



A study of the negotiated-settlement practice in regulation: Some evidence from Florida



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ARTICLE INFO

Article history:

Received 24 September 2013
Received in revised form
8 December 2014
Accepted 8 December 2014
Available online

JEL classifications:

L51 Economics of Regulation
L97 Utilities: General
L94 Electric Utilities
L95 Gas Utilities
Pipelines
Water Utilities
L96 Telecommunications

Keywords:

Negotiated settlement
Rate-of-return regulation
Stipulation

ABSTRACT

Negotiated settlements have become a frequently used alternative to contested proceedings when setting prices charged by public utilities under the US rate-of-return regulatory model. The behavior of the representatives of consumer advocates and the firms during settlement negotiations determine customer prices. This paper examines this behavior by using data from the Florida Public Service Commission to estimate the payoff functions of both parties. The estimation suggests that the advocate and the firm weight the present rate change more than the consumer's future average price and the firm's future operating revenue in their settlement decisions. It also indicates that the time saved by settlements is not a primary reason for their popularity.

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1. Introduction

Traditionally, the prices that consumers in the US and Canada pay for essential services such as electricity have been determined under rate-of-return (ROR) regulation, including formal contested proceedings. Under ROR regulation, the public utility commission considers testimony by interested parties, including the regulated utility and consumer representatives. The commission then sets prices to generate revenue for the utility sufficient to cover its prudently incurred costs and provide a fair rate of return on its rate base.¹

Abbreviations: FERC, Federal Energy Regulatory Commission; FPSC, Florida Public Service Commission; MMFR, modified minimum filing requirements; NEB, National Energy Board; ACCC, Australian Competition and Consumer Commission; OPC, Office of the Public Counsel; ROE, return on equity; ROR, rate of return; TECO, Tampa Electric Company.

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¹ The rate base is the book value of the firm's capital investment less depreciation.

Alternative dispute resolution such as negotiated settlement (including stipulation) has become a popular approach within ROR regulation over the past 25 years. Under the negotiated settlement process, the firm, the consumer representative, and other involved parties negotiate terms with regard to consumer rates and other items outside of formal regulatory hearings. Other items might include depreciation and amortization practices, funding of reserve accounts, and revenue-sharing plans as well as future actions of the parties. The parties submit the settlement to the regulator for approval. If the settlement is approved, no formal hearing takes place and terms of the agreement are upheld. Littlechild (2009a) reports that the Florida Public Service Commission (FPSC),² the regulatory commission whose rate cases we analyze in this paper, "almost invariably adopted" (Littlechild, 2009a, p. 103) all settlements put to it. Between the years 1976–2002, only one settlement was overturned. This settlement was approved in 1989 after one item that the FPSC opposed was removed from the agreement.

² The FPSC is the regulatory commission in Florida that regulates telephone, electric, natural gas, water and wastewater companies.

In spite of its prevalence in practice, negotiated settlement has not received much careful study.³ Earlier studies include [Burns \(1988\)](#) that discusses negotiated settlements at state and federal utility commissions. [Burns \(1988\)](#) views the negotiated settlement as a “procedural streamlining technique” which is a procedure to expedite the decision-making process but not to necessarily substantively change the decision by the regulator that would have resulted if the case had not been settled by the parties. Negotiated settlements have been seen as a less costly and less time-consuming way to reach the same outcomes that traditional proceedings provide. Recent research, however, argues that this is not the main reason for settlements. [Wang \(2004\)](#) and [Littlechild \(2012\)](#) studied settled rate cases of major interstate gas pipeline at the Federal Energy Regulatory Commission (FERC). [Littlechild \(2009a, 2009b\)](#) examined negotiated settlements for rate cases of telecommunications, electric and gas companies at the FPSC. [Doucet and Littlechild \(2009\)](#) document the development of the negotiated-settlement practice in toll cases of large pipeline companies before the Canadian National Energy Board (NEB). [Bordignon and Littlechild \(2012\)](#) examined a negotiated access undertaking approved by the Australian Competition and Consumer Commission (ACCC). These studies find that reduction of costs and saving time, one of the purported reasons for choosing settlements over traditional proceedings,⁴ are not the driving motivation behind these types of agreements. The consensus of these papers is that the parties can reach “more innovative and creative solutions” ([Littlechild, 2009b](#), p. 276) with settlement than the regulator can secure by other means. That is, the settlement process offers outcomes beneficial to all parties that are not available under traditional proceedings. The authors suggest these outcomes arise because: (i) the regulator cannot legally prescribe such solutions or is unwilling to do so because these outcomes may represent departures from the regulatory policy; or (ii) the parties can fashion better agreements than can any regulatory ruling because the parties know their own preferences better than the regulator.

