

A Note on
Consumer Decisions to Choose
Measured Service Pricing

by

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Preliminary Draft

Comments would be appreciated

*Executive Director, Public Utility Research Center,
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of the author, not necessarily those of the sponsoring
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The present flat rate pricing structure for local telephone service distorts economic efficiency since once a consumer subscribes to telephone service, additional local calls are priced at zero, despite the fact that the cost is not zero. Many customers who make relatively few phone calls end up subsidizing the few who make substantial numbers of calls of long duration. A second distortion occurs when the monthly flat access charge results in fewer subscribers than would be the case under more economical measured service pricing alternatives. Even ignoring time-of-day and distance-of-call misallocations associated with flat rate pricing, the price signals received by potential customers are quite inefficient. One can only imagine what would happen to electricity consumption if everyone paid the same basic charge, regardless of the amount of consumption.

The movement to measured service pricing involves a number of issues, only one of which will be considered here: rates for experiments which can provide utilities and regulators with information on consumer behavior under measured service pricing. Examples will be based on the

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current measured options available in parts of South Florida. For simplicity, we will ignore distance and time-of-day issues, and assume each call is a standardize two minute call--costing 7¢ in the Miami-Metro area (40% of all calls were under 1 minute, and about 68% were under 3 minutes in duration).

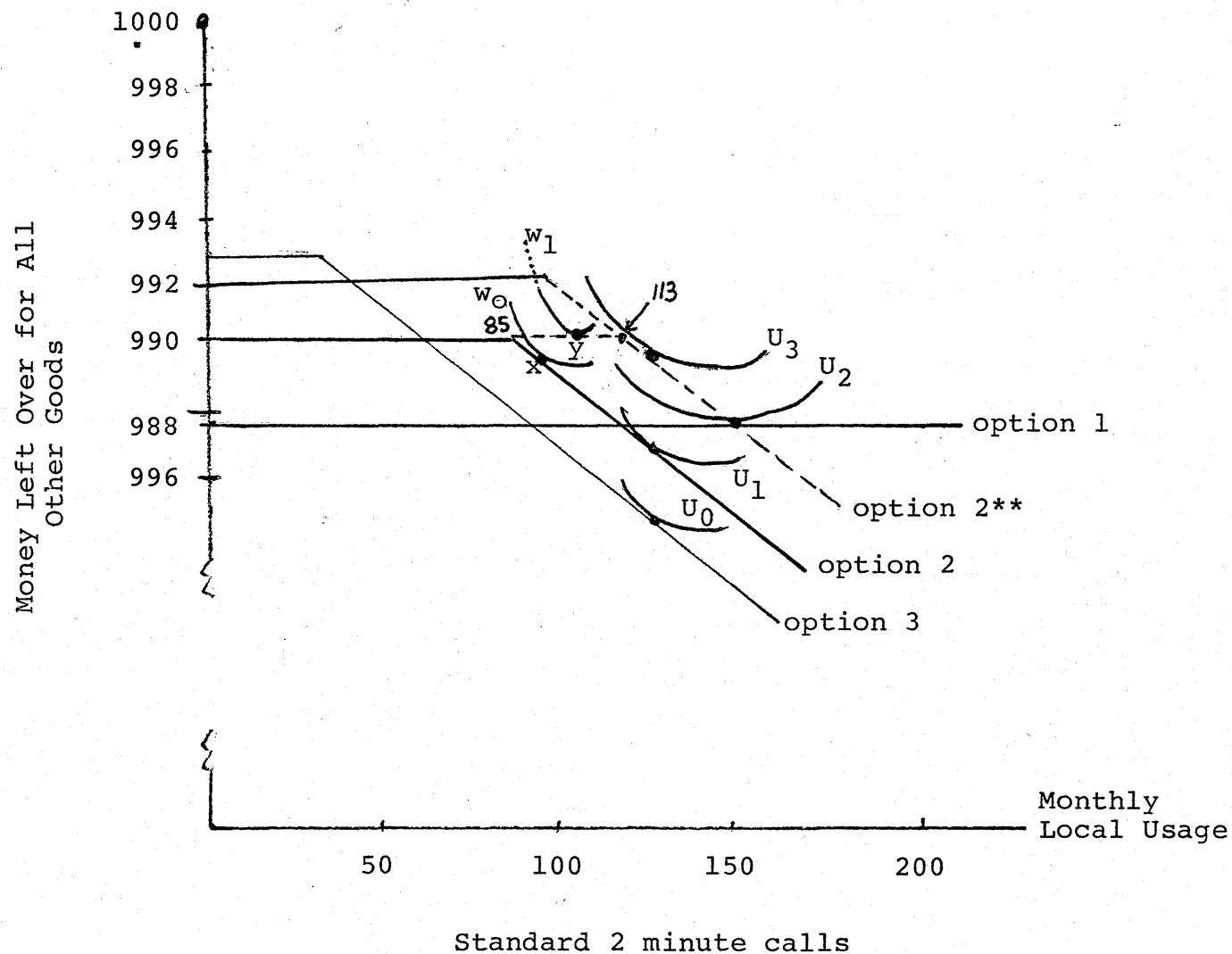
Consumer Choice

Figure A shows the consumer budget lines associated with the 3 basic options, Option 1: Unlimited Local Service - \$12.10 fixed fee; Option 2: Measured Service (up to \$5.95 in local calls free) - \$10.00 fixed fee; Option 3: Low Use Service (up to \$2.00 in local calls free) - \$7.25 fixed fee. In each measured service option, there is a maximum bill of \$15.13, which was presumably designed to reduce the risk to the consumer of accepting option 2 or 3, and then paying an enormous bill due to an exceptionally large number of "standard calls" (through several calls of very long duration, for example). From Figure A, option 1 dominates beyond 114 calls, option 2 between 68 and 114 calls, and option 3 is most inexpensive for customers with fewer than 68 calls. Note that one way to guarantee participation for an experimental group is to lower the maximum bill. If \$12.10 were the maximum charge, there would be no risk to choosing option 2 or 3. Then the behavioral data would be available to allow analysis of customer responsiveness

¹ Option 2** is discussed later in this note.

Figure A

Reducing the Fixed Charge Component
of Monthly Bills



to price and revenue impacts on the firm.

Two other ways to increase participation in sub-experiments are to reduce the fixed charge component of monthly bills and to provide a rebate on the monthly bill. Each technique has some advantages, with a reduction in the fixed charge perhaps being less expensive than a rebate as a way of expanding participation, although a rebate may be easier to understand.

