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Zev Klagsbrun and **Robert J Lemke Oliver*** (rjlo@stanford.edu), Department of Mathematics, Building 380, Stanford University, Stanford, CA 94305. *The distribution of the Tamagawa ratio in the family of elliptic curves with a two-torsion point.*

In recent work, Bhargava and Shankar have shown that the average size of the 2-Selmer group of an elliptic curve over \mathbb{Q} is exactly 3, and Bhargava and Ho have shown that the average size of the 2-Selmer group in the family of elliptic curves with a marked point is exactly 6. In contrast to these results, we show that the average size of the 2-Selmer group in the family of elliptic curves with a two-torsion point is unbounded. The existence of a two-torsion point implies the existence of rational isogeny, and a fundamental quantity attached to a pair of isogenous curves is the Tamagawa ratio, which measures the relative sizes of the Selmer groups associated to the isogeny and its dual. In the family of elliptic curves with a two-torsion point, we show that the Tamagawa ratio is essentially governed by a normal distribution with mean zero and growing variance, which implies the unboundedness of the average size of the 2-Selmer group. (Received September 07, 2014)