This paper investigates the circumstances under which consumer advocates and company representatives will settle a rate case. In the US, consumer advocacy emerged in the 1970s at a time when utility rates were increasing. The purpose was to give more representation to consumers in the formulation of regulatory policies and decisions. It is the duty of the consumer advocate to represent the interests of utility consumers (typically but not exclusively residential consumers) in rate cases. One of the objectives this responsibility involves is trying to secure the lowest rates that customers must pay for utility services. Similarly, the firm's representatives will try to obtain opportunities to enhance profits (or returns) for shareholders. An additional motivation of all parties is the appearance of good job performance. According to [Littlechild \(2009a, p.104\)](#), the consumer advocate and firm “are likely to be interested not only in furthering the interests of their principals (consumers and shareholders), but also being seen to do so.” The immediate reported rate change typically is the most clearly understood characteristic of a regulatory decision or negotiated settlement. Consequently, a rate reduction can serve as an observable signal for good job performance by the consumer advocate. The advocate might negotiate more immediate rate decreases in settlements than is possible under a traditional proceeding in

exchange for other benefits to the utility. Mr. Jack Shreve, the longest-serving head of Florida's primary consumer advocacy agency, Office of Public Counsel, went on to be appointed by the Governor as Special Counsel for Consumer Affairs to the Florida Attorney General in 2003. A press release from the Florida Attorney General's Office announcing Mr. Shreve's appointment identified his negotiated settlements with Progress Energy Florida, Florida Power and Light, and BellSouth that secured large rate reductions for consumers as his primary accomplishments as Public Counsel.⁵ The firm can similarly claim a rate increase reached by settlement as beneficial to shareholders in terms of profit potential.

Settlements and stipulations between the parties can also benefit the firm in other ways.⁶ One common stipulation that [Wang \(2004\)](#) and [Littlechild \(2009b\)](#) discuss is the agreement by advocates and customers to not seek to initiate a rate or earnings investigation for an extended time period. This can be advantageous to firms because it allows them to retain any earnings in excess of those authorized during the specific period. The regulator cannot bar parties from filing a petition or complaint. [Littlechild \(2009b\)](#) discusses two stipulated items common at the FPSC that benefit the firm and represent departures from usual commission policy. One item grants a more flexible depreciation and amortization policy than the commission would otherwise allow. Flexibility with regard to depreciation enables the firm to adjust expenses relative to revenues and earnings.⁷ The second stipulation concerns incentive regulation, which allows firms to earn returns above the cost of capital. [Littlechild \(2009b\)](#) reports that for some settlements, the FPSC staff estimated that the firm incentive regulation would result in higher earnings than traditional regulation.

Florida's Office of the Public Counsel (OPC) represents all utility consumers in the state (residential, commercial, and industrial) and is accountable only to the people of Florida through the Florida legislature.⁸ Following [Littlechild \(2009a\)](#), FPSC rate cases can be classified into three types. The first two types were earnings-review cases and company-request cases. An earnings-review case is initiated by the regulator, sometimes at the request of the consumer advocate, in the belief that the firm has earned above its authorized level such that a rate reduction might be in order. A company-request case is initiated by the utility when it believes a rate increase is necessary. All other types (such as periodic reviews of returns on equity (ROE), Modified Minimum Filing Requirements (MMFRs), and tax savings affecting the utility's allowed revenues) were grouped together in a third category. This last type involves small rate changes, typically a reduction. The behavior of the Public Counsel and public utility representatives during settlement negotiations for these three types of cases (subject to regulatory approval) determines the

³ See [Doucet and Littlechild \(2006\)](#) for a survey of economic and legal literature on negotiated settlements.

⁴ These are given as the main motivations in the law and economics literature that make a defendant and plaintiff come to a settlement before a trial ([Cooter and Rubinfeld, 1989](#)).

⁵ An excerpt from this news release from the Florida Office of the Attorney General on September 24, 2003 states: “Among Shreve's many accomplishments is an agreement in 2002 with Florida Power, now Progress Energy Florida, that cut electric rates by \$125 million per year. In 2003, he worked with the Attorney General's Office to enforce a refund that could total up to \$60 million, which was part of the 2002 agreement. He brokered an agreement with Florida Power and Light that is presently providing rate cuts of more than \$600 million per year. He negotiated a 1994 agreement with Southern Bell, now BellSouth, that reduced consumers' rates by \$300 million per year.”

⁶ For a detailed discussion of these firm benefits and other issues discussed here, see [Chakravorty \(2012\)](#).

⁷ [Littlechild \(2009b, footnote 33 p.283\)](#) reports that the FPSC staff voiced a concern that the “the design of depreciation rates, and the resultant rate base, will no longer reflect the matching principle [matching capital recovery with consumption over an asset's service life], but rather, the degree of variability in the company's revenue.”

