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### 1. Introduction

One of the central issues of price-cap regulation is the treatment of costs that are outside the domain of the regulated firm. In a pure setting, with perfect observation of the purchases made by a regulated firm, the rule suggest that regulators must follow an automatic passthrough of those costs as they do not belong to the action set of the regulated firm. Arguments in favour of conceding an automatic, 100% passthrough are examined for example in Armstrong et. al. (1994) and are based on the desirability of avoiding excessive exposure of distribution companies to, for example, up-stream costs fluctuations. However, most regulations in practice, although they have been built upon this premise, do not always allow such an automatic transfer to take place.

In the regulation of the gas industry, arguments against conceding automatic 100% passthrough rest on mal-incentives to minimize costs or search for lower prices, or to consider alternatives that smoothen the seasonal fluctuation of prices (known as peak-shaving) that involve investment expenditures (see Price, 1995). A different argument against automatic 100% passthrough, partially related to the topic issue of this paper, is based on the anticompetitive bias that the mechanism can have if used by the firm to price products outside the regulated segment. Finally, from a positive viewpoint concerning the actual behavior of regulators, there is the Joskow's asymmetric hypothesis whereby regulators are reluctant to concede price increases and are less concerned with price reductions (see Joskow, 1974 and Hollas, 1994).

In the gas industry, as the purchases of natural gas depend on the availability and contractual conditions (including transport capacity) of gas bought at different basins, the issue of passthrough is dependant upon specific characteristics of the sector. The literature has dealt with similar, albeit not identical regulatory problems in the US and the UK. Phillips (1993), for instance, argue that one of the three regulatory problems to be solved in gas regulation is whether or not to allow that the higher cost originated by "take or pay" contracts be charged only to regulated or "firm" customers. Sutherland (1993) mentions that mistakes in the acquisition of gas by distribution companies (Distcos) may induce a compensatory "by pass" behavior by large customers and a rebalancing of charges against regulated ones.

Observing UK regulation, Yarrow (1991) shows that a passthrough rule based on the average cost of gas may give incentives, if costs are increasing, for buying gas to be sold in unregulated segments. That is, an increase in the volume sold in the unregulated market raise the average cost of gas and therefore the price in the regulated market. This sort of passthrough regulation creates positive spillovers to the unregulated, competitive segments and is deemed to affect competition elsewhere.

In the Argentine case, the passthrough of gas costs is made dependant on the proportions of purchases made, on a firm basis, in different basins. That is, the cost of gas is a sort of weighted averaging of wellhead cost (cum transport) among basins where the purchases are made. In this setting, the decisions to sell in the unregulated or regulated market become interrelated not because "average-cost passthrough" but because they may change the weights or proportions of gas bought in different basins. For instance if the Distco decides to increase the volume sold, on a firm basis[1], in the unregulated segment, there may be an increase in the price of the regulated market if that volume raises the proportion allocated to the more expensive basin. One can conjecture, however, that the problem originates in the distortion created by the absence of gas to gas competition and arbitrage between basins. With price equalization, the question of variable weights becomes irrelevant since the cost of gas is the same regardless the basin of origin.

Adapting the point made by Yarrow (1991) to the argentine regulatory setting, this paper evaluates some consequences of the variable weights rule commented above. We address two issues related to the variable-weights rule imbedded in the Argentine regulation, as opposed to, say, a fixed-weights rule that is fixed beforehand and goes unchanged during all the price-cap period. The first issue is whether the current variable-weights passthrough cost rule gives incentives to buy at expensive basins. The second issue is whether the same rule gives the Distcos more incentives to look for new "business" in the unregulated segment. That is, whether it gives an instrument to have a cost advantage in other competitive segments.

The paper is organised as follows. Before we proceed to the main analysis, we present the reader a brief introduction to the institutional setting of the gas industry and natural gas regulation in Argentina. In section 3 we show reference results for a basic model with only one-basin and two final markets (regulated and unregulated). In section 4 we present a model of two basins and two markets adapted to the argentine case. In section 5 we address the consequences of moving from a variable to a fixed weights rule. Finally section 6 concludes and draws the main implications in light of some evidence obtained from the argentine case.

