This thesis empirically examines the role of advanced portfolio selection methods in factor investing. These methods provide more efficient exposure to underlying risk sources in factor portfolios. Their performance is evaluated across number of prominent factors and compared with more naive equal- and value- weighting, typically used in asset pricing literature as well commercial investment vehicles. The most diversified portfolio consistently achieves the highest returns, while having only moderate volatility and one of the lowest tail risk exposure. On the other hand, the diversified risk parity portfolio suffers high volatility as well as the greatest tail risk exposure, while achieving only comparable average returns with other strategies.