⁸ The Public Counsel in Florida is appointed and re-appointed every year by the Joint Committee of Public Counsel Oversight, a state Congress committee.

prices that utility customers in Florida must pay. The main contribution of this paper is that it is the first to the author's knowledge that analyzes this behavior with formal empirical techniques. Using data from the FPSC, the paper estimates the payoff functions of the consumer advocate and firm during a rate case. Because the expected payoffs of the advocate and firm are unobservable at the time of settlement and regulatory decision, a bivariate probit model with partial observability to estimate the two functions is used. This estimation reveals how advocates value present rate changes and the expected future average price paid by the consumer in their settlement decision. Similarly, the analysis considers whether the reported rate change or the expected future profitability that the rate change implies is more important in the firm's decision to settle. This furthers our understanding of how parties to rate cases behave. The research also examines whether saving time in the form of calendar days is a main reason of settling rate cases as claimed by some settlement participants⁹ but generally discounted by researchers.

The analysis proceeds as follows. Section 2 formulates the empirical model, Section 3 discusses the data, Section 4 presents the empirical results, and Section 5 offers conclusions.

2. Empirical model

In order to identify the primary determinants of the settlement decisions of the consumer advocate and firm, it is useful to model the preferences of these parties. Equations (1) and (2) specify the payoff functions of the consumer advocate and firm, respectively:

$$U_{consumer} = \alpha_0 + \alpha_1 revchange + \alpha_2 avgprice + \alpha_3 exdur + \alpha_4 adv + \alpha_5 tele - \varepsilon_1 \quad (1)$$

$$U_{utility} = \beta_0 + \beta_1 revchange + \beta_2 oprev + \beta_3 exdur + \beta_4 tele - \varepsilon_2. \quad (2)$$

We estimate Equations (1) and (2) using rate case data from the FPSC. Each observation reflects a rate case docket, an official summary of proceedings of the rate case before the FPSC.

In (1), $U_{consumer}$ denotes the consumer advocate's utility at the time of settlement (or, if no settlement is reached, expected utility after a regulatory determination by the commission), $revchange$ is the reported change in the firm's allowed annual revenues decided either by settlement or the regulator, $avgprice$ is a measure of the average price that the advocate expects the consumers will pay in the future after settlement or a regulatory determination, $exdur$ is the expected duration of the rate case if it goes to a regulatory proceeding, and adv is a dummy variable that equals one if the longest-tenured¹⁰ Public Counsel of Florida, Mr. Jack Shreve, was in

office when the order prescribing the final rates of the rate case was issued. In addition, $tele$ is a dummy variable that equals 1 when the rate case is of a telephone company and ε_1 captures the effect of unobserved variables in (1). We discuss these variables in detail below.

As noted above, the reported rate change is the most visible signal of the consumer advocate's job performance. The variable $revchange$ in (1) represents this preference of the consumer advocate. This variable is the total rate revenue change (that is, the total change in allowed rate revenues) that occurs in a rate case. It is measured in 1/100,000th of a dollar.¹¹ Rate revenue reductions are negative and rate revenue increases are positive. If there is no rate revenue change, then $revchange$ is equal to 0. In some cases, the regulator ordered a one-time rate refund. Because the average time for which rates were effective in the sample was 2.27 years, these one-time refunds were divided by 2.27 and aggregated with the permanent rate changes.¹² Since a rate revenue reduction is perceived as good both for the consumer advocate and the consumer, the expected sign of α_1 is negative.

At the time $U_{consumer}$ is determined, the impact of firm benefits on future consumer prices are not known with certainty. However, the advocate will have an expectation about future consumer prices. Because this expectation is unobservable, the paper uses the actual future average price paid by consumers, $avgprice$, as a proxy of this expectation at the time of settlement. The variable $avgprice$ in (1) is intended to capture the overall effect on the future average price paid by customers caused by settlement or regulatory determination by including any effect of the firm benefits found in the settlements as well as the effect of the total rate change. This variable is the operating revenue of the firm divided by the number of customers^{13 14 15} reported between 11 and 23 months after the rate change agreed by settlement or ordered by the regulator has been implemented. We understand that this variable is a crude measure of the average price faced by customers because it combines residential, commercial, and industrial customers, the mix of which will vary by utility (that is, in some cases a single customer could account for a substantial proportion of sales revenue). In fact, it can appropriately be described as indicator of the influence of large-volume use on revenues. Also, a change in $avgprice$ may reflect a change in the number of customers rather than a rate saving for customers based on a settlement. The variable is used here as a proxy for future impacts of current settlements on current customers.¹⁶

¹¹ All money amounts were measured in 2010 dollars.

¹² A similar approach is employed by Littlechild (2009a).

¹³ The operating revenue used in the calculation of $avgprice$ is the total operating revenue secured from residential, commercial and industrial customers. The number of customers is the total number of residential, commercial and industrial customers. An aggregate measure is used because it is the duty of the consumer advocate in Florida to represent all the utility consumers of Florida including residential, commercial, and industrial customers.

¹⁴ The number used to divide the operating revenue was the number of customers at the time the operating revenue of the company was reported. In some years, this was unavailable for electric and gas companies. In its place, the monthly average number of customers was used for the year the operating revenue was reported from the company's annual report.

