COMPETITION AS A TURBULENT PROCESS

Lessons for telecommunications regulatory reform

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"We can hope for competition all we want,
but that doesn't mean it's going to happen."
Former FCC Chairman Reed Hundt[1]

1. Introduction

Worldwide, telecommunications policy has become inspired by a renewed belief in the superiority of competition as an economic organizing principle for the industry.[2] Paradoxically, while the idea of competition is widely embraced as a blueprint for practical policy decisions, there exist widely divergent views as to what constitutes competition and how it impacts efficiency. Moreover, policy prescriptions differ dependent on the conceptual lens chosen. The situation is complicated by the multiple meanings associated with the notion of efficiency. Depending on the context, efficiency can emphasize production, exchange, or the dynamic adjustment of the economic system. Multiple trade-offs exist between these aspects of efficiency and the optimal solution is not always straightforward. Some researchers and policy-makers have suggested to base policy-decisions on the disequilibrium models of competition proposed by Schumpeter and Hayek (e.g., Pitsch, 1996). Often, these notions of competition, especially

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[1] Quoted in *The New York Times*, December 23, 1996, p. C1.

[2] Several other factors are contributing to these changes in policy attitudes and approaches. Technological change, the saturation or near-saturation with basic utility services in many industrialized countries, the increasing diversity of services, and the global restructuring of business have rendered traditional monopoly arrangements unsustainable. The poor performance of publicly owned enterprises in the telecom sector, a perception of the failure of the public regulation of privately owned monopolies, and a generally more skeptical attitude towards the state, have put additional pressure on the traditional sector arrangements.

Schumpeter's notion of "creative destruction" are used in a metaphorical way to shape the policy discourse.

This paper explores alternative concepts of competition, especially Schumpeter's concept of dynamic competition, and their consequences for policy design. As will be shown, responses to interconnection issues (ILECs and cable systems), the amount of pricing flexibility granted to incumbent services providers, or antitrust analyses of merger proposals are all influenced by the conceptual lens chosen. At the same time, the weaknesses of these alternative concepts, for example, the lack of clear guidance for policy decisions, will be highlighted. The next section of the paper discusses equilibrium and disequilibrium concepts of competition. It will illustrate that perfect competition and contestability are only limit cases of more general types of competitive processes. Section three reviews how past U.S. regulatory practice has conceptualized competition. Section four draws lessons from dynamic competitive models for current issues of telecommunications policy.

2. Equilibrium and disequilibrium notions of competition[3]

The concept of competition has always played an important role in economic thinking but it has taken on a number of interpretations and meanings, some of them vague. Stigler (1987) defines competition as "a rivalry between individuals (or groups or nations) and it arises whenever two or more parties strive for something that all cannot obtain." As Yarrow (1995) has pointed out, this is a very broad definition, including the forms of rivalry (market trading, auctions, etc.), instruments of rivalry (prices, advertising, R&D, etc.), objects of rivalry (profits, promotion, prizes, survival, etc.) as well as types of rival. Competition is defined in behavioral terms and no implication is being made that more competition is necessarily better or an end in itself. Other authors, and this is probably the more widely accepted definition, combine structural and behavioral features. For example, Shepherd (1997, p. 3), emphasizes the concept of *effective* competition, requiring "reasonable parity among numerous competitors, able to apply strong mutual pressure. No one firm dominates, and there is also easy entry by new competitors." In

[3] This section greatly benefited from the study of Vickers (1994).

addition to behavioral criteria structural features of an industry (number of competitors, market entry conditions, etc.) are included and a presumption is made that effective competition is desirable.

2.1 Equilibrium models of competition

The classical economists had fairly rich perspectives on competition. Competition was linked to the allocation of resources in the economy and the prices charged for goods and services. Adam Smith (1776), for instance, recognized the disciplining effect of a larger number of suppliers in a market on the prices charged. Antoine A. Cournot provided a first formal analysis of a profit-maximizing firm and showed that "unlimited competition," that is, a market with a large number of sellers, none of which has an appreciable effect on the market price, leads to the lowest possible prices. Francis Y. Edgeworth (1881) demonstrated in his *Mathematical Physics* that oligopoly and market trading processes in general are inherently undetermined but that, as the number of traders increases, the indeterminacy vanishes and the "final settlement" is determinate. Thus, both Cournot and Edgeworth, starting from a process-oriented model of competition, showed that the state of perfect competition is a limit case of more general market structures, an insight that was too often ignored in more recent models.