## 2. Brief Description of the Gas Industry in Argentina

The natural gas industry in Argentina was privatised at the end of 1992 in the second round of privatisation that was centred in the energy sector (electricity and gas). The pattern adopted was one of vertical separation, that is, transport and distribution were separated and regulated by a new body (ENARGAS) while production was considered to be potentially competitive, deregulated and therefore left outside the regulatory framework.[2]

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[1] In Argentina only firm contracts count for the calculation of weights to be included in the cost of gas formula. In Artana, Navajas and Urbiztondo (1998) a regulatory conflict case is evaluated where a Distco had decided to switch to "firm" previous gas sold as interruptible. This is different from the British case where total gas (both firm and interruptible) could be included in the formula.

[2] This framework was set up by a number of legal instruments, see ENARGAS (1995): law 24076 (the privatization's law in the gas sector), Decree 1738/92 (which specifies the content of the law) and Decree 2255/92 establishing the licenses for transport and distribution. Of course, since then other regulatory rules

The natural gas sector in Argentina is organised in eight regional Distcos supplying residential, commercial and industrial customers across the country and two Transco (Norte and Sur) connecting the Distcos with three main basins (Norte, Neuquina –the largest one located in the Southwest- and Austral, -this far away in the southern extreme of the country-). Large customers can have access to Transcos and producers by-passing the Distcos either physically (i.e. when they have their own access to the main pipelines) or contractually.

The main tasks of the ENARGAS are the regulation of transport and distribution margins following a price cap scheme, with revisions every five years, the observation of contracts of gas bought at the wellhead –so as to allow passthrough-, and the implementation of quality standards. As the capping is one on margins, the regulation allows a passthrough of the cost of gas, and conflicts have occurred between the Distcos and the ENARGAS on the allowance of such an adjustment.

Before privatisation both transport and distribution were provided by the former public enterprise (Gas del Estado) while production was in the hands of the integrated oil company (YPF) and transactions were governed by a transfer price arrangement between both firms. This is important to notice, because at the time Gas del Estado was sold out, YPF still remained public and did so for a couple of years until it was privatized as an integrated enterprise, holding a large share of gas production. The production segment was not deregulated until January 1994 when the government decided to leave previous price controls at the wellheads. Since then YPF began to exercise some market power suggesting a path of adjustment of prices at the main wellhead. It is in this context that the regulatory conflicts between the Distcos and the ENARGAS arose as the firms claimed for an automatic passthrough of gas costs.

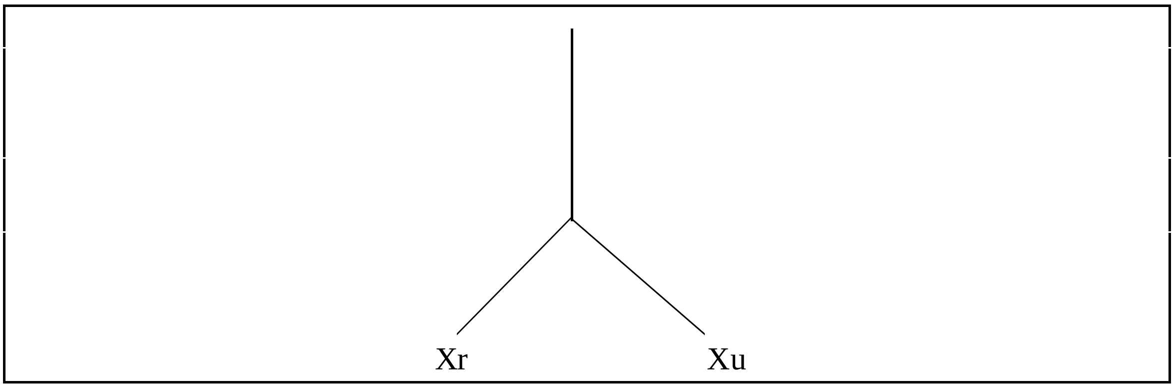
There were two main types of regulatory conflict related to this setting. The first, was the rejection by the ENARGAS to the request made by the Distcos in January 1995 to pass the increase in the wellhead cost of gas. The second was a dispute, also in 1995, over the proportion of gas bought at different basins, implying different cost of gas to be passthrough, as the Distcos reported that the cheaper gas was being sold to unregulated activities. While the first type of conflict deals with an issue of tariff structure and adjustment, the second has an element of competition policy and the interaction between regulated and unregulated segments. It is within this second type of conflict that the issue addressed in this paper fits well.

