Identifying Market Power in Times of Constant Change

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Draft date: July 9, 2016

I explain that market power is fleeting in times of constant change unless there are enduring factors creating monopoly (EFMs). Traditionally finding market power depended upon defining two words: Market and power. This standard approach to defining markets fails when new technologies, customer behaviors, etc. keep demand and supply in flux. Unable to meaningfully define the market, traditional approaches cannot tell us whether there is market power. But this does not mean that market power does not exist because there could be factors leading to monopoly, such as control of essential radio spectrum, that exist across generations of products. Market power analysis should be a search for EFMs and policy responses should focus on diffusing the market power without destroying value.

Keywords: Competition, Market Power, Regulation, Antitrust, Telecommunications

JEL codes: L12, L43, L51, L86, L96

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The justification for economic regulation of telecommunications networks has long rested on the notion that infrastructure services should be regulated if they are essential for economic life and if the service provider is effectively a monopoly, meaning that its lack of rivals enables the firm to exploit customers. (Jamison and Hauge 2014) Absent these conditions, and even with them, government intervention in the marketplace can devolve to rent seeking where the regulations serve the interests of the regulated rather than the public. (Posner 1971, Stigler 1971, Peltzman 1976) Therefore, economic regulation should be used with caution.

Because it is generally accepted that telecommunications is essential for economic life in advanced and advancing economies, these principles have been put into practice largely by looking for market power. The traditional practice has been to assume that there is sufficient market power to justify regulation and to deregulate upon a finding that there is competition. Absent competition, the economic regulations have focused on methods for controlling market power, such as control of retail rates, imposing common carrier obligations, and overseeing network interconnection. (Brock 1981) Regulation of interconnection often remains even if there is competition because there are serious questions about whether competition can keep interconnection prices at efficient levels. (Laffont, Tirole and Rey 2000, Armstrong 2002)

The difficult issue for knowing when a market is competitive is defining the market. Market in this context means a product space (defined by product features and geography) within which customers are willing to readily substitute between service providers, but beyond which customers do not find suitable substitute products. This analysis is traditionally accomplished using a hypothetical monopolist test. In this approach market boundaries are discovered by examining whether product substitutability and competitive entry were such that above-

normal profits could not be sustained if the market were served by a hypothetical monopolist. (Jamison and Hauge forthcoming)

The hypothetical monopolist approach has flaws, but is workable and constitutes best practice in situations where technologies and markets are stable. But recent developments in telecommunications -- including the growing prominence of new technologies, platform markets, and next generation networks -- have turned the approach on its head. In this new context, exploiting market power may be beneficial to customers. For example, in some circumstances firms with market power have a greater incentive to invest in new technologies than do firms in more competitive markets. (Jamison and Hauge 2011) Platform markets – generally two-sided markets that exhibit network effects – tend to tip, resulting in a monopoly or near monopoly, and the tipping creates customer value. (Rohlfs 1974) Also a single platform can have multiple diverse market interactions and platforms can be short lived because customers can easily migrate from one platform to another, such as is happening with Millennials shifting their social interactions from Facebook to Instagram. Next generation networks enable software apps to replace services traditionally hardwired into specialized networks.

This paper addresses this dilemma of assessing market power when markets are not well defined by suggesting that analyses focus on enduring factors creating monopoly (EFMs). A factor leads to monopoly if it is needed by all rivals to produce competitive services and its limited supply causes competition to fail. An example might be a licensing requirement that limits competitors. A factor is enduring if it is used across multiple generations of products. For example with proper licensing some radio spectrum can be used across several generations of mobile services, from 1G to 5G.

This article is organized as follows. I first describe the evolution of the telecommunications sector. Section 2 examines the traditional approach for

identifying market power. Section 3 provides a description of my proposed alternative to the traditional approach. Section 4 applies my framework to a current issue in telecommunications and Section 5 is the conclusion.

I. The Telecommunications Sector

Legacy telecommunications technologies incorporated telephone handsets, local wireline access, manual and then automated switches for connecting callers, and intercity lines that provided international and domestic long distance service. This architecture developed alongside industry structure and government regulatory frameworks that reinforced each other. Industry players were generally state-owned or privately owned telephone companies with monopoly franchises, interconnected across borders through a long distance network owned and operated largely by major operators, such as AT&T. State-owned enterprises were largely unregulated, but governments employed utility-style regulation for monopoly privately owned providers. (Brock 1981, Wellenius and Stern 1994) Networks had value because of the number of customers that could be reached, with customers providing content through their speaking during calls. (Rohlfs 1974)

It is important to my analysis to note that the legacy technologies and network architectures were specialized and initially specific to the voice services. As technologies advanced, large customers such as businesses and governments began demanding lines capable of handling large amounts of data. Telecommunications companies addressed this need by forming private network services. These services used some of the same physical infrastructure as the voice network, such as telephone poles, buildings and some cables, but the private and public networks were effectively separate.