The formal treatment of competition in neoclassical economics initially placed more emphasis on equilibria in different market structures. Competition was reduced to a market structure with a large number of price takers. While such an approach facilitated the solution of certain research questions and allowed the establishment of powerful theorems about the properties of competitive economies, such as the first theorem of welfare economics, it shifted emphasis away from an understanding of competition as a process.[4] Later, markets with fewer suppliers and forms of quality competition were studied under the heading of "imperfect competition" or "monopolistic competition." These market forms allow firms some degree of price differentiation and come closer to real world markets than the original models. The common observation of a

[4] Indeed, the notion of perfect competition is based on highly simplified assumptions and diametrically opposed to the notion of competition as rivalry. However, on should keep in mind, as Schumpeter (1954) has reminded us, that

deviation of prices from marginal costs was seen as a price for differentiated qualities. The vast industrial organization literature of the past decades as well as game-theoretic approaches have expanded the analysis to incorporate quasi-dynamic adjustment processes, endogenous technological change, and learning.[5] Despite these improvements, competition continues to be analyzed in an equilibrium framework.

As Vickers has pointed out, the modern theory of incentives has shed some more lights on the specific mechanisms through which competition may lead to increases in productive efficiency under conditions of static competition. It has been shown that the ability to compare one firm's performance against the performance of other firms may provide increased incentives for management to act efficiently, an insight that has been used in the modern concepts of benchmarking and yardstick regulation. However, it has also been shown that in an inter-temporal context the incentives of competition for productive efficiency may be less clear-cut. For instance, if the pay of management in period t+1 is dependent on the improvement of performance compared to period t, management may be inclined to strategically delay such improvements.[6] The evaluation of companies by the stock market is another mechanism that may induce efficiency, as is the threat of a take-over.

2.2 The role of knowledge: competition as a discovery process

Another, more dynamic, perspective on competition was contributed by the work of the Austrian School of economics, originating in the work of Carl Menger and Friedrich von Wieser. Like Schumpeter's conception of competition, which will be discussed in more detail below, it is inherently dynamic but focuses more on the informational aspects of economic processes. This approach stressed that economic agents do not know, as is assumed in the traditional competitive model, the totality of information relevant for their decisions, such as the true minimum cost of

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the model of perfect competition should be seen as a *theoretical* construct and not an attempt to describe real world markets.

[5] See Tirole (1991) for a review of the industrial organization literature and Laffont and Tirole (1993) for an application to regulatory issues. Fudenberg and Tirole (1995) and for recent developments in evolutionary game theory see Weibull (1997).

[6] This phenomenon is well known from the discussion of the efficiency properties of traditional rate-of-return regulation.

production, the potential for innovation, and so forth. The economic problem of society is a "problem of the utilization of knowledge" and it is "only through the process of competition that the facts will be discovered" (Hayek, 1945, p. 321; 1949, p. 96). Thus competition has its main role as a *discovery process* in which decentralized economic actors utilize their local information and create relevant information for other actors in the economy.

As Kirzner (1992) has pointed out, market prices *communicate* information that has been discovered and thereby influence the direction of entrepreneurial energies. For instance, the fact that a firm can produce certain goods or services at a price below the current market price reveals information for all other producers and buyers about the possible costs of production. Likewise, an innovation reveals information about new processes or products. The advantage of a competitive organization of the economy, as opposed to a more controlled one, thus stems from its superior ability to process knowledge. Competition also works as a selection process by awarding larger market shares to more efficient firms and penalizing less efficient ones with shrinking market shares or even elimination from the market. Modern auction theory has provided a more formal backing for many of the arguments proposed and supported the view of competition as a selection mechanism in markets with imperfect competition (Yarrow, 1995).

