

## CHAPTER I

# ECONOMIC UNDERPINNINGS: THE ECONOMICS OF TELECOMMUNICATIONS NETWORKS, MARKET POWER, AND VERTICAL FORECLOSURE THEORIES

### A. Introduction

This chapter describes the characteristic features of telecommunications markets and explains the economic underpinnings for competition analysis of conduct and transactions involving the telecommunications sector. It includes a detailed discussion of market definition, a key element in a typical analysis of whether a firm has market power. It also gives a general overview of the anticompetitive effects that can result from the exercise of market power, including horizontal competitive effects and vertical foreclosure theories.

Horizontal competitive effects include unilateral and coordinated effects. A merger has unilateral effects if it “enhance[s] market power simply by eliminating competition between the merging parties” regardless of whether the merger causes a change in the way other firms behave.<sup>1</sup> A merger is said to have a coordinated effect if it “enhance[s] market power by increasing the risk of coordinated, accommodating, or interdependent behavior among rivals.”<sup>2</sup>

Vertical foreclosure generally refers to the use of vertical integration or other vertical restraints by an input supplier to achieve market power in an output market. Vertical foreclosure theories frequently arise in the communications industry because a supplier of key inputs often is a downstream competitor, which has implications for the incentives of the vertically integrated firm and its customers and competitors. For example, such theories partly motivated the vertical divestiture from AT&T of the Bell Operating Companies in the mid-1980s.

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1. U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, HORIZONTAL MERGER GUIDELINES 2 (2010) [hereinafter 2010 MERGER GUIDELINES].
  2. *Id.*

## B. An Introduction to Market Power in Communications Markets

The U.S. Department of Justice (DOJ) and the Federal Trade Commission (FTC) are charged with preventing firms from acquiring an increased ability and/or incentive to exercise market power and to prevent the illegal maintenance of market power. The joint DOJ-FTC *2010 Merger Guidelines* lay out their enforcement policy with respect to mergers. The “unifying theme of these Guidelines is that mergers should not be permitted to create, enhance, or entrench market power or to facilitate its exercise.”<sup>3</sup> Antitrust enforcement against monopolization or attempted monopolization is based on core principles focused on “market power and separating the legitimate, procompetitive ways it is acquired and preserved, from the illegitimate, anticompetitive ways.”<sup>4</sup>

The Federal Communications Commission (FCC) also reviews competition in the telecommunications industry. For mergers, it relies on a public interest standard under which it considers, among other things, whether the merger “would enhance, rather than merely preserve, existing competition,”<sup>5</sup> in contrast to the Clayton and Federal Trade

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3. *Id.*

4. Joel I. Klein, Assistant Att’y Gen., Antitrust Div., U.S. Dep’t of Justice, *Rethinking Antitrust Policies for the New Economy*, Haas/Berkeley New Economy Forum, May 9, 2000, available at [www.usdoj.gov/atr/public/speeches/4707.htm](http://www.usdoj.gov/atr/public/speeches/4707.htm).

5. *E.g.*, Memorandum Report & Order, *In re Charter Commc’ns & Time Warner Cable*, 31 FCC Rcd. 6327, 6338, ¶ 29 (2016) [hereinafter *Charter-TWC Order*]. Pursuant to Section 310(d) of the Communications Act of 1934, as amended, the FCC must determine whether the Applicants have demonstrated that the proposed transfer of control of licenses and authorizations will serve the public interest, convenience, and necessity. 47 U.S.C. § 310(d) [hereinafter 1934 Act]; *see also* 47 C.F.R. § 25.119. In making this determination, the FCC assesses whether the proposed transaction complies with the specific provisions of the 1934 Act, other applicable statutes, and the Commission’s rules. *See Charter-TWC Order*, 31 FCC Rcd. at 6336 ¶ 26. If the transaction does not violate a statute or rule, the FCC considers whether the transaction could result in public interest harms by substantially frustrating or impairing the objectives or implementation of the 1934 Act or related statutes. *Id.* The FCC public interest evaluation necessarily encompasses the broad aims of the 1934 Act, which include, among other things, a deeply rooted preference for preserving and enhancing competition, accelerating private sector deployment of advanced services, promoting a diversity of information sources and services to the public, and generally managing the spectrum in the public interest. *Id.* at 6337 ¶ 27.