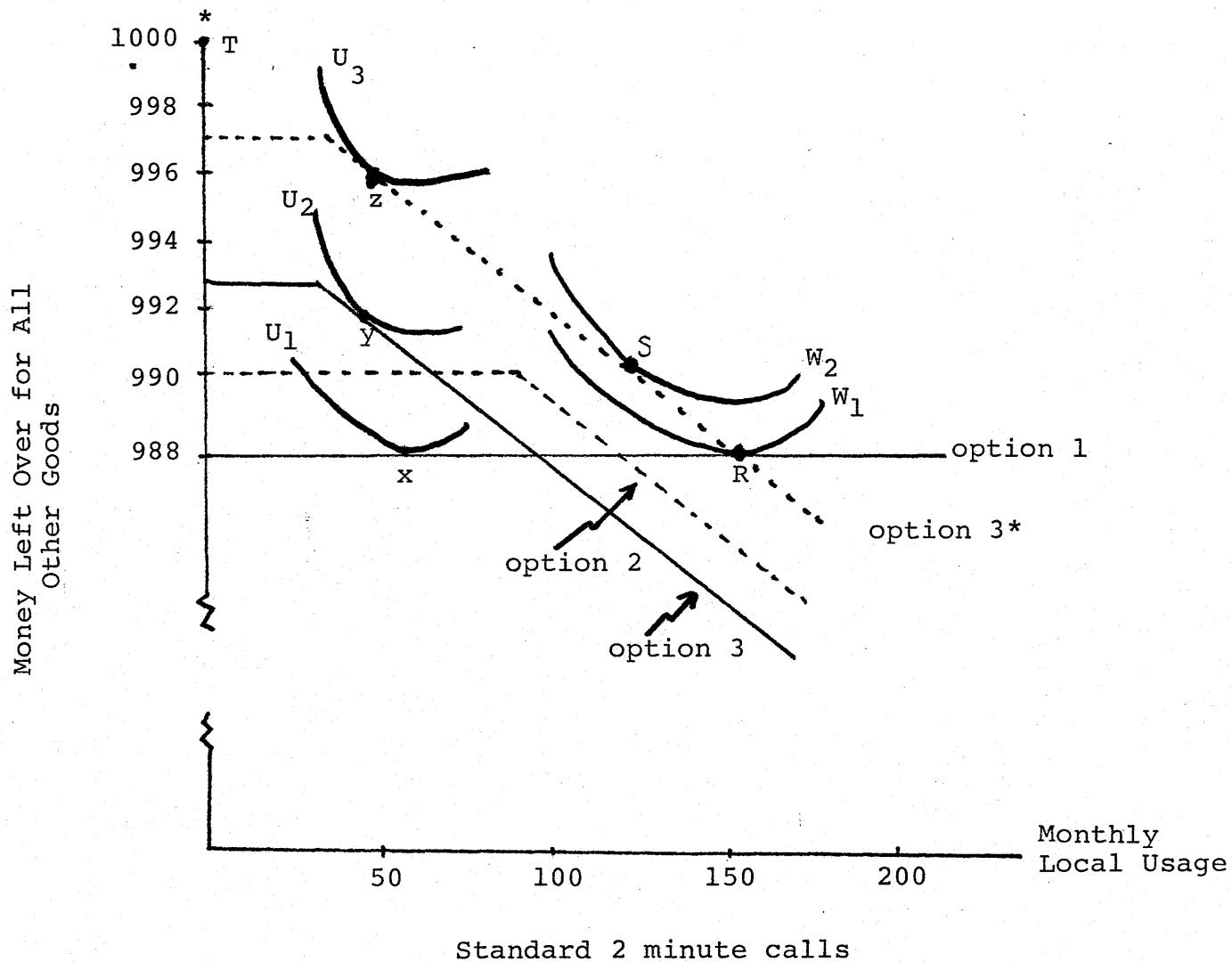
Economists view consumers as having well defined utility (benefit) functions involving telephone calls and money left over for all other goods.

Consider Figure A where the consumer's preference map includes U_0 , U_1 , U_2 , and U_3 . (Where the customer prefers U_3 to U_0 .) Here option 1 is preferred over the other current options, although option 2** would be preferred to option 1. The inclusion of an option which reduces the fixed charge component of monthly bills would expand participation. Note that this option can involve both income and substitution effects, as in a movement from X to Y for another customer with preferences W_0 and W_1 .

Figure B shows that at point T, the consumer does not subscribe to telephone service. However, with a preference map like U_1 , U_2 , U_3 , the customer would choose option 3 and achieve equilibrium at Y (Y is preferred to X). If option 3* were available (a \$4 monthly rebate accompanies the decision to participate in that option), the consumer

Figure B

A Rebate on Monthly Bills



still chooses that option, but goes to Z.

