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Optimal Local Exchange Carrier Size

SUMIT K. MAJUMDAR
University of Michigan, Business School, Ann Arbor, MI. 48109, USA

HSI-HUI CHANG
Department of Accounting, National Chengchi University Taipei, Taiwan, R.O.C.

Abstract. Optimal firm size and patterns of returns to scale among the local exchange companies in the U.S. telecommunications industry are estimated for the years: 1975, 1978, 1981, 1984, 1987 and 1990. The independent companies display increasing returns to scale, while the Baby Bells display constant or decreasing returns to scale. The independent companies operate at a scale smaller than optimal size, while the Baby Bells operate at a scale greater than optimal size. Efficiencies can be gained by industry restructuring, by allowing independents to expand their size while the Baby Bells can be downsized to create smaller units.

Key words: Returns to scale, local exchange carriersize, downsizing.

JEL Classification: L 96 (telecommunications).

I. Introduction

Whether economies of scale exist in a particular industry is an important strategic issue, since their existence determines minimum efficient scale size and the amount of investment required to enter a sector. Large changes have occurred in many parts of the telecommunications industry, with increasing overlays between sectors such as switching and transmission. It has been suggested that parts of the industry have become naturally competitive; returns to scale patterns might be changing so that several competitors of similar size can coexist, making local exchange markets competitive (Bolter, McConnaughey and Kelsey, 1990; Shepherd, 1983).

In the above context, Greenwald and Sharkey (1989), after examining the potential competitiveness of the local exchange sector, conclude that the forces of technology have altered the basis of competition and, thereby, the continuing justification of local monopoly existence. However, the recent evidence available on scale economies in the U.S. local-exchange sector is mixed. Dalton and Mann (1988) suggest that scale economies exist, while Guldmann (1990) and Shin and Ying (1992) suggest that breaking up the monopoly outputs of local exchange companies may be beneficial, and competition can be increased. However, such prognostications are based on somewhat older data; for the year 1982 (Dalton and Mann, 1988), the year 1980 (Guldmann, 1990) and for the period 1976 to 1983

(Shin and Ying, 1992), and there are no data presented on what might actually be optimal firm size in the telecommunications sector.

This paper reports the results of a study which addresses key questions related to the structural make-up of the U.S. local exchange sector: what are the patterns of returns to scale among firms; what is the size of the optimal firm in the U.S. local operating sector; are there differences among different groups of firms; and have size patterns changed over time? Local exchange competition is a key issue, because till 1996 it has represented the last frontier with regard to telecommunications deregulation, and the local loop provides the basic infrastructural element for competition to take place in all forms in the industry. Yet, firms with loops of different sizes do exist in this sector, and each local operating company has privileges in its demarcated territory. Studying optimal size patterns of local exchange companies is very germane, since a first-order understanding of the minimum size of the efficient firm can be acquired.

Data envelopment is used to estimate returns to scale and the most productive scale size for a sample of the 38 major local exchange companies in the U.S. at six points in time: 1975, 1978, 1981, 1984, 1987 and 1990. The paper is organized as follows. In section two some of the conceptual and empirical issues related to scale and size in the telecommunications industry are discussed, particularly with regard to the local exchange sector. In section 3 the research approach is also described. Section 4 contains an analysis and discussion of the results obtained, and section 5 has concluding remarks about the strategic implications of the results.

II. Issues of Scale in Local Exchange Telecommunications

Returns to scale estimates map the relationship between the scale of use of a relevant chosen combination of productive inputs and the rate of output of a firm. Therefore, the size of the firm is a critical variable in influencing efficiency. In a telecommunications firm network management is the primary activity, since the basic objective in service provision is to permit inter-connectivity. Traditionally, returns to scale in local exchange telecommunications have been identified as arising from two main areas. The first is from economies in the physical provision of basic services. Given the network of lines developed as part of the "Universal Service" infra-structure, it is thought to be more efficient to have one single connection to each end-use location, rather than 160 million telephones in the U.S. connected to each other causing duplication. Hence, higher-order connectivity is required with transmission lines connected to switches providing the network for the exchange or communications (Sharkey, 1982). This pre-supposes that returns to scale in switching and transmission of signals enables service to be best provided within a local area through one or more switches, giving rise to a minimum efficient network size (Littlechild, 1979).