Commission Acts, under which the DOJ and the FTC consider whether the transaction “may be substantially to lessen competition.”<sup>6</sup> The FCC also considers competition in and market power in non-merger contexts, such as when it has chosen to forbear from imposing certain regulatory requirements (e.g., rate and entry/exit regulation) on non-dominant carriers (that is, carriers that it has determined to lack market power).

The *2010 Merger Guidelines* do not directly define market power. Instead, the *Guidelines* identify the competitive concerns associated with increased market power as encouraging “one or more firms to raise price, reduce output, diminish innovation, or otherwise harm customers as a result of diminished competitive constraints or incentives.”<sup>7</sup>

In antitrust economics, market power generally is defined as the ability to profitably affect the market price of a good.<sup>8</sup> In the economic model of “perfect competition,” every firm is small relative to the market and products are homogeneous, so no one firm can affect the market price. In such markets, long-run equilibrium is achieved when prices are equal to the marginal cost of the firms in the industry. In this stylized setting, market power is defined as the ability to sustain prices above marginal cost.

A key condition for firms to exercise market power is the existence of barriers to entry.<sup>9</sup> George Stigler defined an entry barrier as a cost for producing a good that must be borne by a firm that wants to enter the market, but not by firms already in the market.<sup>10</sup> An entry barrier is linked closely to the ability of incumbent firms to raise price above cost and has also been defined as “the extent to which, in the long run, established firms can elevate their selling prices above minimal average costs without inducing potential entrants to enter the industry.”<sup>11</sup>

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6. 15 U.S.C. § 18. See 1 PHILLIP E. AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 114b (4th ed. 2013) (“In sum, antitrust policy in the United States follows a consumer welfare approach in that it condemns restraints that actually result in monopoly output reductions, whether or not there are offsetting efficiencies and regardless of their size.”)
  7. 2010 MERGER GUIDELINES, *supra* note 1, at 2.
  8. See, e.g., William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 937 (1981) (“[The] term ‘market power’ refers to the ability of a firm (or a group of firms, acting jointly) to raise price above the competitive level without losing so many sales so rapidly that the price increase is unprofitable and must be rescinded.”).
  9. 2010 MERGER GUIDELINES, *supra* note 1, at 27-29.
  10. GEORGE J. STIGLER, *THE ORGANIZATION OF INDUSTRY* 67 (1968).
  11. JOE S. BAIN, *INDUSTRIAL ORGANIZATION* 252 (2d ed. 1968).

Included among such entry barriers may be economies of scale or an incumbent's established reputation.<sup>12</sup>

The stylized model of perfect competition may be unlikely to align with the facts of most real-world cases. Even in markets exhibiting minimal or no barriers to entry we may still observe prices above short-run marginal costs, due to the presence of fixed costs, although such firms may be earning zero (long-term) economic profits. This is particularly so in many telecommunications markets where fixed costs are a significant proportion of total costs. A comparison of prices to short-run marginal costs may provide an incomplete picture on the extent to which telecommunications companies have market power.

Whether a firm will find it profitable to set prices above competitive levels depends largely on the demand conditions facing that firm. A firm in a perfectly competitive industry is a "price taker," meaning that it can sell all it wants at the prevailing market price, but it cannot affect market price. In contrast, a firm with market power faces a downward sloping (residual) demand curve, which means that as it increases its price it will make fewer sales. A firm that faces such a downward sloping demand curve will set its profit-maximizing price at a level above marginal cost, even if other competitive providers are also serving the market.

The mere possession of market power is not in itself unlawful under U.S. antitrust law. Merger enforcement focuses on the potential for a merger or acquisition to *increase* market power. Prohibitions against collusive behavior focus on the ability of coordinating firms to exercise joint market power that would not exist but for the coordination. And antitrust policy against unilateral behavior, while it may require evidence of existing market power, is concerned primarily with the ability of firms to preserve or increase market power through competitive restraints but is not concerned with the exploitation (such as above-cost pricing) that a firm with market power might enjoy.