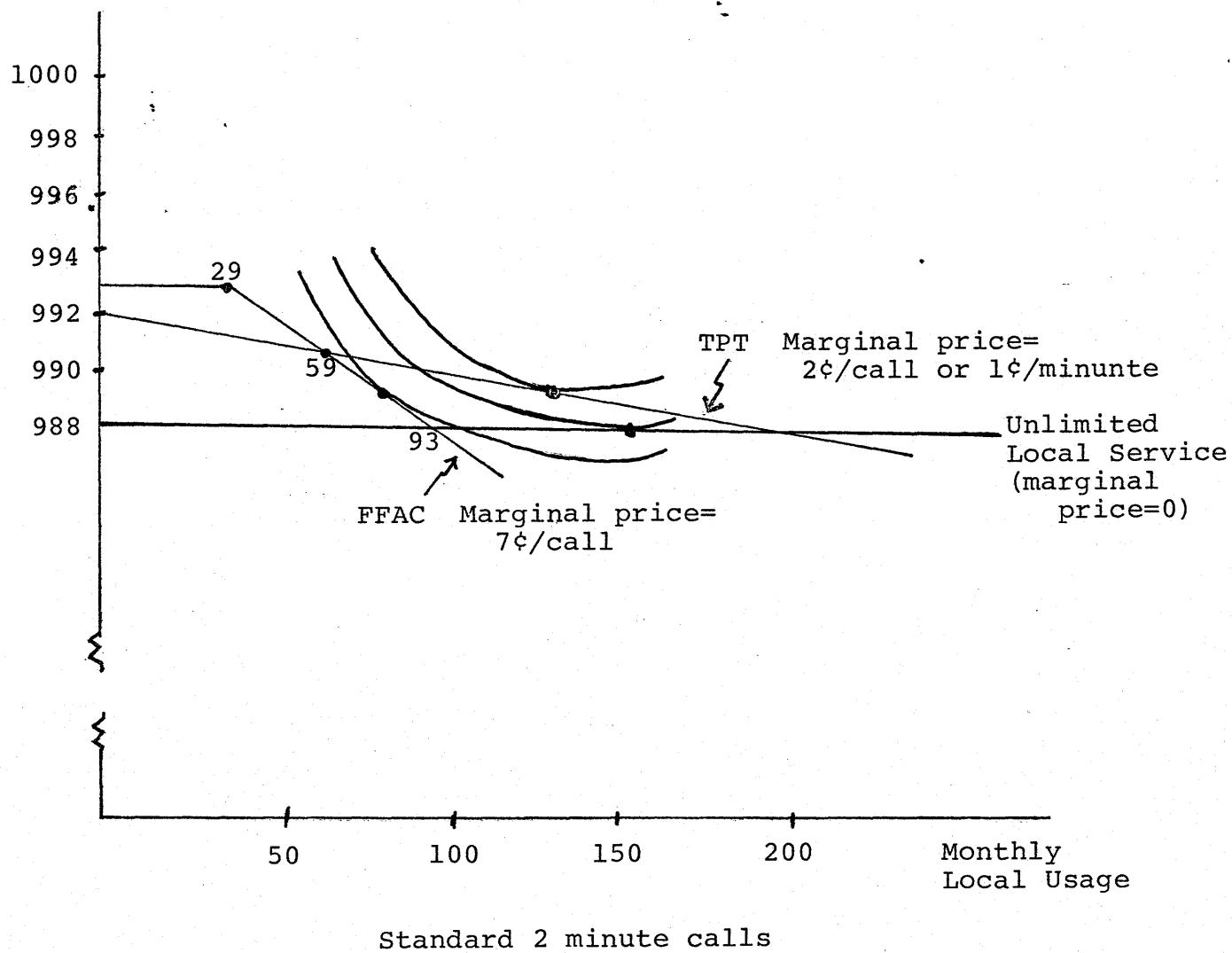
However, a subscriber with preferences like W, now prefers S to R (unlimited local service) and chooses to participate in the experiment. Option 3* attracts more participants than option 3. Only income effects are present here if the marginal utility of income is held constant--which simplifies the estimation of price elasticities.

Marginal Price Differentials and Customer Preferences

Information on consumer preferences can be obtained through experimental prices. Figure C shows two alternatives to unlimited local service. A low use option has 7¢ per call as its marginal price (with \$2.03 from the monthly fee applied to the first 29 calls FFAC). In the example, a two part tariff (TPT) dominates the FFAC option beyond 59 calls. This TPT involves \$8 as a fixed monthly fee for network access, and a 1¢ per minute charge. From the standpoint of experimental design, such marginal price differences would allow the econometrician to more efficiently estimate the marginal rate of substitution at different usage levels. The decision to choose measured service pricing is dependent upon how customers perceive the impact of the new price schedule on their perceived satisfaction (and indirectly on their bills). Thus, some alternative offerings to small groups of customers can assist the firm in evaluating the impacts of measured service pricing.