¹⁵ For telephone companies, number of customers was unavailable. Instead the number of the company's main stations or trunks or the number of the company's access lines was used as a proxy. From 1975 to 1984, the FPSC Annual Reports reported both the number of customers and the number of access lines (or alternatively, number of main stations and trunks) for each regulated telephone company in Florida. The ratio of number of customers to number of access lines was 1.00093 and the standard deviation was 0.0652 for these years.

¹⁶ Although this indicator seemed potentially useful as a control, the sign of the coefficient was not significant in the final analysis.

⁹ For example, from the negotiated settlement signed by OPC and the Gulf Power Company (Order PSC-99-2131-S-EI, p. 9): "This Stipulation and Settlement avoids time, expense and uncertainty associated with adversarial litigation in keeping with the Florida Public Service Commission's long-standing policy and practice of encouraging parties in contested proceedings to settle issues whenever possible." Also, from the negotiated settlement signed by the OPC and the Tampa Electric Company (TECO) in 2000 (Order PSC-00-1441-AS-EI, p. 9): "The Parties acknowledge this Settlement Agreement is being entered into for purposes of settlement only and that the Parties are entering into this Settlement Agreement to avoid the expense and length of further legal proceedings and the uncertainty and risk inherent in any litigation."

¹⁰ Mr. Shreve was in office from 24 April 1978 to 30 June 2003 (a little over 25 years). He was also the Public Counsel when the regulatory order prescribing final rates for most of the rate cases analyzed in this paper (181 out of a total of 197 cases) was issued. The next longest tenure of a Public Counsel (excluding the current Public Counsel) was 3 years and 3 months.

The reason for measuring *avgprice* after at least 11 months is that the rate change specified in a rate order is a change in the firm's allowed annual revenue for a given 12-month period or "test year," and the firm's operating revenue and number of customers are reported at the end of the fiscal or calendar year (normally ending in December). For example, suppose that the ordered rates of a rate case become effective on February 1 and the firm's operating statistics are reported on December 31. In this case, we would calculate *avgprice* using the operating revenue and number of customers recorded for the year the new rates were implemented.¹⁷ However, if instead the ordered rates become effective in June, then the variable *avgprice*, if calculated with the firm's operating revenue and number of customers for the year the new rates are implemented, will capture the effect of the rate change in customer bills for only six months. Consequently, in order to capture the entire annual effect of the rate change on customer prices, we would calculate *avgprice* with the firm's reported operating revenue and number of customer for the following year.¹⁸ Another reason for calculating *avgprice* in this way is that the future effects of the stipulated firm benefits may not take effect immediately after the rates have been implemented. The variable *avgprice* measures the average amount the consumer pays for at least the entire year after the new rates have become effective. This allows the time for some of the stipulated firm benefits to be manifested in the form of higher consumer prices.¹⁹ The variable *avgprice* is also measured in 1/100,000th of a dollar. The consumer advocate would generally prefer a lower *avgprice*. Therefore, the sign of α_2 is expected to be negative.

The variable *exdur* is included in Equation (1) to test the speculation that saving time is one of the primary reasons to settle. This variable was used as an indicator for the duration in calendar days that the parties expected the rate case to last if there was a formal regulatory hearing. As mentioned, the rate cases were divided into three types of cases following Littlechild (2009a): earnings-review cases, company-request cases, and all other cases having an impact on the firm's allowed revenues. Within each type, the duration was calculated only for those cases that were not settled and instead decided by the regulator. The duration is the number of days between a beginning date that was the earliest date in the docket index listing²⁰ and the date of the regulatory order approving the earliest final rates.^{21 22} The average duration for a regulated case was calculated for each type and was used as the *exdur* variable. Because parties generally are

expected to prefer shorter rate cases, α_3 should have a negative sign.²³

The variable *adv* is meant to capture any difference associated with the tenure of the longest-serving Public Counsel and the other consumer advocates. This dummy variable in (1) equals 1 if Mr. Shreve was in office when the regulatory order establishing final rates was given. We also add the dummy variable *tele* that equals 1 when the rate case concerns a telephone company. The Division of Telecommunications at the FPSC is responsible for providing recommendations to the FPSC in this area. This is separate from the Division of Electric and Gas that is tasked with the same function for those areas. The variable *tele* is included to take account of the fact that separate divisions may cause the advocate to have different expectations about regulatory decisions in rate cases. For both the coefficients of these variables, no directional sign is hypothesized.

In (2), $U_{utility}$ is the future profit that the firm expects to earn during the period when settled or regulatory determined rates are in place at the time of settlement or decision. According to Littlechild (2009a), the firm may also use *revchange* as a signal. To test these preferences, *revchange* is added to Equation (2) separately. A firm may actually prefer a rate reduction because the reduction appears to be "customer-friendly," especially if it is by agreement. However, an increase in rates could signal increased future profitability to shareholders. Therefore, the sign on β_1 is ambiguous.