Second, there can be managerial economies of size in network planning, coordination and management. Key resources in a network are access lines, switches and employees, which are combined to form the "live" network. The primary network asset is the number of access lines, which are supported by the switches and employees (Green, 1992). A larger network owned by big operating companies may be able to handle randomly varying demand more efficiently by reallocations of capacity among switching and transmission equipment. Planning and managing network resources may be cheaper, and if there are fixed costs of network management they can be spread over a greater number of lines in a larger network, as measured by the number of access lines (Greenwald and Sharkey, 1989). Hence, the larger the network, as measured by the number of access lines, the greater the presumed returns to scale.

There are also size-driven managerial economies of scale due to specialization and vertical integration, because larger firms are often technologically sophisticated. Such sophistication may lead to a more rapid diffusion of modern technologies in these larger firms. X-inefficiencies may arise because of size, ownership and inertia factors, or for exogenous reasons such as regulation. These x-inefficiencies vitiate against the presumed capabilities that may accrue with large-scale, because coordination failures can occur due to size.

Micro-level scale studies of the U.S. local-exchange sector are few, but some do exist. Several other studies reveal the existence of scale economies in the overall U.S. or Canadian telephone system, of which the local exchange is a part. These are of two types: production function oriented (Vinod, 1972) or, using duality theory (Shepard, 1970), cost-function oriented (Christensen, Cummings and Schoeh, 1983), and each recent study of scale economies in telecommunications of which we are aware has used the cost function approach, primarily estimating a translog cost function. See Fuss (1983) for a review of the principal studies which have used the translog cost function approach.

Waverman (1989) reviews most of these studies and states that "the weight of the evidence of all these studies (as to whether scale economies exist or not in the telecommunications sector), is simply not strong enough, since changing the level of aggregation, the functional form, the constraints imposed, or the objective function dramatically alters the results" (1989: 87). While extant studies may reveal scale economies, they suffer from lacunae which may call the interpretation of the results into question. One is an aggregation bias. The unit of analysis in all reviewed studies has been the Bell System. Data has been pooled across local and long-distance operations to evaluate whether the system displays scale economies.

Aggregation bias in calculating scale economies thus exists, if AT&T is treated as the firm, and "aggregate data are just too large a production unit for the analysis" (Waverman, 1989:89). Waverman also writes: "My view is that the subadditivity test for aggregate AT&T is so sensitive to data and to econometric technique that it cannot be relied on for making policy" (1989, p. 90). The concept of scale economies is a firm-level concept; and, at that level of analysis what is involved is the calculation of the effect or costs across different sizes of exchange of adding one subscriber or unit of output. The unit of analysis should, therefore, be the firm, which is a local operating company, or a long-distance services operator; also data should be generated as to what is optimal firm size. While the evidence presented in the studies noted include local exchange companies, the studies have measured the global effect across all AT&T companies, which includes the AT&T Long Lines operations as well as twenty-two Baby Bells, of increasing output in one operating unit somewhere. Such aggregation affects the meaningful drawing of conclusions with regard to the local-exchange sector.

Also, none of the studies Waverman (1989) reviews have looked at scale economies possessed by the independent operating companies. These companies make up a substantial portion of the U.S. telecommunications industry. Leaving them out of studies seriously distorts any conclusions generalized to the U.S. local-exchange sector as a whole. Dalton and Mann (1988) and Guldmann (1990) are the only two studies of which we are aware that specifically consider other local exchange firms in their sample.

III. Empirical Approach

There are over 1500 telephone operating companies in the U.S. Of these about 50 are Class 1 carriers who report to the Federal Communications Commission and have annual revenues of over $100 million; they account for about 80 percent of local operating company customers. The rest are primarily small rural telephone companies funded by the Rural Electrification Administration; their operations are not comparable to that of the big companies. Guldmann (1990) studied these rural companies. However, all other studies include the Class 1 companies, which this study does as well. The returns to scale estimates of 38 local exchange telephone companies, out of the top 50 (these companies account for about 95 percent of local exchange revenues), are computed for 6 time-periods: 1975, 1978, 1981, 1984, 1987 and 1990 are compared.

Data from the annual FCC document *Statistics of Communications Common Carriers* are used for empirical analysis. The companies studied include 21 of the 22 Bell operating companies, 6 United Telecommunications' local exchange companies, 5 GTE local exchange companies, 3 CONTEL companies, 2 independents – Cincinnati Bell and Southern New England Telephone – and 1 company – Central Telephone – from the CENTEL group. Other companies are left out because of various bits of missing data; the companies left out are the smaller operating companies within the non-Bell category, the main one of which is Rochester Telephone Company. In the data coverage, it is ensured that there is a 38 firm panel for each of the 6 years analyzed, covering all the important operating companies. A list of companies is available on request.