## 3. The Basic Reference Problem: Passthrough costs rule, regulated and unregulated markets

A point made by Yarrow (1991) is that there may exist spillovers that operate due to the passthrough costs mechanism and change the incentives that a regulated firm has to sell gas to unregulated markets, such as new ventures in the industrial sector. In an adaptation

have been passed by the ENARGAS to conform a now more general framework; these rules will be quoted as they are needed.

of this simple model presented in this section, we assume a firm facing two markets, one of them regulated by a price cap with a passthrough rule based on the average cost of gas borne by the firm. To simplify matters it is assumed that gas is bought at one basin and transported through one pipeline; the regulated firm takes citigate prices and the production/transport segments are not explicitly modelled. The basic scheme is:




Xr and Xu are quantities sold at regulated and unregulated markets, both coming from the same purchase of gas. As we shall see the basic problem to the regulator is how to deal with the separation of these decisions.

By definition, the price of the regulated segment, pr, is equal to the sum of the distribution margin, mr, (which is the object of regulation) and the unitary cost of gas at citigate which is taken as the average cost of gas, Cg(Xr+Xu) / (Xr+Xu). That is we define[3]:

$$pr = mr + Cg(Xr+Xu) / (Xr+Xu) \qquad (1)$$

The profit function of the firm is then written as:

$$\pi = mr \cdot Xr + [\, Cg(Xr + Xu) / (Xr + Xu)] \cdot Xr + pu \cdot Xu - Cg(Xr + Xu) - Cr(Xr) - Cu(Xu) \qquad (2)$$

The first three terms show the revenues of the firm from regulated (where the price is decomposed in margin plus cost of gas) and unregulated segments (the price pu is assumed fixed and independent of Xu). Demand in the regulated market is assumed price inelastic.[4] The last three terms define the costs: the firm spends in total citigate gas

[3] In terms of RPI – X + Y regulation, the term mr includes adjustment in the X factor, while the average cost of gas corresponds to the Y factor.

[4] Price elastic demand is one of the arguments that can be used to justify that the regulated firm will have incentives to minimize the cost of gas purchases under full passthrough. That is, the firm is not indifferent to buy gas at any price, even though it can be passed to consumers, since there is a corresponding loss of volumes sold. In our case the firm still has incentives to minimize costs of purchases for two additional

outlays given by Cg(Xr+Xu) which is a function of total quantities purchased, and the costs of distributing gas to regulated Cr(Xr) and unregulated Cu(Xu) segments, each one specific to the gas sold in that segment. We further assume that this later separation of specific distribution costs is due to the use of different physical facilities and that Cr(Xr) includes fixed or capital costs.

The second term in (2) shows that there exists an in-built passthrough mechanism, defined in this way, expressed by the unitary or average costs of gas Cg (Xr + Xu) / (Xr + Xu) multiplied by the units sold in the regulated market. Alternatively, the mechanim can be seen as recognising the cost of gas Cg (Xr + Xu) multiplied by the weight of regulated sales in the total final sales of gas, that is, Xr / (Xr + Xu).

Assuming initially, and only for ilustrative purposes, that the firm can set the quantities Xr and Xu we obtain first order conditions expressed by:

$$\partial\pi / \partial Xr = mr - Cg' - Cr' + Cg' \,.\, (Xr / (Xr + Xu)) +$$

$$+ (Cg / Xr + Xu)).\, [\, 1 - (Xr / (Xr + Xu))]$$

$$= mr - Cr' - (Xu / (Xr + Xu))\,.\, [Cg' - Cg / (Xr + Xu)] = 0 \qquad (3)$$

and

$$\partial\pi / \partial Xu = pu - Cg' - Cu' + (Xr / (Xr + Xu))\,.\, [\, Cg' - Cg / (Xr + Xu)]$$

