Reinforcement learning (RL) provides a novel framework from which to approach the problem of stochastic asset allocation. In this thesis, we develop a model under which the agent is tasked with producing a profitable portfolio with desirable risk characteristics. We construct a quasi-general portfolio optimization problem which uses a Markov Decision Process to model the agent and environment interaction. We perform an empirical analysis of trained agent success, utilizing a unique multiyear cryptocurrency data set that includes prices and non-price related factors. We compare the "best case" performance of three contemporary RL algorithms over an out-of-sample three month portfolio management horizon to obtain performance metrics of the algorithms. The resulting agent produced portfolios have many desirable features, including above baseline returns, minimal maximum draw-down, and low realized volatility of returns.