The year 1975 represents a period of full regulation. By 1978 technology in the form of electronic switching had started diffusing in visible quantities. In that year certain competition-enhancing decisions were also made, particularly with regard to the pricing decisions of firms. 1981 represents a time period when there was yet regulation of the industry, but key decisions to restructure the industry were taken by the Reagan administration and the Anti-trust Division of the Justice Department. In 1984 the Bell operating companies were formally divested to the seven regional holding companies (RHCs). By 1987 the industry was competitive in some sub-sectors, including many in which the local operating companies participated. By 1990 the cumulative impact of the policy changes that had occurred in the industry would have been felt on the operations and behavior of the firms.

The tabulated results that follow in section 4 are calculated by estimating for each time-period (1975, 1978, 1981, 1987 and 1990) DEA returns to scale and most productive scale size estimates for all 38 companies in the sample. Baby Bell and non-Bell operating companies results are compared as two separate groups in the discussion of results. While the non-Bell companies have not been in the limelight relative to the Bell companies, they are often large (GTE California has annual revenues of over $2 billion), operate in critical states (Southern New England Telephone in population-rich Connecticut) or cities (Cincinnati Bell in Cincinnati), and in many local exchanges have almost as large a market share as the Bell operating companies. For example, in Ohio the share of Ohio Bell in total telecommunications operations of the state is only marginally above those of other companies.

For 1984, 1987 and 1990 the results for the operating companies belonging to the 7 post-1984 RHCs are consolidated and presented as if they were Baby Bells all displaying similarities in behavior, and compared against the results of the non-Bell companies. The rationale is that the BOC/RHC operating companies were subject to stricter control and regulation in the pre-divestiture era, and as such would also have been more susceptible to the 1984 "shock". Additionally, they generally are of larger size for historical reasons (Brock, 1981), compared to the other operating companies; they have also undergone major cultural transformation in the decade of the 1980s (Schlesinger, Dyer, Clough and Landau, 1987).

For the years 1975, 1978, 1981, 1984, 1987 and 1990 the Baby Bell operating companies represent an interesting grouping for comparison vis-à-vis the non-Bell operating companies. For instance, the non-Bell independents were more aggressive prior to 1984 in updating their electronic switching capabilities, as shown by Zanfei (1992). In the post-1984 era the Bell operating companies have become equally aggressive and competitive, not least because of "equal access" pressures (Bolter, McConnaughey and Kelsey, 1990), but till 1989 had not caught up in technological sophistication with the non-Bell Companies.

DEA is a linear programming model introduced in Charnes, Cooper and Rhodes (1978) to evaluate the relative efficiency of decision making units that use multiple inputs to produce multiple outputs. It is a technique which explicitly allows the computation of returns to scale estimates for each firm, where the firm is the unit of analysis. In other words, the aggregation problem which has plagued all prior studies of the telecommunications industry is avoided. Details of how firm-specific returns to scale parameter and most productive or optimal scale size for each input

Table I. Returns to scale characteristics of the firm studied

	Years					
	1975	1978	1981	1984	1987	1990
Constant Returns to Scale						
All Companies	6	7	9	16	9	11
Bell Companies	3	3	4	12	6	8
Non-Bell Companies	3	4	5	4	3	3
Increasing Returns to Scale						
All Companies	14	17	14	15	19	15
Bell Companies	1	5	5	3	5	3
Non-Bell Companies	13	12	9	12	14	12
Decreasing Returns to Scale						
All Companies	18	14	15	7	10	12
Bell Companies	17	13	12	6	10	10
Non-Bell Companies	1	1	3	1	0	2
Grand Total						
All Companies	38	38	38	38	38	38
Bell Companies	21	21	21	21	21	21
Non-Bell Companies	17	17	17	17	17	17

consumed or output generated are computed can be found in Banker (1984) and Banker, Charnes and Cooper (1984). This paper is a straightforward application of the original Banker, Charnes and Cooper (1984) formulation. Therefore, details are not provided. There is now a very large literature on DEA. This is evaluated by Seiford (1996). Seiford (1996) and Seiford and Thrall (1990) provide details of the various advances made within the DEA framework. Interested readers can follow-up the literature using the pieces suggested.