The firm decides whether to settle by comparing expected profitability from negotiated settlement to that set by regulation. What matters in the firm's estimation of profits is its expected future operating revenue. Again, because this expectation of the firm is unobservable, we use the firm's actual operating revenue for the period after the settlement takes effect, *oprev*, as a proxy for the firm's expected future operating revenue at the time of settlement. The variable *oprev* is the operating revenue of the firm reported between 11 months²⁴ and 23 months²⁵ after the ordered rates have been implemented. Total operating revenue is used instead of the reported net operating income because there is a chance that the some of the stipulated items (such as depreciation policies and revenue-sharing plans) would increase expenses and thus reduce net income. The reason for using the firm's operating revenue recorded between 11 and 23 months after the new rates have become effective is the same reason for calculating *avgprice* with the operating revenue and number of customers reported for the same period. That is, the total rate change will be added to the company's net operating income one year after the rates become effective, and we want to account for the entire overall annual effect of settlement or regulatory determination on the firm's operating revenue. The variable *oprev* is measured in 1/100,000th of a dollar like *revchange* and *avgprice*. Because the firm's expected profit should increase with an increase in its expected operating revenue, β_2 should be positive.

The variable *exdur* is included in (2) to see whether saving time is an important factor in the firm's settlement decision. We expect β_3 to have a negative sign because the firm prefers a shorter process to a longer one.

¹⁷ Eleven months was chosen instead of one year because many of the rate changes were implemented on the first day of the year. For example, if the operating revenue and number of customers were reported on December 31 and the rates specified in the final order became effective on January 1 (as is often the case) we would calculate *avgprice* with the operating revenue and number of customers for the year the rates became effective. If the rates became effective in March then we would calculate *avgprice* with the operating revenue and number of customers recorded in the following year.

¹⁸ That means in our example, if the operating statistics are reported on December 31 of the following year, *avgprice* is calculated with the operating revenue and number of customers reported eighteen months after the new rates have been implemented.

¹⁹ We do not calculate *avgprice* after 23 months because there is a possibility of the implementation of new rates and stipulations of the next rate case, and we try to isolate the effect of the outcome of one rate case as much as is possible (the average time for which rates were effective in the sample was 2.27 years).

²⁰ Most often this date was when the docket was requested to be established by one of the parties. The date was usually earlier than the date the docket was actually opened.

²¹ Sometimes in a docket there was more than one regulatory order implementing final rates. Much of the time, the orders that came after were just upholding or extending the items of the first one.

²² Regulatory orders which implemented interim rates were not considered.

²³ It may be the case that a party may want to prolong a rate case if it expects an undesirable decision from the regulator. For example, a firm might want a rate case to last as long as possible if it expects a rate reduction. To test for this possibility, the model was estimated with an interaction term of *exdur* and *rate* in both the payoff functions of the advocate and firm. This term was found to be statistically insignificant in both functions.

²⁴ The reasons for choosing 11 months instead of 1 year are the same as in the construction of *avgprice* (see footnote 17).

²⁵ It is reported in the same way as the operating revenue and number of customers were obtained to calculate *avgprice*.

The variable *tele* in (2) is a control for any possible differences in the firm's expectations based on whether it is a telephone company rate case as compared to an electric or a natural gas company rate case. This is the same dummy variable used for advocate expectations. As in the case of the consumer advocate's payoff function (1), we do not hypothesize the sign of the coefficient of *tele* beforehand. The effect of unobserved variables in (2) is captured by ε_2 .

In the dataset we use to estimate Equations (1) and (2), each observation reflects a docket. The variables $U_{consumer}$ and $U_{utility}$ cannot be directly observed. We can, however, observe whether the rate case ended in a negotiated settlement. A settlement occurs only when both parties expect to gain more from the settlement outcome than from regulation. If we construct the variable d , which equals 1 if a rate case is settled and 0 if the case is regulated, we have:

$$\begin{aligned} d &= 1 \text{ if } U_{consumer} > 0 \text{ and } U_{utility} > 0 \\ d &= 0 \text{ otherwise.} \end{aligned} \quad (3)$$

The model specified by expressions (1), (2) and (3) can be estimated as a bivariate probit model with partial observability as described by Poirier (1980).²⁶

Assuming $(\varepsilon_1, \varepsilon_2)$ have a bivariate normal distribution, the model specified by (1), (2) and (3) can be estimated using the likelihood function:

$$L = \prod_{d=1} F(\mathbf{Z}_1\alpha, \mathbf{Z}_2\beta, \rho) \prod_{d=0} [1 - F(\mathbf{Z}_1\alpha, \mathbf{Z}_2\beta, \rho)]. \quad (4)$$

In (4), we have:

$$\begin{aligned} \mathbf{Z}_1\alpha &= \alpha_0 + \alpha_1 revchange + \alpha_2 avgprice + \alpha_3 exdur + \alpha_4 adv \\ &\quad + \alpha_5 tele, \end{aligned} \quad (5)$$

$$\mathbf{Z}_2\beta = \beta_0 + \beta_1 revchange + \beta_2 oprev + \beta_3 exdur + \beta_4 tele, \quad (6)$$

$$\begin{aligned} Cov(\varepsilon_1, \varepsilon_2) &= \rho \text{ and } Prob(U_{consumer} > 0, U_{utility} > 0) \\ &= F(\mathbf{Z}_1\alpha, \mathbf{Z}_2\beta, \rho). \end{aligned}$$

Identification of this model requires that at least one independent variable present in one of the payoff functions is absent in the other. This criterion is satisfied, as can be seen from (1) and (2).

