Assignment games represent a tractable yet versatile model of two-sided markets with transfers. We study the likely properties of the core of randomly generated assignment games. If the joint productivities of every firm and worker are i.i.d bounded random variables, then with high probability all workers are paid roughly equal wages, and all firms make similar profits. This implies that core allocations vary significantly in balanced markets, but that there is core convergence in even slightly unbalanced markets. For the benchmark case of uniform distribution, we provide a tight bound for the workers' share of the surplus under the firm-optimal core allocation. We present simulation results suggesting that the phenomena analyzed appear even in medium-sized markets. Finally, we briefly discuss the effects of unbounded distributions and the ways in which they may affect wage dispersion. Joint work with Assaf Romm.