In the telecommunications industry, market power often derives from industry conditions that create entry barriers, such as the high cost of deploying physical infrastructure (e.g., the portions of a network that are dedicated to individual customers).<sup>13</sup> Other conditions are externally

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12. See Harold Demsetz, *Barriers to Entry*, 72 AM. ECON. REV. 47, 47-48 (1982).

13. The deployment of physical infrastructure involves more than construction; for example, there can be substantial upfront and ongoing costs associated with negotiating and obtaining rights to access facilities necessary for construction, such as rights-of-way, poles, and conduits, as well as customer premises that may be controlled by third parties, such as

imposed, as in the case of licensing or entry regulation. For example, prior to the Telecommunications Act of 1996,<sup>14</sup> many states did not authorize competitive provision of local exchange services (although so-called “Competitive Access Providers” were permitted to connect business customers to long-distance carriers using dedicated access links). With respect to wireless services, the number of facilities-based providers is limited by the quantity of licenses that the FCC awards, which is, in turn, limited by the amount of spectrum it assigns to this use. Regulations that limit the number of firms that can enter or the types of services a firm can offer can create entry barriers and may, depending on the nature and extent of competition within the market, confer market power on firms in the industry or firms not hindered by such limitations. Regulatory requirements or restrictions may also create economic barriers to entry, even when entry is legally permitted and might be economically feasible in the absence of the regulatory requirement.<sup>15</sup> Finally, as discussed in part C.5 below, many telecommunications markets may be characterized by network externalities, which may also

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privately owned multi-tenant commercial buildings. *See, e.g.*, Report & Order & Order on Reconsideration, *In re* Implementation of Section 224 of the act, 26 FCC Rcd. 5240 (2011); Notice of Inquiry, *In re* Acceleration of Broadband Deployment, 26 FCC Rcd. 5384 (2011); Order on Remand, *In re* Unbundled Access to Network Elements, 20 FCC Rcd. 2533 (2005) [hereinafter *Unbundled Access Remand Order*]; *see also* Order & Notice of Proposed Rulemaking, *In re* Special Access Rates for Price Cap Local Exch. Carriers, 20 FCC Rcd. 1994, 2004-05, ¶ 26 (2005).

14. Pub. L. No. 104104, 110 Stat. 56 (1996) (codified as 47 U.S.C. § 151-614) [hereinafter 1996 Act].
15. For example, to the extent that regulation requires an incumbent dominant provider to maintain averaged rates, such that the price for service is above cost in some geographic areas and below cost in others, an entrant that has the same costs as the incumbent may confront an economic barrier in areas where the incumbent’s prescribed rate is set at a below-cost level, even when no legal or scarcity-related barrier to entry is imposed. *See* U.S. Telecom Ass’n v. FCC, 359 F.3d 554, 573 (D.C. Cir. 2004). Conversely, the entry barrier may be artificially lowered in those locations where the incumbent’s rates are set at above-cost levels. *See, e.g.*, LILIA PÉREZ-CHAVOLLA, NAT’L REG. RES. INST., STATE RETAIL RATE REGULATION OF LOCAL EXCHANGE PROVIDERS AS OF DECEMBER 2006 (2007), available at [https://www.academia.edu/1557709/State\\_retail\\_rate\\_regulation\\_of\\_local\\_exchange\\_providers\\_as\\_of\\_December\\_2006](https://www.academia.edu/1557709/State_retail_rate_regulation_of_local_exchange_providers_as_of_December_2006).

create entry barriers and confer market power on the firm with the dominant network.

### **C. Basic Network Economics and Characteristic Features of Communications Industries**

#### ***1. An Overview of Communications Networks***

All communications networks share a common purpose: to transmit information from one point to another. Historically, different networks were developed to transmit different types of information, and each network used a unique technology and architecture to accomplish its purpose. For example, telephone networks enabled two-way voice and data communications, while television broadcast stations, cable television systems, and direct broadcast satellite systems (DBS) were designed to provide one-way delivery of video programming from a single point to multiple viewers. Today, technological advancements have driven a phenomenon often described as “convergence.”