Because *revchange* is the actual total change in rate revenues that occurs in a rate case, it may be endogenous in Equations (1) and (2). This is because the rate change may be determined by the parties simultaneously with the decision to settle. If this is the case, then *revchange* will be correlated to ε_1 and ε_2 . To address this problem, we follow the procedure formulated by Rivers and Vuong (1988) for endogenous independent variables in simultaneous probit models. This involves running an OLS regression of *revchange* on all of the independent variables and instrumental variables. We then save the residuals from this regression and estimate the bivariate probit model with the saved residuals in both equations. The Equations (1) and (2) now become Equations (1a) and (2a) respectively:

$$\begin{aligned} U &= \alpha_0 + \alpha_1 revchange + \alpha_2 avgprice + \alpha_3 exdur + \alpha_4 adv + \alpha_5 tele \\ &\quad + \alpha_6 resid - \varepsilon_1 \end{aligned} \quad (1a)$$

Table 1
Distribution of negotiated settlement in each industry.

Industry	Negotiated settlement	Regulated cases	Total
Telephone	26	47	73
Electric	11	57	68
Gas	5	51	56
Total	42	155	197

$$W = \beta_0 + \beta_1 revchange + \beta_2 oprev + \beta_3 exdur + \beta_4 tele + \beta_5 resid - \varepsilon_2, \quad (2a)$$

where *resid* in Equations (1a) and (2a) are the residuals from the OLS regression of *revchange* on the instrumental variables. If *resid* is found to be statistically insignificant in (1a) and (2a) from the estimation of the model specified by (1a), (2a) and (3), we know that *revchange* is not endogenous in the payoff functions of the advocate and the firm. We can then estimate the model represented by (1), (2) and (3).

The instrumental variables we use in the OLS regression of *rate* on the independent variables and instrumental variables as required by the Rivers and Vuong (1988) procedure are *comreq*, *pastrev* and *elec*. The variable *comreq* is the amount requested by the firm when seeking a rate increase in a company-request case. It is zero for earnings-review cases and the third category of cases, which includes all other types of cases other than earnings-review or company-request. The third type of case, which includes ROE reviews, almost always results in a rate reduction. Rate reduction in both types of cases is related to revenues. The variable *pastrev* is the firm's total operating revenue the year before the rate case was filed. It is zero for company-request cases. The variable *elec* is a dummy variable that equals 1 when the rate case is for an electric company to account for the firm's industry. Because *tele* is already included as one of the independent variables, we add *elec* as one of the instruments in the OLS regression.

3. Data

We use the same dataset as Littlechild (2009a), which was compiled by the FPSC. The database contains details of decisions for more than 300 dockets between the years 1960–2008. The data cover the largest investor-owned utilities (13 telephone companies, 8 natural gas companies and 5 electric companies) regulated by the FPSC from 1968 onward.

Specifically, the database covers (after 1976) decisions regarding (1) base rate increases and decreases, (2) changes in authorized returns on equity, (3) earning and over-earning, and (4) depreciation, reserves, revenue-sharing, and other issues affecting company revenues (Littlechild, 2009a). Littlechild (2009a) uses one docket as one observation and the same approach is taken here.

We study the dockets in this database that were opened between the years 1978–2008. This period was chosen because some of the dates used to calculate *exdur* were missing for the cases prior 1978. A subset of 197 dockets (of 239) was analyzed,²⁷ of which 42 ended in a negotiated settlement. Table 1 shows how many dockets were settled for each industry.

²⁶ The model was also estimated with squared terms of the important independent variables in (1) and (2). The bivariate probit model with partial observability either did not converge or the results remained unchanged when these squared terms were added.

²⁷ Thirty-seven (37) dockets that were not included in the analysis were of the telephone companies: Florala Telephone Company, Frontier Communications of the South, Quincy Telephone Company and St. Joseph Telephone Company. The statistics for these companies included operations from other states as well as from Florida. Their statistics from their operations in Florida alone could not be separated in these data. Hence, rate cases of these companies were left out of the analysis. Also, 5 dockets were also left out because company operating statistics were not available for the years needed.

Table 2
Summary statistics of independent variables.

