Frequency recovery/estimation from discrete samples of superimposed sinusoidal signals is a classic yet important problem in statistical signal processing. Its research has recently been advanced by atomic norm techniques that exploit signal sparsity, work directly on continuous frequencies, and completely resolve the grid mismatch problem of previous compressed sensing methods. In this paper, we investigate the frequency recovery problem in the presence of multiple measurement vectors (MMVs) which share the same frequency components, termed as joint sparse frequency recovery and arising naturally from array processing applications. To study the advantage of MMVs, we first propose an $\ell_{2,0}$ norm like approach by exploiting joint sparsity and show that the number of recoverable frequencies can be increased except in a trivial case. While the resulting optimization problem is shown to be rank minimization that cannot be practically solved, we then propose an MMV atomic norm approach that is a convex relaxation and can be viewed as a continuous counterpart of the $\ell_{2,1}$ norm method. We show that this MMV atomic norm approach can be solved by semidefinite programming. We also provide theoretical results showing that the frequencies can be exactly recovered under appropriate conditions. The above results either extend the MMV compressed sensing results from the discrete to the continuous setting or extend the recent super-resolution and continuous compressed sensing framework from the single to the multiple measurement vectors case. Extensive simulation results are provided to validate our theoretical findings and they also imply that the proposed MMV atomic norm approach can improve the performance in terms of reduced number of required measurements and/or relaxed frequency separation condition.