags are very sensitive to any systematic problems in the noise estimate, and while this empirical approach to correctly characterizing the noise appears to work well, our estimates of the amplitude of the structure function on the longer timescales are probably more robust than our estimate of the slope of the structure function.

Figure 8 shows the resulting observed and rest-frame structure functions for the [3.6] and [4.5] bands as a function of magnitude limit. We generally see more variability on longer timescales. We fit our structure functions with a power-law

$$S(\tau) = S_0 \left(\frac{\tau}{\tau_0} \right)^{\gamma} \tag{6}$$

using $\tau_0 = 4$ years (2 years) for the observed (rest-frame) estimates. Table 6 presents the resulting fits. The [3.6] and [4.5] structure functions are consistent with each other, but also significantly steeper than the i-band structure function from an ensemble of SDSS quasars (Vanden Berk et al. 2004), with $\gamma = 0.303 \pm 0.035$, and higher amplitude, with $S_0 = 0.20$ mag for $\tau_0 = 2$ years.

The steeper mid-IR slope could be explained by the emission being dominated by larger physical scales than the optical emission. At these redshifts, the observed frame mid-IR corresponds to the rest-frame near-IR, where the emission has contributions from both the disk and hot dust. If we focus on the more compact disk emission, the characteristic scale of an accretion disk for emission at wavelength λ, defined by the point where the disk temperature matches the photon energy, is

$$R_\lambda \simeq 10^{16} \left(\frac{\lambda_{\rm rest}}{\mu{\rm m}} \right)^{4/3} \left(\frac{M_{\rm BH}}{10^9 M_\odot} \right)^{2/3} \left(\frac{L}{\eta L_E} \right)^{1/3} {\rm cm}, \tag{7}$$

where L/L_E is the Eddington ratio and $L = \eta \dot{M} c^2$ defines the radiative efficiency η. Taking $L/L_E = 1/3$, $\eta = 0.1$, and $z = 1$, the optical emission for $M_{\rm BH} = 10^9 M_\odot$ comes from a region only a light day (0.003 light years) in size, while the mid-IR scale is approximately