Once we recognize that economies of scale and scope on the supply and demand side of the market create efficiencies, we must accept the proposition that there will be small numbers of firms supplying the functionalities that consumers want because their costs and prices will be lower. This is an infrastructure problem that has existed since the birth of capitalism. The answer has always been to design a structure that provides the shared infrastructure and makes it available to all users on fair, reasonable, and nondiscriminatory (FRAND) terms. There have been a variety of solutions, from regulated, private, franchise provision (common carriers, turnpike trusts) to state ownership. Unregulated private provision has been a disaster for well over a century because the economic interests of the private actors conflict with the public good. The question is not whether to regulate the behavior, but how.

Regulated competition is the answer, where the goal is to promote competition in decentralized capitalist markets along two dimensions—the core infrastructure market and markets that rely on such infrastructure—both of which require constraints on market power, which is "inefficient." Inefficiency can be measured by prices and profits above costs, diseconomies of scale and scope, or artificial barriers to entry. Thus, along the first dimension, because we do not know the precise limits of the economies of scale and scope, we hold out the hope that there can be competition for the core infrastructure services. Along the second dimension, we are much more confident that there can be competition for the complements that ride on the infrastructure. Anticompetitive behavior that limits potential competition along either dimension must be regulated and eliminated or diminished.

Sometimes, we break the infrastructure into pieces, either horizontally (considering economies of scale) or vertically (considering economies of scope). However, that is not always the best answer. Sometimes it is better to ensure FRAND access to the infrastructure, which, above all, addresses the problem for the competition from complements, but which can also lower the barriers to entry for head-to-head competition for the provision of infrastructure (i.e., competitors combine FRAND access to parts of the infrastructure with other parts that they self-supply). The answer is complicated but so too is the digital economy. Anticompetitive conduct is generally easy to define, but may be difficult to prove. Clearly identifiable complements that should not have been integrated with the infrastructure may be easy to see, but identifying whether the right solution is divestiture or structural separation is more challenging. Encouraging the entry of competitive supply of complements is always the right thing to do, but response to the removal of entry barriers may be too slow without action against vertical integration.

The high degree of concentration among big data platforms is reinforced by three other factors that create a "tight oligopoly on steroids," which the commission highlights in its discussion of tacit collusion. High concentration is reinforced by multi-market contact, technological specialization, product segmentation, and geographic separation (for Big Broadband Networks) or must-have bundles (for Big Data Platforms). As shown in the following table, our working papers show that the tight oligopoly on steroids afflicts both the communications networks (Big

Broadband Networks) and the information system (Big Data Platforms). The tight oligopoly on steroids results in the classic harms of lack of competition: denial of consumer choice, insufficient innovation, higher prices, and lower quality.

THE TIGHT OLIGOPOLY ON STEROIDS:
BIG BROADBAND NETWORKS AND BIG DATA PLATFORMS

Tight Oligopoly on Steroids Characteristic	**Big Broadband Networks**	**Big Data Platforms**
High concentration & multi-market contact	Franchise, economies of scale Telco Basic Data Service (BDS), Wireless Cable Multichannel Video Programming Distributor (MVPD) , Broadband Internet Access Service (BIAS)	Economies of scale & scope, zero marginal cost, winner-take-most Google Search, Facebook connectivity, Amazon distribution
Technological Specialization	Point-to-point (landline) Cell Networks Star Video	Google algorithms and network value, Facebook network value, Amazon distribution efficiency
Product Segmentation	Voice, wireless Video, BIAS	Search, Social media, distribution
Unique Product Traits	Geographic Separation Local network Franchise origin	All: “must have” content protected by lock-in supply-side foreclosure and demand-side bundling and behavioral manipulation

Gatekeeper control of chokepoints, reinforced by steroids, gives the small number of firms that dominate the digital communications sector immense market power. They have demonstrated time and again that they have the willingness and ability to abuse that market power. Specific areas where policy can move forward in spite of the complexity include:

- Concentration: Public policy must not only deal with the high level of concentration, it must also address the steroids to restore competition for Big Data Platforms.
- Excessive horizontal or vertical concentration should be prevented
- Anticompetitive bundling: Take action to avoid anticompetitive bundling, banning unfair rates terms and conditions, requiring open access to APIs.
- While collusion is clearly illegal, tacit collusion and parallel exclusion should also be prevented.
- Exclusionary practices: should be banned, including predation (with a new standard for anticompetitive pricing), foreclosure, denial of access to customers, and self-dealing
- Transparency: Fair Information Practices

- Privacy: Effective consumer choice. One of the great challenges is access to data and the solution cannot be to just force data to be shared. There must be a stronger regime for consumer sovereignty over data.

While some of these policies should apply to all firms in the market and may be addressed by general policies – e.g., a structure of supply side transparency and demand side consumer choice (sovereignty) – others should focus on dominant firms. A "traditional" measure of dominance should be used. A tight oligopoly exists where the top four firms have a 60% (or more) market share, and all firms that could constitute this market share should be well regulated. While action against anticompetitive structures and conduct should be taken against firms who constitute the tight oligopoly, scrutiny should not stop there. The empirical evidence we have reviewed shows that "four is few, six may be enough, and ten are many." Scrutiny of higher numbers of firms (4–10) should be subject to complaint and might shift the burden to complaining firms.

While dual jurisdiction (antitrust and regulation) has been essential to oversight over the communications sector, and should remain so, it is important to have clear regulatory responsibility vested in specific agencies (we prefer a new digital regulatory agency). Because of the large benefits, the approach should be to achieve the desired pro-competitive, pro-consumer outcomes with the least amount of intervention necessary.

Subject to agency expertise and practice, no remedies should be taken off the table, and the threat of extreme action is a useful prod to corrective action. However, no remedies should be mandated before careful consideration has been given to the costs and benefits of more extreme actions. In order to accomplish its goals with the least intervention necessary, the regulatory agency must have full investigative authority, power and resources and it must be subject to deadlines to avoid foot dragging by firms under investigation.