2.3 Creative destruction and innovation

Joseph A. Schumpeter criticized the static approach as failing to capture the essence of competition in a capitalist economy, which he saw as a dynamic process, propelled by endogenous forces of change. Although Schumpeter admired the elegance and logical coherence of the Walrasian general equilibrium model, he was dissatisfied with the fact that it only applied to static or stationary state economies. Thus the general equilibrium approach was unable to explain the dynamic changes in the economy. Schumpeter tried to solve this issue by introducing a powerful change agent into his analysis, the entrepreneur. Entrepreneurs, willing and able to challenge the established ways of doing things, create dynamic change by introducing "new combinations" of activities. Such new combinations could consist of new products, the

introduction of new methods and organizations of production, the establishment of monopoly positions or their destruction, and so forth.

In his later writings, acknowledging the increasing concentration of economic power in large enterprises, Schumpeter shifted his emphasis to the role of innovation per se and, in *Capitalism, Socialism, and Democracy* coined the powerful metaphor of capitalism as a process of "creative destruction." It is not price competition of the traditional sort that matters, he argued. Rather it is "competition from the new commodity, the new technology, the new source of supply, the new type of organization (the largest-scale unit of control, for example) -- competition which demands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives" (Schumpeter, 1942, p. 84). Monopoly power and the concomitant supernormal profits are a precondition to stimulate innovative activities by corporations. Temporary deviations from the efficiency conditions of static equilibrium become necessary preconditions for the dynamic efficiency properties of the system.

This broad analysis was reduced by subsequent researchers into two hypotheses, namely that (1) monopoly power is conducive to innovation and (2) larger firms are more likely to innovate than smaller firms (Kamien & Schwartz, 1982). A close reading of Schumpeter indicates, however, that at least the second hypothesis does not originate in his but the work of John Kenneth Galbraith and that hypothesis one misses some of the main points related to the dynamic functioning of competition. Schumpeter saw the establishment of a temporary monopoly position as an incentive for entrepreneurs to pursue their tasks and argued that only continued high performance would allow monopolistic firms to retain their monopolistic position. The empirical research has demonstrated that the two specified hypotheses need to be modified to reflect the specific technological and demand characteristics of industries. In summarizing the research literature up to the early 1980s, Kamien & Schwartz (1982) come to the conclusion that neither perfect competition nor monopoly are conducive to innovation but rather a situation of loose oligopoly. More recent research has often rejected the hypothesis that large firms are more innovative than small firms are (for instance, Ács & Audretsch, 1992; Carlton & Perloff, 1994;

Geroski, 1990) but that does not directly attack the broader Schumpeterian argument of temporary monopoly power as an engine of capitalist economic growth.

2.4 Neo-evolutionary models of competition

Neo-evolutionary models of firm behavior and economic change were developed as a reaction to the limits of orthodox theory, especially its focus on maximizing behavior, its treatment of change as largely external to the system, its focus on equilibrium states, and so forth (Nelson & Winter, 1982). Economic change is modeled as a continuous interaction between routines within firms and the market environment of these firms. This interaction has predictable components (routines whose outcomes can be mapped as a probability distribution) and stochastic components that cannot be predicted. Routines exist for different processes within the firm, for instance, operational decisions, changes in the capital stock of the firm, or the procedures for processing information about the market environment. These routines are not maximizing procedures but engrained methods for reacting to conditions of limited information, which are in turn altered during the process of economic evolution. Based on these routines, firms react differently to their market environment, which may be modeled as exogenous or endogenous to firm decisions. Firms do not only react to this environment but also try to influence it actively. Thus the state of an industry at any point is influenced by the state of the environment in the previous period and the specific routines that firms do apply to react to and influence these conditions.

Evolutionary theory provides a much richer approach to the understanding of dynamic change in industries and the public policies affecting them. It enhances our understanding that such processes are typically irreversible and ongoing in time. It focuses analysis on long-run developments rather than short-run marginal adjustments and encompasses qualitative as well as quantitative change. It deals with variation and diversity as well as with non-equilibrium and equilibrium states. Lastly, it allows for the possibility of persistent and systematic error-making and thereby non-optimizing behavior (Hodgson, 1993, p. 32). Evolutionary models can explain path-dependency in economic processes and are not based on the presumption that economic

change necessarily increases efficiency. In fact, firm or public policy adjustments that seem adequate in the short run may prove to be efficiency reducing in the long run.