IV. Discussion of Results

The patterns of individual returns to scale characteristics shown by the two groups of companies as well as all the companies in the sample taken together are discussed. Table I below highlights the number of companies which enjoy constant, increasing or decreasing returns to scale, and the changes in the patterns over the 6-year period analyzed.

The data in Table I reveal, first, that over time a greater number of companies display constant returns to scale: from 6 companies for 1975, the number increases to 9 for 1981. For 1984 there are 16 companies in this category; however, it is a year of transition, and it is more appropriate to review results for 1987 and 1990, where there are 9 and 11 firms displaying constant returns. Hence, by 1990 at least 29 percent of the companies are at an optimum size, where they have exhausted increasing returns, but do not yet start displaying decreasing returns, or diseconomies of scale.

The trend with regard to increasing returns is stable over time, relatively speaking. Firms displaying increasing returns to scale are by far the largest category: between 37 and 50 percent of the sample firms display such returns. For 1975 14 companies displayed increasing returns; for 1990 the number is 15, or 39 percent of the total number of companies. These numbers are important because they highlight that a significant proportion of firms can still have the ability to exploit further economies of scale, because the optimum size of operations have yet to be attained. However, the evidence with regards to decreasing returns to scale also bears scrutiny.

From Table I it is noted that for 1975 there are 18 companies, or 47 percent, displaying decreasing returns to scale. In other words, given their production correspondences, they are too big and have exhausted scale economies. For 1975 this is, by far, the characteristic most significant. For 1990 the number of companies in the decreasing returns category is 12, or 32 percent of the sample. This improvement in the abilities to reap scale economies has resulted in a rise in the number of companies displaying constant returns to scale. Over time we find that the structural changes taking place in the industry have brought about a realignment in company size, as more companies have moved from a situation of suffering from diseconomies of scale to one where they neither suffer from it, nor are they enjoying scale economies.

The number of Baby Bell companies in the constant returns to scale category has more than doubled from 1975, when there are 3 in that category, to 8 by 1990. Conversely, the number of non-Bell companies displaying constant returns to scale has stayed static over time. Of the companies enjoying increasing returns to scale the number of Bell companies is smaller than that of the non-Bells. Compared to the non-Bells, in each year there are only a handful of Bell companies – 1 in 1975, 5 in 1981, 3 in 1990 – enjoying increasing returns. Conversely, in 1975, 13 non-Bell companies (or 93 percent of companies in that category for that year) display increasing returns. In 1990 the trend is only slightly different; 12 non-Bell companies (or 80 percent of companies in that category for that year) display increasing returns to scale.

The implications of the above results are that constant returns or decreasing returns to scale do not characterize the structure of the local exchange sector; rather, firms are smaller than their optimal size. Increasing returns to scale prevail. Yet, such returns prevail among the smaller, non-Bell companies which have yet to exploit all possible economies of scale. While Bell companies have not reaped the benefits of size in exploiting scale economies, as shown by the low number of Bell companies in the increasing returns to scale category, the divergence between optimal and actual size has reduced over time.

Recollect that some Bell operating companies are very substantial in size, each often considerably larger than the telephone operations of many small and wealthy, or even large and not-so-wealthy, nations. For example, Pacific Bell has operations throughout California while Southwestern Bell operates in Texas, Oklahoma, Mis-

Table II. Details of most productive scale size: Number of access lines (in 000s)

	Actual Number of Lines			Optimal Number of Lines		
Year	All companies	Baby bells	Non-baby bells	All companies	Baby bells	Non-baby bells
1975	3631.76	5670.95	1112.76	2104.81	2194.43	1944.10
1978	4085.47	6343.67	1295.94	2815.04	3094.79	2469.47
1981	4377.21	6772.90	1417.82	3212.27	3526.21	2824.46
1984	2766.74	4270.71	908.88	2944.06	3781.60	1910.65
1987	3033.03	4668.14	1013.18	3738.19	4010.49	3401.82
1990	3326.61	5123.19	1107.27	3298.01	3059.75	3592.32

souri, Kansas and Arizona. Among the 18 companies for 1975 which displayed decreasing returns to scale in 1975, 17 were Bell companies. For 1987 all companies to do so were Bell companies, and for 1990 10 of the 12 (or 89 percent) companies to do so were Bell companies. The implication is that Bell companies are still too big. They have transcended the scale of operations where they can exploit increasing returns, and they suffer from diseconomies of scale. Over time, however, the number of companies doing so has, nevertheless, dropped; from 17 Bell companies showing decreasing returns to scale in 1975 (or 81 percent of the Bell companies in our sample), the number in 1990 is 10 (or 48 percent of the total sample of Bell companies that we study); this further confirms the fact that transformation in activities characterizes Bell Companies in the post-divestiture period.