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
<i>revchange</i>	197	-29.31	1394.89	-12502.63	5780.79
<i>avgprice</i>	197	0.026	0.068	0.00016	0.95
<i>exdur</i>	197	256.97	78.58	168	347.66
<i>oprev</i>	197	14003.92	25232.81	5.09	129655.6

For each docket, the database includes whether the docket had a negotiated settlement outcome, the date of the earliest regulatory order implementing final rates, the rate increase requested in a company-request case, the total rate change, the effective date for new rates, and the type of case. The beginning dates needed to calculate *exdur* were found from each docket's index listing.²⁸ The company's net operating income, operating revenue, and number of customers (number of access lines or number of main stations and trunks in the case of telephone companies) were recorded from the FPSC Annual Reports. For some years and some companies, when these operating statistics were not available, we recorded these data from the company annual report filed with the FPSC or FERC (in the case of electric companies).^{29 30} Table 2 presents the summary statistics for the independent variables.

4. Empirical results

4.1. Test of endogeneity of *revchange*

Table 3 presents the results of the OLS regression of *revchange* on the instrumental variables and the independent variables. Both *comreq* and *pastrev* are statistically significant at the 1% level.

The model specified by (1a), (2a) and (3) was then estimated. Table 4 shows the results of this estimation. The variable *resid* is not statistically significant in either the consumer advocate's utility function (1a) or the firm's profit function (2a). Therefore, according to Rivers and Vuong (1988), *revchange* is not endogenous in (1) or (2).

4.2. Bivariate probit model with partial observability of the negotiated-settlement practice at the FPSC

The results of the estimation of the partially-observable bivariate probit model specified by (1), (2) and (3) are presented in Table 5. As hypothesized, *revchange* in (1) is negative and statistically significant at the 1% level. The variable *avgprice* is not statistically significant, suggesting that the change in revenues is more important to the advocate than the consumer's future average price in the decision to settle.

The variable *revchange* in (2) is positive and statistically significant at the 5% level. An increase in rate revenues increases the firm's payoff. It seems that the firm uses the rate change as a signal as well. A revenue increase is perhaps perceived positively by the firm in terms of prospects for future profitability.

When all the other variables were held at their mean and the variable *revchange* was 0, the probability of settlement was about

Table 3
OLS regression of *revchange* on instrumental variables.

	Coefficient (standard error)
<i>constant</i>	-193.5711 (475.0632)
<i>avgprice</i>	135.0536 (1097.578)
<i>oprev</i>	-0.0024712 (0.0053599)
<i>exdur</i>	0.6291967 (1.145864)
<i>adv</i>	28.52558 (308.2385)
<i>tele</i>	-112.6561 (205.4993)
<i>elec</i>	214.8717 (208.5814)
<i>comreq</i>	0.4225332*** (0.0722825)
<i>pastrev</i>	-0.0294662*** (0.0058268)

N = 197. * = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Table 4
Rivers and Vuong (1988) test of endogeneity of *revchange*.

	Coefficient (standard error)
Equation (1a)	
<i>constant</i>	1.402322 (1.088932)
<i>revchange</i>	-0.00085** (0.0003983)
<i>avgprice</i>	1.520793 (1.811961)
<i>exdur</i>	-0.00354 (0.0024658)
<i>adv</i>	-1.4535* (0.8800289)
<i>tele</i>	0.666236** (0.3335442)
<i>resid</i>	-0.00027 (0.0002468)
Equation (2a)	
<i>constant</i>	-4.44747* (2.369583)
<i>revchange</i>	0.002221 (0.0043744)
<i>oprev</i>	0.001285* (0.0007075)
<i>exdur</i>	0.008165 (0.0099665)
<i>tele</i>	1.833272 (1.215853)
<i>resid</i>	0.003506 (0.0060173)
ρ	0.51 (1.045002)
Log likelihood	-69.745

N = 197. * = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

Table 5
Bivariate probit model with partial observability of the negotiated-settlement practice at the FPSC.

	Coefficient (standard error)
Equation (1)	
<i>constant</i>	1.360506 (0.8935138)
<i>revchange</i>	-0.0009872*** (0.0003719)
<i>avgprice</i>	1.372826 (1.612405)
<i>exdur</i>	-0.0026507 (0.0022798)
<i>adv</i>	-1.728552*** (0.6423262)
<i>tele</i>	0.6839236** (0.3326862)
Equation (2)	
<i>constant</i>	-3.500295** (1.55608)
<i>revchange</i>	0.0042299** (0.0021345)
<i>oprev</i>	0.0010362** (0.0005263)
<i>exdur</i>	0.0038931 (0.0048879)
<i>tele</i>	2.063308** (0.9921667)
ρ	0.82 (0.3601446)
Log likelihood	-70.354207

N = 197. * = significant at the 10% level, ** = significant at the 5% level, *** = significant at the 1% level.

27%. That is, when there is no change in rates and the other independent variables equal their mean value, the likelihood of the rate case ending in settlement is 27%. This probability increases to 30% for cases involving a reduction of \$10 million from existing rate revenues (the average reduction was \$45,414,890). The average rate reduction increases settlement probability to around 43%.

The coefficient for the variable *adv* in (1) is negative and statistically significant at the 1% level. This suggests that given the

²⁸ These index listings are on the FPSC website for the dockets opened after 1988. For dockets opened before 1989, the docket index listings are stored on microfilm at the FPSC in Tallahassee.