In telecommunications, convergence generally refers to the ability of networks to carry various types of communications traffic and information. For example, while voice calls placed by a residential customer were historically transported end-to-end over the public switched telephone network (PSTN) that was dedicated to that specific sort of traffic, telephone calls today are more typically transmitted via a converged data network that also transports other kinds of traffic. Thus, voice services may use a customer’s broadband connection that also delivers video programming and Internet access. Similarly, radio and television stations make their programming available on the Internet by streaming content or providing links to stored content—a consequence of this convergence is that devices today can receive multiple types of content, whereas in the past each type of content had its own specialized device. The boundaries between networks and devices are accordingly becoming blurred.

“Broadband,” for example, is an evolving concept that can be defined in various terms (e.g., speed, bandwidth, functionality).<sup>16</sup> The

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16. Compare Notice of Inquiry, *In re* A Nat’l Broadband Plan for Our Future, 24 FCC Rcd. 4342, 4346-47, ¶¶ 15-18 (2009), with 2016 Broadband Progress Report, *In re* Inquiry Concerning the Deployment of Advanced Telecomm. Capability, 31 FCC Rcd. 699, 716-19, ¶¶ 40-44 & 721, ¶ 50 (2016). See also Tariff Investigation Order & Further Notice of Proposed Rulemaking, *In re* Bus. Data Servs. in an Internet Protocol Env’t, 31 FCC

principal wire-based providers of broadband to residential customers are: (1) traditional telephone companies using either fiber to the premises (FTTP) or copper access facilities upgraded with Digital Subscriber Line (DSL) technology; and (2) cable operators over infrastructure originally deployed to provide video programming that has been upgraded with Data over Cable Service Interface Specification (DOCSIS) technologies, an international telecommunications standard that permits high-speed data transfers over existing cable systems. Both groups of providers have increasingly upgraded their physical infrastructure to include more fiber. In addition, a significant portion of Internet access is wireless, using fixed wireless, Wi-Fi, or mobile wireless providers. Some wireless is provided by broadband satellite companies as well. Although much of the same functionality is now available on both fixed (i.e., wired) and wireless (e.g., streaming high-definition video) broadband, there is debate as to the degree to which the two are substitutes.

This convergence may have two effects. On the one hand, if a network facility is controlled by a single network owner, convergence that expands the offerings of that facility may enhance that owner's market power. On the other hand, convergence may diminish the effects of historical bottlenecks in the network, as additional platforms are able to supply content to their customers; for example, wireless, cable and telephone platforms may all compete to supply last-mile access services for voice, data and video applications.<sup>17</sup>

In addition to the issues presented by convergence, the various networks and service providers present unique antitrust considerations including different characteristics that may create market power and give firms the incentive and ability to engage in particular anticompetitive practices. These network characteristics are discussed in the following sections of this chapter. Mitigating factors that might undermine a firm's ability to exercise market power are likewise addressed.

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Rcd. 4723 (2016) [hereinafter *Business Data Services Order*] (discussing business data services in an Internet Protocol environment).

17. "Last mile" access historically referred to fixed wireline connectivity between a provider's network and its customers' premises. Today, particularly given the availability of broadband by wireline, terrestrial wireless, and satellite providers, "last mile" may refer to any two-way communications technology capable of reaching end users.

## 2. Economies of Scale

Telecommunications networks have various types of economies, particularly economies of scale, density, and scope, as well as so-called “network effects.” These economies sometimes are strong enough to make certain telecommunications networks “natural monopolies,” where single-firm production is most efficient.<sup>18</sup> Even if these economies are not strong enough to result in a natural monopoly, they can still have important effects on the structure of communications industries.