2.5 Relations among the concepts of competition

These different concepts of competition seem, at a first glance, to represent incompatible paradigms. However, as is obvious, the more recent evolutionary concepts draw many ideas from models of selection and discovery as well as from the Schumpeterian vision of economic change as largely driven by endogenous forces. Schumpeter himself saw static neoclassical theory as justified to describe an economy in a *Kreislauf* (circular flow) not affected by any change except in its parameters. In other words, he saw it as appropriate to describe situations with no or very slow innovation activity, where all decisions are based upon routines and, as all information is available, maximization is possible. In the Schumpeterian view, there is a clear trade-off between the conditions of static efficiency and the conditions of dynamic efficiency. Dynamic efficiency requires a violation of the former, for instance, through patent protection, temporary monopoly power, and so forth.

Predominantly interested in positive economics, Schumpeter did not give an answer as to whether there was an "optimal" trade-off. Weizsäcker (1980) attempted to give a more explicit answer to this question by modeling competition as a multi-tier process. He distinguished between the level of consumption goods, production, and innovation. The efficiency conditions as each higher level require deviations from the efficiency conditions at lower levels. To encourage private production of consumption goods, property rights need to be established restricting direct competition in consumption (e.g., competition between person A and B for the use of A's car). But such restricting property rights enable competition in the exchange of cars and thus provide incentives for productive activities. Likewise, restrictions of direct competition at the level of production through intellectual property rights are the precondition for innovative

activity. From this perspective, the main question is not whether more or less competition is desirable but to balance more competition at one level and less competition at another.[7]

At a more pragmatic and applied level, the concept of "workable" or "effective" competition has aimed at providing guidelines for the design of public policies towards industries (Clark, 1961, more recently Chessler, 1997 and Shepherd, 1997). The idea is rooted in the traditional structure-conduct-performance approach to industrial organization. Markets are classified along the familiar spectrum ranging from pure competition to pure monopoly. In between these extremes are the market structure of monopolistic competition (many suppliers, none holds more than 10% of the market), loose oligopoly (leading four firms hold less than 60% of the market), tight oligopoly (leading for firms hold between 60-100% of the market). Dominant firm structures prevail if one firm has 50-100% of the market and no close rival. The concept of workable competition attempts to identify the conditions under which the disciplining forces of competition are strong enough to warrant unregulated market organization. Based on numerous empirical industry studies, this threshold is reached when four conditions hold. First, at least five firms have to supply the market. Second, none of the firms must hold more than 40% of the market and the remaining competitors are fairly equal in size. Third, market entry and exit barriers must be low. And fourth, customers must have the ability to switch suppliers without significant transaction costs. The notion of workable competition provides a simple blueprint for public policy decisions. It attempts to balance static and dynamic aspects of efficiency. However, the theoretical underpinnings of the approach are weak.

3. Models of competition in U.S. telecommunications reform

In the United States, in contrast to other nations such as the United Kingdom and New Zealand, telecommunications was liberalized in a rather gradual fashion. In traditional economic models this process is typically modeled by treating regulatory reform as a reaction to exogenous changes in technology and demand. These forces disturb the established market equilibrium. Until recently, at the federal and state level, regulatory policy was based on the static natural monopoly

[7] Incentives for innovation do not necessarily require restrictions on competition in production. The government

model. Consequently, a withdrawal of regulation was considered appropriate, when a market segment was sufficiently competitive. The criteria for making this assessment varied depending on the issue. Initially, they emphasized structural aspects of the respective markets, such as the market share of the incumbent(s). Later, under the influence of contestability theory, additional attention was dedicated to market entry conditions and the scope of the incumbent for abusing its market power.[8] At the state level, rules of thumb rather than well-defined thresholds were often applied.