²⁹ Operating statistics and number of customers was recorded from company annual reports filed with the FPSC for 46 observations.

³⁰ The company operating statistics in the FPSC Annual Reports are reported from the company annual reports. The operating statistics were cross-checked when they were available from both sources and they were consistent.

same rate change, Mr. Shreve was less likely to settle than other advocates. When all the independent variables were held at their means, Mr. Shreve was about 61% less likely to settle than his successors. The length of Mr. Shreve's tenure as Public Counsel and his behavior during his tenure may have reflected other factors not explored in this analysis. According to Littlechild (2009a), Mr. Shreve became Public Counsel at a time when utilities had garnered surplus revenues. This may have allowed Mr. Shreve to be tougher in his dealings with the firms because he knew large rate reductions were possible. These circumstances may have changed for those who followed Mr. Shreve into office, which might have led them to accept smaller rate reductions in settlements.

The coefficients for *exdur* in (1) and (2) are not statistically significant. This indicates that neither the consumer advocate nor the firm are concerned about the time saved in calendar days from avoiding the formal regulatory process. This result seems consistent with the analyses of Doucet and Littlechild (2009), Littlechild (2009a, 2009b), and Wang (2004) suggesting that time savings is not a significant motivation behind the negotiated-settlement process, despite some claims to the contrary.

As hypothesized, the variable *oprev* in (2) is positive and statistically significant at the 5% level. This confirms that an important reason for firms to agree to settlement is higher future expected revenues. Surprisingly, the coefficient for *oprev* (0.0010362) is less than the coefficient of *revchange* (0.0042299) in (2). This seems to suggest that for the firm, the allowed revenue increase is more important than the subsequent change in operating revenues.

The coefficients for *tele* in both (1) and (2) are positive and statistically significant at the 5% level. This shows for the same rate change, the advocate and firm have a larger payoff when it comes to rate cases involving telephone companies. This finding could suggest a perception of greater uncertainty about the traditional regulatory process for telephone than for electric and natural gas cases.

5. Conclusions

The findings indicate that consumer advocates agree to settlements primarily to secure substantial immediate rate reductions from current rates. A substantial present rate reduction serves as an observable signal for job performance. The estimation suggests that perception is important for the firm, too. Although future revenues are important to the firm when deciding to settle, the rate change has a larger effect on the firm's payoff. The findings also indicate that time saving is not significant to either party in the decision to settle, supporting by formal econometric analysis the assertion made by Doucet and Littlechild (2009), Littlechild (2009a, 2009b) and Wang (2004).

These results are applicable to the Florida PSC only and are not generalizable; this is a limitation of the study. Rate cases at other state and federal regulatory commissions may have different outcomes due to institutional and other differences. In some states, the consumer advocate is appointed by the governor; in others this function is performed by the public service commission staff. Whether this matters to outcomes would be an interesting subject for future research. Another limitation of the analysis is that it does not account for the political environment that sometimes motivates the behavior of the consumer advocate. A future analysis incorporating political factors would also be interesting. The independent variables used in the study can also be improved in future work. As mentioned, *avgprice* is a rather imperfect measure. It would be interesting to see an analysis with another variable in

its stead that is a more accurate measure of the expected future impact of settlements on consumers. Additionally, a more appropriate independent variable to test whether saving time is one of the main motivations for settlements should be the expectation of the duration of a rate case in person days instead of calendar days that is used in this analysis.

Chakravorty (2012) recommends various policies to ensure that the consumer advocate internalizes the consumer's utility. Some have advocated for democratically elected advocates to ensure that these officials are motivated to act in the best interest of consumers.³¹ Another possible legislative policy is to extend the tenure of the consumer advocate.³² The shorter and more uncertain their tenure, the more likely that advocates will want to secure present observable gains in exchange for future losses. Another policy is to increase the transparency of the negotiated-settlement process and the consumer advocate agency generally.³³ The regulator can play a role in this regard by publishing regular reports about negotiated settlements and their effect on rates and other outcomes. By providing access to reliable information about the cases before them, regulators can facilitate a negotiated-settlement practice that benefits consumers.

Acknowledgments

I would like to thank David Sappington, Sanford Berg, Chunrong Ai, Robert Thomas and Ted Kury for their help and guidance. I am grateful to Stephen Littlechild, Dale Mailhot, Ann Cole, and J.R. Kelly for providing me with the data used in this paper. Financial assistance in the form of a grant during this study from the Robert F. Lanzillotti Public Policy Research Center is also gratefully acknowledged.

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³¹ In the Florida Congress, the bills HB 643 and SB 1228 sought to make the Attorney General of Florida responsible for appointing the Public Counsel. Both bills died in Congress committees in 2006.

³² As mentioned previously, the Public Counsel is appointed and re-appointed every year in Florida.

³³ In its existence since 1974, the Florida Office of Public Counsel (OPC) has published one activity report in 2003.