Economies of scale, density, and scope affect the costs and efficiencies of telecommunications networks, and there is overlap among them. The term “economies of scale” generally refers to cost conditions that are influenced by the overall size of the enterprise. Firms subject to economies of scale experience successively lower average unit cost at successively higher levels of output. One common source of economies of scale—and one that is often present among telecommunications service providers—is the presence of large fixed costs that must be incurred even for the first unit of output to be produced. Such costs may be fixed (i.e., constant) over a broad range of output, so that when spread across successively larger volumes of service, the average amount of fixed cost per each unit of output decreases.<sup>19</sup>

Economies of scale may have a direct bearing upon the number of firms that can viably produce in a given market at a point in time.<sup>20</sup> In markets exhibiting properties of natural monopolies, firms achieve minimum average cost at a level of output that is large relative to the total demand in the industry.<sup>21</sup> Where minimum average cost can be achieved at output levels that are less than 50 percent of total market demand (where demand is evaluated at a price equal to minimum average cost), two or more firms can coexist in equilibrium. The level of demand at which minimum average cost is attained is referred to as “Minimum Efficient Scale” (MES).<sup>22</sup> Whether the economies of scale extant in various telecommunications industry sectors operate to limit the

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18. ALFRED E. KAHN, *THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS* 127-28 (1988).

19. See E. Noam, *Fundamental Instability: Why Telecom is Becoming a Cyclical and Oligopolistic Industry*, 18 *INFO. ECON. & POL'Y* 272, 276 (2006).

20. See generally DENNIS W. CARLTON & JEFFREY M. PERLOFF, *MODERN INDUSTRIAL ORGANIZATION* (3d ed. 2000).

21. *Id.* at 76.

22. *Id.* at 41.



number of providers and the potential for future competition has been subject to vigorous debate.<sup>23</sup>

Concerns over the potential for incumbents to benefit from economies of scale to the detriment of new entrants also has resulted in regulatory intervention. For example, the 1996 Act mandates regarding interconnection between incumbent and competitive local exchange carrier networks (incumbent local exchange carriers (ILECs) and competitive local exchange carriers (CLECs), respectively), and requirements for wholesale access by CLECs to certain ILEC network elements, were intended as a means of helping new entrants overcome the economies of scale possessed by incumbents.<sup>24</sup> They sought to do so by providing CLECs with access to ILEC facilities that, according to the FCC, the entrant could not readily and efficiently duplicate.<sup>25</sup>

There are different economies of scale—and different levels of MES—with respect to the various physical segments of a network. Thus, while services such as intercity transport of telecommunications traffic exhibit significant scale economies, the aggregate demand for such services is often large enough to support multiple, competing service providers.<sup>26</sup>

Competition may nonetheless emerge through other technologies, such as the convergence discussed previously whereby separate networks historically providing unique services subsequently provide a bundle of services in common. For example, the convergence of cable and telephony services that use the same cable infrastructure, and the advances in wireless services that have turned wireless into an alternative to wireline telephony as well as a provider of Internet access services

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23. See, e.g., Susan P. Crawford, *The Future of Regulation: The Communications Crisis in America*, 5 HARV. L & POL'Y REV. 245 (2011).

24. See First Report & Order, *In re* Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, 11 FCC Rcd. 15,499, 15,846-47, ¶ 679 (1996), *vacated*, Iowa Utils. Bd. v. FCC, 219 F.3d 747 (8th Cir. 2000), *rev'd in part*, Verizon Commc'ns v. FCC, 535 U.S. 467 (2002).

25. *Id.*

26. See First Report & Order, *In re* Establishment of Policies & Procedures For Consideration of Application to Provide Specialized Common Carrier Servs. in the Domestic Pub. Point-To-Point Microwave Radio Serv., 29 F.C.C.2d 870, 883-84, ¶¶ 34-35 (1971). For example, the Commission has been conducting a review of special access for many years that includes a large-scale data collection effort to study the scale of providers, among other things. See Order & Modified Data Collection Protective Order, *In re* Special Access for Price Cap Local Exch. Carrier, 30 FCC Rcd. 10,027 (2015).

reflect how existing facilities become alternative providers, obviating the need for de novo duplication of incumbent last-mile facilities. At the same time, a single entity controlling last-mile platforms such as fixed telephony/broadband and mobile wireless networks in the same geographic area as well as necessary links to the operation of competitor networks, has raised exceedingly complex competitive issues that are addressed later in this chapter and throughout this book.