As markets rarely evolve from regulated monopoly structures to competition overnight, this approach often led to a vicious circle of arguments and extended debates. For example, incumbent telephone companies were not allowed to set prices in a more flexible way as long as a market was not competitive. Entry by the RBOCs into the long distance markets was conditioned onto sufficient local competition. Moreover, given the complexity of issues involved, regulatory policy often made "local" decisions without anticipating some of their longer-term effects. For example, the *Above-890* decision triggered a wave of applications to provide private line services and later MCI's attempts to enter the long distance market.[9] Taken together, these decisions probably slowed the emergence of competition. It is vain to speculate what other course of action could have been pursued but it is helpful to look at the guidance provided by alternative concepts of competition and how they may inform future decisions.

The deregulation of customer premises equipment (CPE) was based on the notion that CPE was separable from the network and a structurally competitive market. The influx of numerous potential suppliers of CPE and conceptual and engineering analyses supported this approach. Likewise, value-added services were seen as separable and structurally competitive.[10] In the

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through either publicly sponsored research or through subsidies could also provide them.

[8] The FCC was aware of the shortcomings of a static approach. For example, in its *Competitive Common Carrier Service*, First Report and Order, 85 F.C.C.2d 1 (1980), it emphasized the need for forward-looking decision making. However, as will be argued in more detail in the next section, so called forward-looking models can be deeply rooted in static analysis.

[9] Under conditions of incomplete information, bounded rationality, opportunistic behavior, and differing value systems of the actors involved, such a strategy may be the only feasible approach. See, for example, the lucid discussion in Brock (1994), especially chapters 2 and 3.

[10] Complicated issues arose as to whether the incumbent regulated service providers should be allowed to participate in the emerging competitive markets.

Competitive Common Carrier Service docket (1979-1985), the FCC attempted to draw a line between common carrier services fully subject to the requirements of Title II and Title III of the Communications Act of 1934 and those that could be relieved from them. The key criterion applied by the FCC to distinguish dominant carriers was whether an incumbent firm was able to abuse its market power to either increase prices above costs or lower them artificially below costs. Thus increased importance was placed on a behavioral criterion rather than structural or market share data.[11]

In addressing the issue of cable price regulation, structural criteria were again at the fore, at least initially. Based on the mandate provided by the Cable Communications Policy Act of 1984, the FCC freed all cable systems in markets with more than three additional over-the-air television signals from price regulation. Subsequently, the threshold was raised to six over-the-air signals. The yardstick for effective competition was again modified in the wake of the Cable Television Consumer Protection and Competition Act of 1992. Effective competition was defined based on multiple criteria. According to these, small cable systems serving less than 30% of the households in the franchise area were exempted. Likewise, systems facing competition from another multichannel service provider available to at least 50% of the households in the franchise area and subscribed by at least 15% were also deemed subject to effective competition. The Telecommunications Act of 1996 separated cable services into three tiers (basic, programming, and premium) and established differing regulatory frameworks for each. As of April 1, 1999 the premium and programming tiers are unregulated. For continued regulation the basic tier, the Act introduced an third alternative test, namely the presence of a common carrier offering entertainment service, independent of its market share. Thus, without more careful analysis, the Act assumed that the emergence of satellite television and other media such as the Internet would constitute a sufficient check on the potential market power of cable systems in the higher service tiers.[12]

[11] In October 1995, the FCC found AT&T to be non-dominant, despite its continued share of more than 50% of the long distance voice market.

[12] So far, no significant evidence has been produced indicating the abuse of market power by cable systems after the deregulation of the programming tier.

The Telecommunications Act also conditioned the entry of the RBOCs into the long distance market on a 14-point list of mostly structural criteria. It does not explicitly mention any behavioral standard although the FCC's mandate to apply a public interest standard before granting permission to the RBOCs to enter the long distance market could be seen as implying such a test. Most recently, the FCC conditioned increased pricing flexibility for interstate services of LECs subject to price cap regulation to service-specific triggers. These triggers essentially are based on a combination of structural criteria.[13] Again, structural criteria are used a proxies to eliminate the possibility of an abuse of market power.