Figure C

Two Part Tariff vs Fixed Fee
Applied to Calls



TPT = Two Part Tariff \$8/month + 1¢/minute

FFAC = Fixed Fee Applied to Calls

\$7.50 fixed fee (\$2.03 applied to first 29 calls)
+ 7¢/(2 minute call)

Revenue Stability with Income Changes

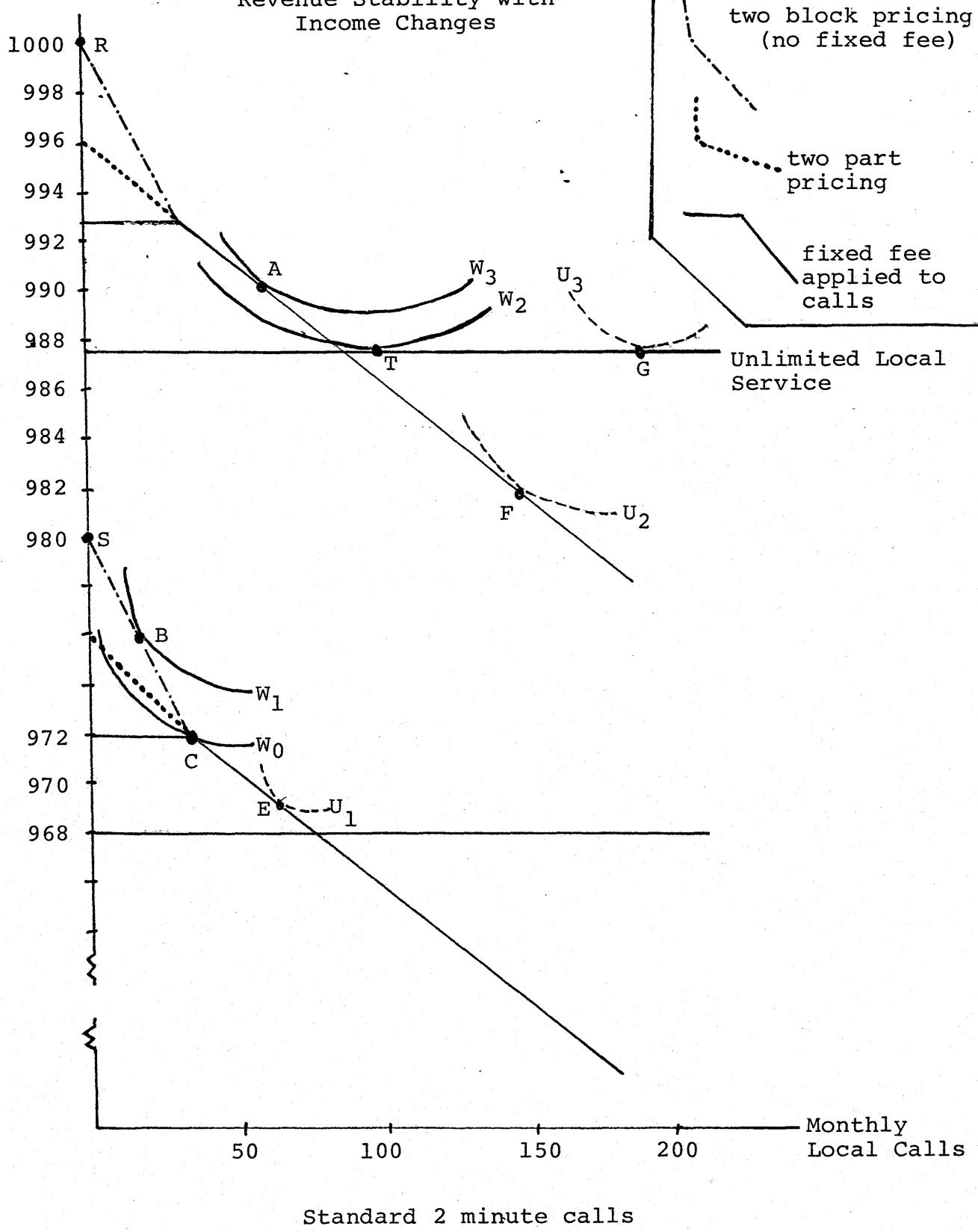
This section considers how income changes affect total expenditures on local telephone service. In the same vein, the decision to choose a measured service option rather than unlimited local service pricing will be influenced by how income levels interact with preferences. Thus, the foregoing analysis can be viewed as a comparative statics framework which illustrates consumer preference for particular pricing structures at various income levels.