Today telephone sets have been replaced by a wide range of customer devices, including simple cell phones, smartphones, tablets, television sets, and PCs and other computing devices. Wireline access has been replaced by a mixture of wireless and wire technologies, voice switches are being replaced by servers and data routers, and intercity lines are being replaced by a mixture of middle mile, regional, and backbone networks using fiber optics, microwave, coaxial cable, and satellites, mostly using Internet protocols. As in earlier days, network value is provided by persons, but now the content value is created in multiple forms, such as web text and features, voice, videos and e-commerce transactions, and the value is enabled not just by the physical network, which is evolving to an all Internet protocol next generation network (NGN), but also by virtual networks created in software apps that enable voice, video, photos, text, etc. Such apps include Facebook, Skype, Instagram, and Gmail.

Thus telecommunications is evolving from services provided via specialized networks to services provided by apps residing on generalized networks designed primarily to accommodate data. In considering changing business models it is worthwhile to note that these networks are largely part of the public Internet, which is designed for data. Because a data network is not optimal for providing voice and video services, some network providers have developed what are called private Internets that are specialized for voice, video, or other applications, such as secure transmissions.

This transition in services and networks is disruptive to business and regulatory models that are based on the specialized network paradigm. For example many traditional telecommunications providers organized their business models around revenue streams for voice communications. As their networks evolve to NGN, some operators find themselves largely as network providers enabling bit streams that apps use to supply the value found in voice communications, as well as in video, photos, etc. The value of such NGN networks will be based on their

abilities to allow customers to access apps and to allow app providers to reach customers. The NGNs' revenue streams will depend on network providers' abilities to monetize the value that customers find in accessing and using apps, and to monetize the value that app providers place on reaching customers. In instances where the network provider is also an app provider, such as Google and Facebook in some instances, the network revenue streams will also depend on monetizing any network demand that is stimulated by the providers' apps.

In effect the new business models tease apart two value propositions – the value of enabling a form of communication (for example, enabling talking in real time) and the value of the channel over which to communicate -- that were integrated under the old model. This is troubling for some telecom operators who continue to view the value of enabling a form of communication (i.e., talking) as their sole or at least primary value proposition for customers. They should not be alarmed, provided that they can adapt their business models.

The new business model for networking is to monetize the value of the channel. This should be commercially viable as the new channel is more valuable than the old one because NGN channels have multiple uses – web, video, etc. – which should allow operators to charge higher prices than they did for specialized network channels.[1]

The new business model for enabling communication is to charge separately for this functionality, although this is often free to the consumer. For example some voice over Internet protocol (VoIP) providers do not charge for many types of call, such as on-network calls, whether video or voice. Facebook at this time does not charge for real time video broadcasting. In contrast with YouTube, which

[1] I should note, though, that the old prices were for both channel and for enabling voice. So the new channel prices can be higher than the implied channel price under the old model, but not necessarily higher than the actual prices charged for the integrated service. Thus while in my experience operators can and do charge more for networking in a NGN context, this may not always be the case.

does not charge for normal video provision, Vimeo does charge and is able to do so by offering higher quality service.

Network providers can capture some of this app value even without being an app provider. If prices charged for apps are less than customers' willingness to pay, then network providers' prices can capture part of that value. Also, while in the past networks generally charged only one side of a call, namely the sender, in the new business models, absent certain net neutrality restrictions, networks can monetize the value they provide to app providers by, for example, selling enhanced features that improve app performance. Thus, even if operators are not providing apps, there should be more than enough value in providing channels to make a pure networking play commercially viable. The challenge is in transitioning from the old model to the new one. There may also be a challenge of commoditization of networking if net neutrality restrictions create homogeneous networks.

II. Traditional Approach to Identifying Market Power

The best practice approach for identifying market power is to first define the relevant market and then to analyze whether it is served by a monopoly, in this case. In other cases, regulators may be interested in whether there is market power even if there is more than one competitor.

The process for defining the relevant market has remained essentially the same for several years, but it is not without controversy. The approach examines markets in two dimensions – product aspects and geographic aspects. In considering the product aspects, analysts attempt to determine whether products that customers view as effective substitutes are reasonably available. Regarding geography, the analyst considers whether customers are limited by geography in their search for products and so examines the degree to which customers can

expand their search geographically and whether firms can cross geographic boundaries to serve demand.

Both dimensions are analyzed using a hypothetical monopolist test, which considers whether a hypothetical monopolist within the product or geographic boundaries would be able to profitably raise and maintain prices above competitive levels. In applying this test, the analyst first chooses a market definition that the analyst is sure is overly small; for example, 2G mobile services when fixed line services and 3G services are readily available. The analyst then tests whether a hypothetical monopolist could profitably raise prices by a small amount and maintain the prices. If the hypothetical monopolist cannot, then the market boundaries in question are deemed too narrow. The analyst slightly broadens the market definition and again runs the test. Once the analyst finds a market definition where the hypothetical monopolist can profitably increase its price, then the market boundaries are considered appropriate. (Jamison and Hauge forthcoming)

This traditional approach fails when services and customers are changing rapidly. The approach depends on upon stable demand elasticities. These elasticities are effectively unknown for emerging products and are rapidly changing as customers evolve and sales change. The approach is inherently static, meaning that it provides evidence for a particular market at a single point in time. A static analysis is of limited usefulness when the answer is irrelevant when the time period of interest spans multiple situations.