Despite the variety of approaches used at the federal level and the concern about dynamic developments, the conceptual underpinnings were rooted in traditional or more advanced static economic analysis. In the next section we will explore how dynamic concepts in the tradition of Schumpeter could be used to analyze current issues and how they would lead to differing policy recommendations.

4. Implications of Schumpeterian analysis for regulatory practice

4.1 Schumpeter's apprehension for regulation

Schumpeter did say little about the social control of business in general and the regulation of infrastructure industries in particular. Despite (or, perhaps, because of) his own inroads into politics in post-World War I Austria and Germany, he considered the task of the economist to be mainly the analysis of economic issues. Throughout his academic career, he was more interested in pure theoretical than in applied economics. Regulatory economics received only a brief treatment as an applied field. Schumpeter thought that regulatory economics did address issues that could have contributed to economic theory. However, he concluded that it had not accomplished much beyond convincing the U.S. Supreme Court that determining a reasonable return for utilities based on the market value of capital involved a circularity problem (Schumpeter, 1954, pp. 949-50). He was rather outspoken, though, that "it is ... a mistake to base

[13] FCC, *Fifth Report and Order and Further Notice of Proposed Rulemaking*, CC Docket No. 96-292, August 5,

the theory of government regulation of industry on the principle that big business should be made to work as the respective industry would work in perfect competition" (Schumpeter, 1942, p. 106).

4.2 Dynamic perspectives on current regulatory issues

The clearest conclusions can be drawn with respect to the pricing of interconnection and resale. Schumpeter's work highlights the factors contributing to new market entry and the replacement of old technology by the new. Market entry is driven by temporary profit opportunities. These are influenced by several factors, including cost advantages of a potential new market entrant, demand-side conditions that allow monopolistic markups over costs, and protection provided by patents. Legal or de facto monopolies are shielded against such potential market entry eliminating the process of competition from new entrants. Even if market entry would be allowed, as the prices of the incumbent are generally regulated opportunities for temporary profits are diminished. Therefore, other things equal the incentive for new market entry is reduced. Schumpeterian analysis points to this trade-off between static and dynamic efficiency, albeit without giving clear guidance as to how an optimal choice should be made.

A recent example of how dynamic analysis would lead to quite different policies is the pricing of interconnection and resale. In its Interconnection Order,[14] the FCC, based on the language in the Telecommunications Act of 1996 prohibiting pricing based on a rate-of-return method, required that interconnection prices be set based on forward-looking incremental costs. The proposed Total element Long Run Incremental Cost (TELRIC) method combines status quo and best practice assumptions. Whereas the existing location of wire centers is accepted, costs are based on the most efficient available technology (greenfield approach). The FCC's Order was stayed by the courts and later remanded to the agency by the U.S. Supreme Court for clarification. In the meantime, state Public Utility Commissions following the mandate of the Telecommunications

1999.

[14] *First Report and Order, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996,* CC Docket No. 96098, August 1, 1996,

Act, set interconnection rates based on a range of forward-looking methodologies, including variations of TELRIC and Total Service Long Run Incremental Costs (TSLRIC).[15]

Brock (1996) and Katz (1996) discussed the economic rationales for the FCC's approach from a neoclassical perspective. In contrast to TSLRIC, TELRIC includes a portion of the common cost of the service provider and therefore addresses the problem of cost recovery.[16] As a forward-looking cost concept, it allows competitors to take advantage of existing economies of scale, scope and density. It also reduces the incumbent's advantage due to network externalities and reputation. From a static efficiency perspective this is a correct approach. The argument can even be interpreted in a dynamic fashion: new facilities-based market entry will only occur if the new service provider indeed has a more efficient technology, organization, or marketing available.[17]

For these arguments to be correct, market entry would have to occur at the margin. Schumpeterian analysis emphasizes that change in real-world markets does not occur at the margin but only if significant cost differences and thus profit opportunities exist. Therefore, the solutions adopted for interconnection pricing will deter competition from new entrants. Kahn (1998) has pointed to this fact as well without explicit reference to dynamic competitive models. He argues appropriately that interconnection prices and resale prices should be based on long run incremental costs (LRIC), based on the historical costs of providing the service.[18]