### **3. Economies of Density**

Economies of density arise when average per-household costs of service are lower the higher is the household concentration (i.e., the density) in a given geographic area. Telecommunications networks typically involve extensive amounts of “common” facilities whose costs are fixed or are subject to only minimal variation over a broad range of customer or traffic volumes. Density directly impacts the average unit cost of providing network services, and therefore the economic viability of serving a given geographic area. Unit costs will generally be higher in low-density geographic areas, where the relatively fixed costs of common network elements (such as poles, cables, conduits, and other supporting structures) must be spread among relatively few customers. Network construction in low-density areas also frequently involves greater distances, which, in turn, escalates the cost of common network elements and the average cost required to serve each customer. The higher costs and lower overall demand tend to make it necessary to serve a greater fraction of total market demand in low-density areas than in more densely populated urban (and suburban) communities in order to cover average costs at prices that customers are willing to pay.

Density-related effects may be most pronounced in “last mile” telecommunications networks (although they can arise in other parts of the network as well). Density affects the costs of both wireline and wireless networks, but the relative efficiency of wireless networks versus wireline generally will differ depending on the geography of an area. In many low-density areas, the per-customer costs may be so far in excess of those in more densely populated areas that affirmative subsidization or other financial support arrangements are required in order to incentivize any wireline vendor to provide service.<sup>27</sup> For wireless networks, the key

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27. See Report & Order & Further Notice of Proposed Rulemaking, *In re Connect Am. Fund*, 26 FCC Rcd. 17,663, 17,839-42, ¶¶ 539-544 (2011), as modified by Report & Order, Order on Reconsideration, & Further

input—spectrum—is fixed. A wireless network could rely on a single tower to serve a large geographic area with low density population, but a high density area may require many more towers.<sup>28</sup> Consequently, competition for wireline services is more likely to arise in relatively high-density areas because the MES, as a share of total market demand, will typically be lower, all else equal. As expected, the earliest and most intense facilities-based competition in wireline local telecommunications appeared in dense downtown urban centers.<sup>29</sup>

Nonetheless, economies of density may be highly localized, and while density can increase demand, it can also increase cost. Costs can vary substantially based on other geographic and regulatory factors such as terrain, weather, and zoning restrictions. The net effect on entry can thus vary depending upon the specifics of the technology and the area. For example, there may be sufficient density at one commercial multitenant building to support multiple wireline providers, but insufficient demand (or higher cost) to allow for viable competition at other, nearby or even adjacent, locations.<sup>30</sup> Assessing the viability of competitive entry at a particular location based exclusively on its density characteristics can fail to capture other conditions (e.g., revenues available to the entrant, as well as site-specific costs and other technology-specific factors) that may affect competitive entry.<sup>31</sup>

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Notice of Proposed Rulemaking, *In re Connect Am. Fund*, 31 FCC Rcd. 3087 (2016).

28. That is, a carrier only has a certain amount of spectrum, and that spectrum can only be used by a single tower in a given area. If that spectrum is insufficient to meet the demand in that area, then a provider can split the area into two smaller areas and build two towers, each serving one of the smaller areas, and so on. These are the “cells” of “cellular service.”
29. See Memorandum Op. & Order, *In re Teleport Commc’ns Grp. & AT&T*, 13 FCC Rcd. 15,236, 15,256-57 ¶ 37 (1998); see also Business Data Services Order, *supra* note 16.
30. See Memorandum Op. & Order, *In re Petition of Qwest Corp. for Forbearance Pursuant to 47 U.S.C. § 160(c)*, 25 FCC Rcd. 8622, 8661, ¶ 73 (2010) [hereinafter *Qwest Phoenix Forbearance Order*].
31. *Id.* There is significant debate on the determinants of entry as well as the effects of entry and potential entry on pricing. See, e.g., Business Data Services Order, *supra* note 16, § V.A.