For each combination of inputs, given the firms in the sample, an optimal size for each input can be derived. Firms displaying increasing returns to scale are operating at less than their optimal size; firms displaying decreasing returns to scale are operating at a level greater than their optimal size. The number of access lines is the primary way to measure network size. Network management is a key critical capability which telephone operating companies use to deliver their products, and the network in place permits inter-connectivity between customers. Historically, the AT&T strategy was to have large operating company networks on the grounds that these large companies would exploit economies of scale in network management and provide the universal service needed. Details of the MPSS for access lines are given in Table II.

The data in Table II are expressed in thousands of lines; however, results are discussed taking millions of lines as the unit of analysis. The average optimal size for access lines for all the companies in the sample rises from 2.1 million in 1975 to 3.2 million in 1981; it rises somewhat more, to 3.7 million, in 1987, but drops to 3.3 million in 1990. An optimal network size is 3.3 million lines; this number of lines yields neither economies nor diseconomies of scale in network management. Until 1981 firms operated with diseconomies of scale in access lines. The actual

Table III. Trends in percentage of customer access lines digitized

	1983	1984	1985	1986	1987	1988	1989
All groups average	8.98	12.88	20.09	28.60	37.17	43.61	53.69
Baby bells average	0.51	2.16	7.67	14.94	22.80	29.00	36.76
Non-bells average	20.84	27.90	37.50	47.72	57.28	64.06	70.62

Source: Computed from Zanfei (1992: 236–237).

numbers were: 3.6 million for 1975; 4.1 million for 1978; and 4.4 million for 1981; these exceeded the optimal size, as Table II shows. Since 1984 there has been a movement towards optimality in possessing the scale efficient number of lines, and by 1990 both optimal and actual number of lines are 3.3 million.

The average optimal size for the Bell companies ranges between 2.2 million in 1975 and 4 million in 1987, rising consistently until then. But it drops to 3 million in 1990. The Bell companies have been operating at above their optimal size in all the years studied, as the data reveal. In 1975 the excess lines (actual lines minus the MPSS lines) were 3.5 million, but by 1990 the excess was down to 1.8 million. The non-Bell companies' average optimal size is lower than that of all companies taken together as a whole or of the Baby Bell companies for the years 1975 to 1987; it is higher than that of either, at 3.5 million lines, for 1990. The evidence suggests that these smaller companies still enjoy considerable scope in exploiting economies of scale in network operations. At the same time, their actual number of lines is always considerably less than optimal size for all years. There is a gap of 2.4 million lines for 1990; thus, non-Bell companies, which currently enjoy increasing returns to scale, can increase their network size by that number of lines before scale economies in network management disappear.

One key factor influencing optimum network utilization is the type of technology being used by telephone companies to energize the network. Modern switching developments have slashed the costs of network intelligence by enabling local exchange companies to move away from using transmission systems, the costs of building which are still at expensive levels of the part, unlike the costs of switching which have dropped significantly. For example, Flamm (1989) documents how the telephone plant induces for inside plant, central-office equipment and electronic switching systems rise and then fall, very rapidly indeed for electronic switching systems from the early 1980s to the mid 1980s. As a result of these developments, it is more economical to move the network nodes out towards the end-user and substitute switching equipment for transmission equipment. Such transfers lessen capital costs of the total network. Because of digitization, the ability of modern switching centers to handle greater volumes also rises, and adopters of modern technology will find themselves gaining increasing returns to scale (Huber, 1989). Data in Table III are relevant for the analysis.

The data are derived from Zanfei (1992). They show what percentages of customer access lines have been converted to digital technology, for seven years in the 1980s. The data are not coterminous with the data used for the present study; these data are commented on only for the purposes of displaying trends. For local operating companies as a whole, the percentage of digitalized lines goes from less than 10 percent in 1983 to over half the lines by 1989. However, the average percentages for the Baby Bells are less than one percent in 1983, rising to 37 percent in 1989. Conversely, the non-Bells have been very aggressive in technology upgradation. In 1983, 21 percent of lines were digitalized; by 1989 the percentage had risen to over 70, and for some individual company groupings where even higher. For example, the CENTEL and CONTEL Companies' access lines were ninety three percent and eighty percent digitalized respectively.