One cannot deduce from Schumpeter's writings, however, a blank endorsement of full deregulation without consideration of the unique conditions of an industry. The network character of telecommunications creates many unique market entry barriers. For instance, the first mover can gain significant advantages if the costs of duplication of network facilities are high and no feasible economic alternative is available. Further, if customer inertia exists or a service occupies only a small percentage of their budgets, they may not respond to a competing

[15] The database of the National Regulatory Research Institute contains key interconnection agreements from all states. Available at <http://www.nrri.ohio-state.edu>.
[16] Many states that use TSLRIC in calculating the costs of interconnection allow the company a mark-up to cover common costs when prices are being set. See, for example, the practice of the Michigan Public Service Commission.
[17] For arguments along this line see, for example, Beard, Kaserman & Mayo (1998).
[18] An argument against the TELRIC approach could also be derived from the work on investment under uncertainty, for example, Dixit & Pindyck (1993).

service unless a considerable price difference exists. In Schumpeter's model, market power is achieved by superior performance and is sustainable only through continued excellent performance. As the formerly regulated telecommunications industry is being deregulated, a significant amount of market power is prolonged from the previous regulatory regimes. The Schumpeterian view of competition through innovation has only limited applicability under these conditions, as the position of the incumbent monopoly has typically not been acquired in a competitive process.

A crucial point for the analysis is how fast deregulation would lead to the erosion of the historic monopolistic position and whether or not the potential efficiency losses from monopoly are outweighed by the potential efficiency gains from activating the process of creative destruction. This process of innovation if often heavily path-dependent as new services need to be compatible with the existing technical infrastructure. As a result, technological change is frequently only a "local" phenomenon and proceeds rather gradually, leaving the incumbent providers significant control over their market environment through the control of engineering parameters of networks (Mansell, 1993). "Global" technological change is a rare phenomenon, although the current rapid expansion of wireless services may constitute such an example. A complicating point in such an analysis is the fact that Schumpeter did not formulate an explicit theory of welfare. Rather, he had a fundamental trust in the dynamic efficiency of the process of innovation and the even diffusion of its benefits.

Interesting angles can also be derived for other issues of telecommunications reform. For example, from a Schumpeterian perspective it would be difficult to justify the exclusion of the RBOCs from the long distance telephone market. The Telecommunications Act conditions market entry on the existence of competition in the local markets, while, at the same time, access to local networks is opened at forward-looking cost. There is a clear trade-off between the goal of a dynamic transition with multiple players in the long distance and the local markets and the static notion of efficient pricing of the existing infrastructure services. The essential facilities doctrine, underlying much of the current policy, does not survive close scrutiny from a Schumpeterian point of view. This is not to say that an abuse of market power based on the

control of bottleneck facilities would support dynamic competition. However, given the regulatory controls that are currently in place at the local as well as at the interstate access level, the gross abuse that would justify regulatory action seems unlikely. Again the likely impact of the current approach is a deceleration of competition.

A third area in which Schumpeterian thinking leads to conclusions that deviate from current orthodoxy is mergers and acquisitions. From a dynamic competitive perspective, the important test is the impact of a consolidation on the future evolution of competition. Current antitrust analysis of mergers scrutinizes market structure and entry conditions. From a Schumpeterian perspective, measures like the Herfindahl-Hirschman Index (HHI) likely need to be modified as only lasting market power justifies policy intervention. Thus it is laudable that antitrust analysis has paid more attention to the market entry conditions and the potential of abuse of a dominant position in a concentrated market. Against this background, the decision to let several mergers (SBC Communications, PacTel and SNET; Bell Atlantic, NYNEX and GTE; SBC and Ameritech) pass is not fully logical. From a dynamic perspective the implications of these mergers for the process of creative destruction would need to be assessed. Although the FCC and the state PUCs could accomplish this under the public interest test, such an analysis was not performed in the mentioned cases.