$$= pu - Cg' - Cu' + Xr.\, (\partial pr / \partial Xu) \;\; = 0 \qquad (4)$$

In this example, efficient allocations of the distribution of gas to both regulated and unregulated markets are defined by quantities Xr* and Xu* such that mr = Cr'(Xr*) and pu = Cg'(Xr*+Xu*) + Cu'(Xu*). The regulated margin of distribution mr must equal the marginal cost of distribution while the unregulated competitive price pu is equalized to the marginal cost of gas acquisition and distribution (to the unregulated segment). The asymmetry comes from the fact that the passthrough mechanism attempts at eliminating the cost of gas in the former case.

Suppose that the regulation proceeds by successfully fixing mr = Cr'(Xr*). Conditions (3) and (4) show that the firm still has incentives to depart from efficiency due to the workings of the passthrough mechanism, unless the cost of gas Cg is lineal. For instance, with increasing costs of gas the regulated firm has incentives to reduce output (in relation

reasons. First, it has to sell to an unregulated segment where there is no such a passthrough. Second, there may be some parts of the gas purchases that are not recognised by the passthrough mechanism. For example, the firm has to buy some gas to generate energy for transporting the gas through the pipeline, and this "retained" gas (as it is called in Argentina) has been considered by the regulator as not part of the passthrough mechanism. This last issue has itself given rise to a conflict with some Distcos (see Urbiztondo et. al, 1997) to Xr*) in the regulated segment and to sell more in the unregulated one. Even in the case that the regulation successfully (as it usually does) imposes a demand compatibility constraint $Xr \geq Xr^*$, the firm still has incentives induced by the passthrough rule to expand its activities in the unregulated segment. And this incentive has both competitive as well as regulatory consequences.

Condition (4) shows the basic spillover effect created by the pricing formula (1). If costs of gas are increasing, buying gas for the unregulated market raises the marginal benefit given the additional revenue obtained in the regulated segment. Alternatively, the cost of provision to the unregulated market falls and the firm can sustain a lower price to fight competitors in this market. Thus, "control over gas supplies through long term contracts has a valuable entry deterrence side insofar as costs are increasing" (cf. Yarrow, 1991). When costs are linear or decreasing, this anti-competitive effect vanishes. Thus, in this simple model the hypothesis depends on empirical elements upstream and calls attention on arrangements that tend to control the supply of gas, understood as production cum transport contracting.

The regulatory consequence is that even when demand in the regulated segment is fully served, consumers end up –again if costs are increasing- paying higher final prices as the passthrough mechanism transfer the effects of expanded purchases for the unregulated segment, i.e. $\partial pr / \partial Xu > 0$.

This basic problem of regulation cannot be solved, for instance, by imposing a "firm" contract of gas purchases for the regulated market (as is usually the case) and computing average costs only for firm supplies. As it happened in the argentine case, the unregulated market activities required firm supplies and they were rapidly included in the mix of firm contracts of the Distcos. Instead, a rough solution is to make $\partial pr/\partial Xu = 0$, by fixing the average cost of gas in formula (1). This approach has costs in terms of suspending full passthrough of costs that are borne by the regulated firm. For instance, an increase in the demand of the regulated segment has to be covered with additional purchases that raise costs (if they are increasing) and are not recognised by the price formula. Thus, even the simple model of one basin shows the basic insight that a fixed weighting of the cost of gas in the passthrough formula is a dear solution to the spillovers caused by a variable weight implied in the average cost formula. This basic insight is extended in the next section.

