

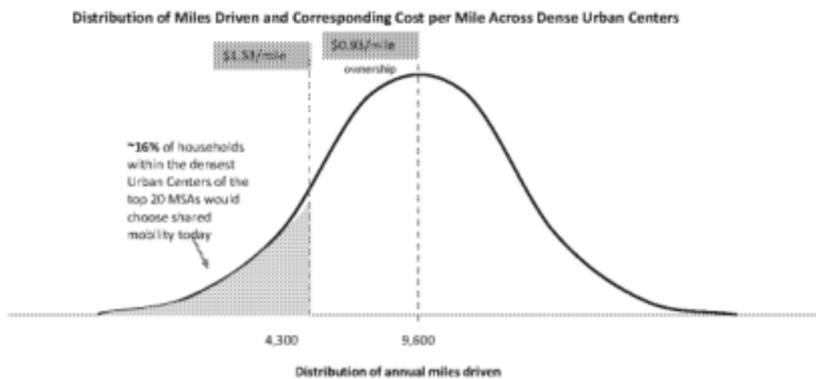


The Cost of On Demand Mobility

Business models based on Shared Mobility are fundamentally sound, as they take advantage of the fact that there are diseconomies associated with individual vehicle ownership - vehicles are expensive purchases that depreciate rapidly, yet they are only utilized 5% of the time. That said, the cost of using on demand mobility services is still quite high compared with conventional vehicle ownership. We estimated pricing at ~\$1.53 per mile, on average, for the main mobility offerings (ie Uber, Lyft). This compared with the ~\$0.93 per mile average cost for operating a vehicle within the top 20 U.S. MSA's (as noted below, there is significant cost variability between MSAs), and a \$0.78 average cost per mile for private vehicle ownership across the U.S. At a high level, our analysis suggested that using ridesharing services may already be cheaper than using a personally owned vehicle for ~16% of households in high density urban sub-sections (these urban households account for ~5% of total households in the broader MSAs, and they collectively own ~2% of the vehicles in these MSAs).

But there was also significant variability between cities. For example, ridesharing appears cheaper than individual vehicle ownership for 25% of households in the Los Angeles area and 18% in NYC, but only ~6% in the San Bernardino-Riverside area. The attractiveness of on-demand mobility in a city such as New York appears to correlate well with other data points. For example, NYC had the highest cost per mile for operating an individually owned vehicle (\$3.35 per mile in Manhattan and \$1.61 across the rest of the New York MSA). NYC also has the lowest vehicle ownership density of any of the major metro areas that we studied (0.6 vehicles per household, compared with a national average of 2.1 vehicles per household).

Figure 2: ~16% of households in dense urban centers would see economic benefit from giving up vehicle ownership in favor of on-demand shared mobility



Source: Uber, Lyft, Census, DOT, DB estimates

The Economics of On-Demand Mobility improves dramatically when vehicles become Autonomous

As noted above, we believe it will become significantly cheaper (and in major cities more practical and convenient) once the driver is removed from the car and utilization increases. To determine the cost of operation for an Autonomous "RoboTaxi" we assumed that such a vehicle is on the road ~17 hours a day (similar to an NYC taxi), and generates revenue 80% of that time (compared with revenue generation of ~53% for uberX and ~49% for taxis in NYC today). We acknowledge that robo-taxis could conceivably have availability that is even higher. However, based on academic studies, utilization declines dramatically overnight (with a few