3.3 Pro-competitive institutional design

The various streams of evolutionary economic thinking had different views of the role of government. The most extreme position is held by the Austrian School which sees only a minimal role for the state although measures to protect competition are endorsed (Littlechild, 1978). Schumpeter believed in the theoretical possibility of "rational" as opposed to "retaliatory" regulatory policy but had little confidence that such a policy could be implemented in real world politics (Schumpeter, 1942, p. 150).[19] What separated evolutionary models of the control of

[19] Schumpeter perceived the political process as a competition for leadership and not as a democratic process of representative democracy. Thus, he came rather close to the position of some of modern public choice theory modeling politicians as driven by narrow self-interest.

market power from its traditional counterparts are the criteria used to judge efficiency-reducing market power.

First, as Schumpeter has expressed rather clearly, the equilibrium point of a perfectly competitive market where price equals marginal costs as well as average costs is an inappropriate standard as it ignores the role of temporary market power in stimulating innovation. Thus, traditional cost-based regulation is not compatible with evolutionary modeling. Rather some temporary deviation from the price equals marginal costs/average costs rule is justified. Models using regulatory lag or price caps would much better meet this criterion. Second, the status of an industry needs to be judged over a longer time period, as competitive processes need some time to develop. Again, to quote Schumpeter, a system that at any point in time deviates from the static equilibrium conditions may nevertheless be superior in the long run (Schumpeter, 1942, p. 138).

In evolutionary models, competitive processes may be turbulent and lead to rather uneven distributions of the benefits of increased competition. This is to a certain part visible in the events in telecommunications, where the majority of benefits was realized by medium and large businesses as well as residential customers with a high share of long distance calls in their calling basket. As evolutionary theory does not see a particular "public interest" that needs to be protected but rather looks at the policy process as competition between conflicting interests, it does provide only a weak basis for the welfare assessment of the outcomes or regulatory reform.

5. Concluding observations

Traditional and evolutionary concepts of competition emphasize different aspects of competitive processes. The models of neoclassical theory and traditional regulatory theory typically relegate technological change, innovation, and institutional and regulatory change to external forces impacting on an industry. In contrast, evolutionary models study the interplay of endogenous forces within the economic system with the environment of economic agents. From an

evolutionary vantagepoint, static models can be seen as a limit case applicable to an environment with no or only limited change. The traditional static models may lead to wrong policy conclusions by attempting to mimic equilibria of static competitive markets. Even more recent and sophisticated models of multiproduct firms, asymmetric information and incentive design do not cope with the fundamental problem of incorporating change into the analysis. From an evolutionary perspective one cannot support a total laissez-faire approach to the organization of utilities. Rather, instruments that are more compatible with processes of experimentation and learning ought to be applied. These include regulation via price caps, the utilization of more extended periods to assess the effectiveness of competition, and other measured to protect the workability of competition.

According to Schumpeter it is necessary to distinguish between temporary and structural market power. Temporary market power is an important precondition for innovation and does not justify regulatory intervention. Traditional tools applied to detect market power (market shares, HHIs, market entry conditions) need to be adapted to allow such a distinction. From a Schumpeterian perspective, pricing methods such as TELRIC or TSLRIC fundamentally misunderstand the nature of the competitive process. Rather than fostering competition, they delay and distort the competitive process. Schumpeter and Hayek had serious doubts as to whether the regulatory institutions were able to implement effective policies, even is those were known. Thus, regulation should only serve as an intervention of last resort and probably only after a clear record of sustained abuse of market power.

The economics of Schumpeter and Hayek provide a radically different basis for the design of regulatory policies for the transition to a competitive environment. Their models were not developed in the context of regulation and have thus not penetrated regulatory thinking. Until recently these models were not expressed in the more formal language of modern economics. However, recent research in neo-evolutionary economics is revitalizing more dynamic notions of competition. We explore the implications of these approaches as a basis for the formulation of future telecommunications policy. An implementation of such principles would be difficult to achieve in the current context of U.S. regulation. For example, it is not straightforward to

determine the threshold between temporary and lasting market power. Nevertheless, it is a framework worth exploring as it can help to better understand the conditions that foster the evolution of competition.

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