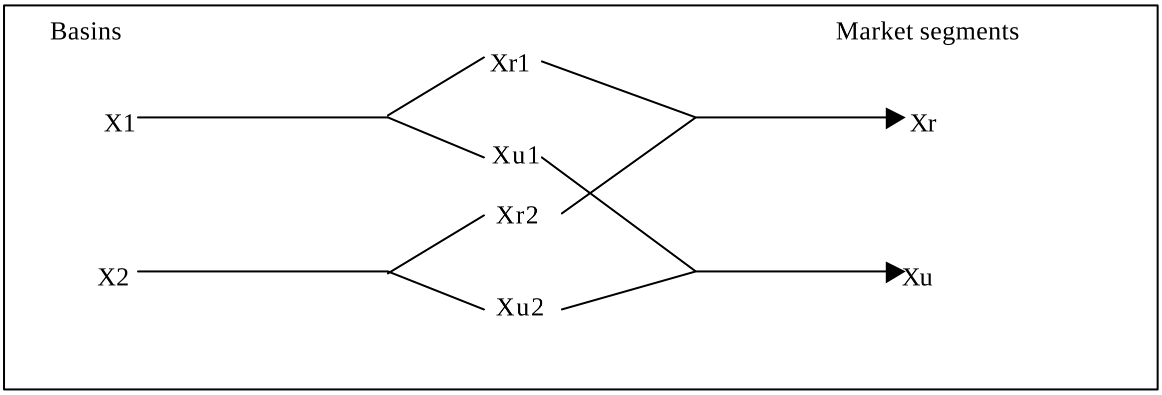
## 4. Gas Purchases from Two Basins with Linear Costs of Gas.

Suppose that costs of gas acquisition are linear (so the basic problem, if stated in the simple case shown before, disappears) and that there exist two basins from which the regulated firm can purchase gas to serve both regulated and unregulated segments. Further, suppose that the regulation states that only firm contracts will be computed in the passthrough formula and that passthrough cost proceeds by computing a weighted average of unitary (assumed constant) costs of gas, with the weights being the proportion of purchases made in each basin. In this context, which resembles the argentine case, the pricing formula (1) is restated as:

$$pr = mr + \{Cg1.(X1/(X1+X2))+ Cg2.(X2/(X1+X2))\} \qquad (5)$$

where Cg1 and Cg2 are citigate unitary costs of gas, and X1 and X2 actual purchases (of firm) gas made by the firm, from basins 1 and 2, respectively. The regulated firm buys gas from basins 1 and 2 and sells gas to final users in the regulated R and unregulated U segments. Thus by definition $X1+X2=X=Xr+Xu$. The relevant variables, and information reported by the firm, are illustrated in the following diagrams:

| | | Basins | | |
|---|---|---|---|---|
| | | 1 | 2 | |
| Market segments | R | Xr1 | Xr2 | Xr |
| | U | Xu1 | Xu2 | Xu |
| | | X1 | X2 | X |




The profit function in this setting is now redefined as:

$$\pi \;=\; mr\,.\,Xr + \{Cg1.(X1/(X1+X2)) + Cg2.(X2/(X1+X2))\}.\,Xr + pu\,.\,Xu\; -$$

$$-\; Cg1\,.\,X1 - Cg2\,.\,X2 - Cr(Xr) - Cu(Xu) \qquad (6)$$

where we recall that $Xr = Xr1 + Xr2$ ; $Xu = Xu1 + Xu2$ ; $X1 = Xr1 + Xu1$ ; $X2 = Xr2 + Xu2$.

As in the simple case (see expression (2)), the first three terms of (6) show the revenues from regulated and unregulated activities and the rest are the costs of acquisition of gas and the distribution costs. Observe that revenues are again dependant on the average cost of gas purchases, but now this “averaging” is basically sensitive to the unitary (constant) costs of each basin.

In this setting there exist four basic decision variables, which are the four quantities purchased in each basin and for each market, Xr1, Xr2, Xu1, Xu2. The actual decision problem of the regulated firm is further constrained by the fact that it has to serve demand in the regulated segment (so Xr is predetermined) and that there may exist transport capacity constraints from each basin. These constraints are written as:

$$Xr1 + Xr2 \geq Xrd \qquad (7)$$

$$Xr1 + Xu1 \leq X1c \qquad (8)$$

$$Xr2 + Xu2 \leq X2c \qquad (9)$$

Where Xrd is demand in the regulated segment and X1c, X2c are available capacity in the pipelines connecting the citigate with the basins.