This dilemma can be answered by focusing on what it is that could provide a firm with market power over multiple generations of markets over time. I call these EFMs and explain their meaning and use in the next section.

III. The Enduring Factors Creating Monopoly Approach

Our inability to dependably identify markets does not leave us without options. Economists have long recognized that monopolies occur for reasons and we can use these factors that create monopolies to examine whether monopolies are likely to occur over generations of products.

Not all factors leading to monopoly are relevant to our analysis. For example, one well-known factor leading to monopoly is economies of production, or more specifically subadditivity of costs. This cost structure ensures a natural monopoly, but it is irrelevant for our needs because it examines the costs of providing a specific product in a specific market. There is no reason to believe that these production economies will endure over generations of products. For example, in many instances wireline telecommunications was a natural monopoly because it was uneconomical to duplicate customer lines. However, this cost structure did not apply to mobile communications.

Some barriers to entry lead to monopoly, but they may not apply across generations of products. For example, high fixed costs are considered a barrier to entry because they create risks for firms that are considering entering a market. However, the fixed costs may not apply to future generations of products. Intellectual property rights and trademarks are also likely to be product specific. Indeed a trademark may hold a company back if customers think of the trademark as representing old technology. Switching costs may also not be relevant if new generations of products are backwards compatible.

The factors leading to monopoly that are enduring are those inputs, broadly defined, that are essential for production of future generations of products and whose supply is such that they are unavailable to rivals. Following are some examples:

- Access to essential rights of way, such as building access or radio spectrum.
- Essential facilities, such as crucial towers or conduit that cannot be economically duplicated and products will depend upon wireless network in the case of towers, or wireline networking in the case of conduit.
- Exclusive supplier or distributer agreements where these inputs and channels will be needed across product generations.
- Permissions to compete, both explicit permissions, such as formal government licenses, and implicit permissions, such as favorable relationships with powerful officials.

There are important factors that lead to market power that I would not consider enduring. One recent example is customer base. Some economic analyses that find market power in platform markets assume that a firm has a customer base that the firm is able to leverage across multiple generations of products. For example, Cremer, Rey, and Tirole (2000) examine market power in the Internet backbone and conclude that embedded customer bases are a source of market power leading to discrimination in connectivity. Missing from their analysis, however, is any consideration of how public policies addressing market power (mergers in their case) affect the economics of building a customer base. If policies extract that value, then service providers are likely to limit the amount of value that they create for customers. Similarly, Carlton and Waldman (2002) examine generations of software and conclude that an embedded customer base provides a software provider with a competitive advantage that can lead to market power. Similar to Cremer, Rey and Tirole (2000), Carlton and Waldman (2002) assume that the customer base is a gift and so omit from their analysis any consideration of how regulation might affect business incentives to create such a

valuable product space in the first place. In contrast, Jamison (2001) demonstrates that the opportunity to leverage complementarities across markets stimulates investment in existing markets.

IV. Implications for a Current Issue

A current issue where my analysis is relevant is the case of over the top (OTT) services. These are situations where an app provider, such as Skype, enables customers to communicate using voice or video in real time. The app rides over the public Internet, which is designed for data, and so the service is sometimes low quality relative to that provided by specialized networks.

Three issues tend to arise with OTT providers. One prominent issue is whether the OTT provider should be considered a telecommunications provider. In my analysis the OTT provider is not a provider of a physical communications channel and so is not a telecommunications carrier. The OTT provider is simply a software interface. The OTT provider does not compete with telecommunications channels and is indeed dependent on them.

Another prominent issue is whether an OTT provider is competition for a telecommunications provider. In my analysis this is the wrong question. It is futile to base policy or regulation on a product rivalry when product definition evolves rapidly: Even if we could conduct a valid analysis, its relevance would quickly decay. Instead we should base our decision to regulate on analyzing whether any operator possesses EFMs. Any service operators that do not should not be subjected to economic regulation, except to address consumer protection issues and perhaps network interconnection. Operators that do possess EFMs will possess market power over time and over generations of products. How this market power should be address would depend upon the specifics of the situation.

An issue that is less often addressed is the regulator's role in the evolution of traditional telecommunications providers' business models. Sometimes telecommunications providers seek to have regulations imposed on OTT providers. In my analysis this is an issue of how traditional operators will evolve their business models to an NGN world. They certainly need regulatory space to experiment and adapt, for example, by trying different service provisioning and pricing arrangements for providing communication channels. Limiting OTT providers would likely be a mistake in this context, as the restrictions would keep the network providers from learning how customers will value and use networks in a world rich with apps.

V. Conclusion

In this article I examine how to consider market power in a world of constant change. I find that traditional approaches fail us because they depend on stable markets. I suggest that a more productive approach is to identify those factors that lead to market power and that endure over generations of products. I call these EFMs.

I have left many questions unanswered. For example I have not identified a systematic approach to finding EFMs. Nor have I developed rules of thumb or classes of EFMs that could guide regulators in knowing how to respond when an EFM is present. These and other questions are left for future work.

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