So far, we have assumed a zero income effect, so the price changes only involved substitution effects unless corner solutions are obtained. The assumption is not unreasonable for the dollar amounts associated with the different price structures. However, for shifts in consumer demand due to income changes, one would need to take income effects into account explicitly. Here, we also investigate the responsiveness of the telephone company's revenues to a drop in the budget, a two percent decrease from R to S in Figure D.

Four alternative budget lines are shown for a customer initially having \$1,000 per month to spend. Two block pricing charges different prices for different blocks of consumption--but no fixed fee is charged. In the example, the price is 25¢ per call up to 29 calls, and 7¢ per call after that. If 29 calls are made, the bill is \$7.54. Turning to the next pricing scheme, under the two part pricing example, a fixed fee of \$5.47 per

Figure D

Revenue Stability with
Income Changes



Budget Drop of \$20

month is charged. Each call costs 7¢--so that 29 calls will cost \$7.50. A portion of the fixed fee is applied to local calls in the third alternative. This option was chosen for the Florida experiments to provide information on customer behavior compared with unlimited local service for a fixed fee of \$12.10.

The sample preferences ($w_0 \dots w_3$) are for a consumer who would prefer option 3 (a fixed fee of \$7.25, \$2.00 of which is applied to local calls) over unlimited local service. Point A is preferred to T or R, so the consumer chooses to participate in the experiment. The firm would obtain more revenue from the customer under unlimited service. The consumer at A would be indifferent to whether two block pricing, two part pricing, or fixed fee applied to calls were presented as the alternative to unlimited local service. The three alternatives have different implications for revenues from the firm if income changes, however. A two percent budget drop of twenty dollars would send the customer to either C or B, depending on which alternative was available. There is only a two dollar revenue loss if the fixed fee applied to calls schedule is in use, but there would be an eight dollar revenue loss if a two block pricing scheme were available.

Note that a consumer with preferences like U_1, U_2, U_3 would choose unlimited local service at the initial budget level (G is preferred to F). At the lower level, the customer would choose any of the measured service

options. The analysis of participation across customers would yield long run income elasticity information.

If the unlimited service option were unavailable (or cost \$20 instead of \$12.10) the U consumer would initially be at F. The reduction in income would cause a large drop in the consumer's expenditures on telephone service (from eighteen to thirteen dollars). Revenue volatility increases for such customers. However, decreases in income will cause the firm's revenues from small users to decline less under the system in which a fixed fee applied to calls than a two block scheme. Thus, any usage sensitive price scheme will increase the volatility of firm revenues if calls are income sensitive. Note that the volatility is two-way. An income increase causes a shift from E to F for the U preference mapping. However, on the up-side, the two block pricing scheme would cause a greater increase in revenues than the fixed fee scheme.

Conclusion

From the standpoint of the firm, empirical studies of the composition of customers and the price and income elasticities of demand are extremely important for management to evaluate the impact of alternative pricing schemes. Clearly, the movement toward measured service pricing has many financial impacts on the telephone company. There may even be trade-offs between pricing schemes that affect revenue volatility and customer welfare.⁴

⁴ For example, Leland and Meyer showed that two block is preferred to two part from the standpoint of optimality.

Or, one schedule may dominate the others, given the mix of customers and likely economic developments. These questions cannot be answered until experiments are conducted and data gathered on consumer behavior.

Without a dual billing system, to provide the kind of information to customers necessary for them to make rational choices, customers will be less likely to experiment with LMS. They will be unsure as to its impact upon their bill. Of course once they voluntarily accept LMS, many will be very satisfied with lower bill, and the resulting modifications in calling patterns will give the company valuable information. Thus, the ideas presented are intended to suggest ways to expand the number of people who will choose LMS in experimental samples--so firms and regulators will gain information on the benefits and costs of local measured service pricing.⁴

⁴ The Bibliography contains a partial listing of recent articles on measured service pricing. Additional issues relating to the public good aspects of telephone systems, call externalities and subscriber externalities, and peaking characteristics of calls are also discussed in these articles.

Telephone Pricing

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