While the data on line digitalization are not reliable or compatible for the purpose of drawing strong inferences, those firms adopting greater quantities of digital technology do seem to benefit from increasing returns to scale. Non-Bell companies have adopted a greater number of digitalized access lines in the 1980s; as they have adopted these in greater quantity, more companies within that category start to enjoy increasing returns. For 1981 nine of these companies were in the increasing returns category. By 1987 this number had increased to 14. Concomitantly there has been an impact on optimal size, which has also increased. These results provide some evidence about the impact technological change in the industry might have on efficiency characteristics; nevertheless, it is reiterated that the impact of technical factors relative to managerial or other factors has not been separated out in this paper and the evidence is merely expository.

V. Conclusions and Implications

This paper examines whether the principal companies making up the local exchange sectors of the U.S. telecommunications industry display increasing, decreasing or constant returns to scale, whether the patterns of most efficient scale for resource inputs as displayed are changing over time, and whether different groups that make up the sector, the Bell and non-Bell companies, display differences in such patterns. This study specifically looks at the companies in the sector in a disaggregated manner; a contemporary period between 1975 to 1990 is covered in six time-slices: 1975, 1978, 1981, 1984, 1987 and 1990. During these time-periods a major natural experiment in industrial organization took place in the U.S. telecommunications industry. Major recent issues in policy-making devolve around whether local-exchange markets are competitive, whether local monopolies that exist should exist, and whether the evolving structure of the sector is such that more firms can be accommodated within it.

The returns to scale estimates and estimates of minimum efficient or optimal scale were computed using a non-parametric frontier production technique – data envelopment analysis. The results, that increasing returns to scale seem to be not absent, are broadly consistent with prior empirical work on scale economies in the telecommunications industry. The emerging evidence (Guldmann, 1990; Shin and Ying, 1992) suggests that the local exchange sector is not a natural monopoly. What the results in this paper instead highlight is a possible optimal structure for the sector. It is found that though increasing returns to scale prevail, the larger Bell companies do not enjoy them. Rather, Bell companies display either constant or decreasing returns to scale. Conversely, the non-Bell companies are currently at a scale of operations where they enjoy increasing returns to scale and can considerably enlarge their activities before diseconomies set in.

The results have the following policy implications. The production structure of the local exchange is such that several competitors of similar size can coexist, and the issue of what is the size of an appropriate local exchange monopoly is called into question. The Bell companies, which make up the largest component (in revenue terms) of the local exchange sector, include some very large, multi-state firms. Even among single-state operators (for example, Pacific Bell and New York Telephone among others) there are Baby Bell firms whose size puts them within the top 200 corporations in the United States. While these companies have been shown to be more technically efficient than the non-Bell companies (Majumdar, 1994), they are also very much bigger and do not enjoy scale efficiencies. Over the last eight years, since divestiture, some of the Bell operating companies have downsized rapidly. Yet, some of them can be broken up further.

The results indicate that efficiencies might be gained by restructuring the U.S. local exchange sector, since the institutionally determined operational boundaries of the dominant firms are smaller than their actual boundaries. Conversely, permitting non-dominant non-Bell companies to enter new territories might enable these companies to exploit the increasing returns to scale their production structure permits, before these economies too are exhausted. If some of these companies do not possess the necessary capabilities to enter new territories, opening up the market to other new entrants such as foreign firms or the long-distance operators which possess the requisite resources can ensure that production efficiencies available are enjoyed to the fullest.

Investment in switches by firms represents assets to provide services with; conversely, infrastructural assets can also be created by new entrants with new switches, given that optimal size is around 3 million lines and switching costs are dropping rapidly (Flamm, 1989). With network optimal size being at these levels, the changes in switching technology imply that a larger number of firms, which are of intermediate size and using fungible and modular switches, can create second tier networks in the local exchange sector. As long as interconnections among networks are made available, at appropriate prices, the implication of such a structural pattern is that several local-exchange service suppliers can enter the sector and competition among them will enhance welfare.

Traditionally, Baby Bells have been thought to be superior in efficiency patterns. Yet, they are burdened by history in that they operate in territories which are geographically diverse and large. However, given the evidence of a decline in their optimal size for access lines, the Bell companies might be able to divest some operations so as to concentrate on what might be their economically efficient core; conversely, they could create separate stand-alone operating companies, each operating in specific areas at a scale closer to the optimum size. Additionally, allowing local-exchange market entry by other firms which are of the requisite size can permit side-by-side competition, and this option may provide an efficient mode of production organization in the larger markets presently served by the Baby Bells.

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