Growing consumer desire for broadband access to the Internet demands new infrastructure to solve the “last mile” problem of links to private residences. In previous work, we developed a static model of competition in a linear city for the provision of fiber infrastructure, and we calibrated this model using engineering cost data. In this work, we examine a dynamic investment model, in which firms can invest strategically in network capacity to preempt investment by competitors, thereby gaining a position of market dominance. We focus exclusively on fiber infrastructure with two competing firms in a market region (e.g. telephone and cable firms).

We examine two aspects of a broadband network: the number of homes passed (network reach) and the take rate (the percentage of homes passed that actually buy service). In a fiber optic network, the cost per home passed relates to the cables and rights-of-way themselves, which are not fungible, while the cost per user relates to router capacity and perhaps content provision, which are fixed for relatively short time periods. The key feature of this model is that extending a network represents a commitment which can be used strategically to discourage network extension by a rival.

As we found in our previous (static) analysis, dense neighborhoods may be able to support two co-located fiber networks, while more suburban areas can only support a monopoly provider. In this asymmetric equilibrium, the larger firm enjoys greater profits. In our current dynamic analysis, demand is growing and a firm has the strategic option of building a network that has greater reach than is myopically optimal. It uses the large network to preempt its competitor from capturing the monopoly region of the metropolitan area in future periods. We find that in the early stages of demand growth, the leader firm will preempt its rival by passing more homes than is myopically optimal. This preemption strategy tends to counteract the monopolist’s natural tendency to restrict demand and may even result in firms building networks that are larger than the social optimum.