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Frank Thorne* (thorne@math.wisc.edu), Department of Mathematics, University of Wisconsin-Madison, 480 Lincoln Drive, Madison, WI 53706. *Bounded gaps between products of primes with applications to elliptic curves and modular L -functions*. Preliminary report.

In recent work Goldston, Graham, Pintz, and Yildirim use a variant of the Selberg sieve to prove the existence of small gaps between E_2 numbers; that is, squarefree numbers with exactly two prime factors. We apply their techniques to prove similar bounds for E_r numbers for any $r \geq 3$, where these numbers are required to have all of their prime factors in a set of primes \mathcal{P} . Our result holds for any \mathcal{P} of positive density that satisfies a Siegel-Walfisz condition regarding distribution in arithmetic progressions, and we also prove a stronger result in the case that \mathcal{P} satisfies a Bombieri-Vinogradov condition. We were motivated to prove these generalizations because of recent results of Ono and Soundararajan. These generalizations yield applications to divisibility of class numbers, nonvanishing of critical values of L -functions, and triviality of ranks of elliptic curves. (Received September 08, 2006)