First order conditions for the maximization of (6) subject to (7) – (9) are given by[5] :

$$\partial \pi / \partial Xr1 = mr + avg(Cg) - Cg1 - Cr' + Xr.(X2/(X1+X2)^2).(Cg1 - Cg2) + \lambda - \mu 1 = 0 \qquad (10)$$

$$\partial \pi / \partial Xr2 = mr + avg(Cg) - Cg2 - Cr' + Xr.(X2/(X1+X2)^2).(Cg2 - Cg1) + \lambda - \mu 2 = 0 \qquad (11)$$

$$\partial \pi / \partial Xu1 = pu - Cg1 - Cu' + Xr.(X2/(X1+X2)^2).(Cg1 - Cg2) - \mu 1 = 0 \qquad (12)$$

$$\partial \pi / \partial Xu2 = pu - Cg2 - Cu' + Xr.(X2/(X1+X2)^2).(Cg2 - Cg1) - \mu 2 = 0 \qquad (13)$$

where avg(Cg)={Cg1.(X1/(X1+X2))+Cg2.(X2/(X1+X2))} is the average cost of gas and $\lambda$, $\mu 1$ and $\mu 2$ are lagrange multipliers associated with restrictions (7) to (9), respectively.

Efficient allocations in this setting are, if constraints are non-binding, characterised by purchases Xr1*, Xr2*,Xu1*,Xu2* such that:

$$\partial\pi/\partial Xr1=\partial\pi/\partial Xr2=mr-Cr' = 0 \qquad (14)$$

$$\partial\pi/\partial Xu1=\partial\pi/\partial Xu2=pu-Cu'-avg(Cg)=0 \qquad (15)$$

We then state a first result that shows that with arbitrage in the cost of gas between basins, which arise in the absence of capacity constraints and competition in at least one of the basins, the regulated firm has incentives to made efficient purchases of gas. This result is important because it shows that a fundamental distortion of the problem addressed is closely related to the absence of gas to gas competition.

[5] Second order conditions are guaranteed by the convexity of distribution costs Cr and Cu.

**Proposition 1**. *Suppose that transport capacity can accommodate firm contracts and that there is competition in at least one of the basins so that there is perfect arbitrage in the citigate cost of gas (Cg1=Cg2). Then the regulated firm operating with the pricing formula (5) will purchase gas efficiently and there will be no spillovers between gas purchase decisions (no anti-competitive bias).*

Proof: Straightforward from the assumptions ($\mu 1=\mu 2=0$; Cg1=Cg2=Avg(Cg)) and the use of FOC (10) to (13) to obtain conditions (14) and (15).

The previous statement begs the question of what makes arbitrage between cost of gas from different basins to hold. From the previous result it is sufficient to assume availability of transport capacity and competition up-stream. However, for arbitrage to occur it is necessary to have customers with incentives to exploit price differentials. It may seem paradoxical to claim that the regulated firm will purchase gas cost-effectively provided that there is arbitrage between basins, if a precondition for this arbitrage is to have buyers that minimize cost of purchases in the first place. The next result clarifies this point by showing that, if it is free in its decision to buy gas (that is, in the absence of transport capacity constraints, as it is assumed in Proposition 1) the regulated firm will effectively exploit price differentials to its advantage.

**Proposition 2**. *Suppose that transport capacity can accommodate firm contracts and that there is a cost divergence between basins so that (without loss of generality) Cg1 > Cg2. Then it can be shown that the regulated firm operating with the pricing formula (5) has incentives to buy gas at the cheapest basin regardless the final use of the gas purchased*.

Proof. Using conditions (9)–(13) with $\mu 1=\mu 2=0$ (free transport capacity) we obtain after algebraic manipulation

$$(\partial\pi/\partial Xr1)-(\partial\pi/\partial Xr2) = (\partial\pi/\partial Xu1)-(\partial\pi/\partial Xu2) =$$

$$= (Cg2-Cg1).[1 - (Xr / (X1+X2))] < 0 \qquad (16)$$

Expression (16) shows the differential incentive to buy from each basin, given by the differential marginal benefit, which should be negative according to the proposed statement. This is quite so since $(Cg2-Cg1)<0$ and $[1 - (Xr / (X1+X2))] > 0$ since $Xr<X1+X2=X=Xr+Xu$.

Proposition 2 validates Proposition 1 and implies that any divergence between Cg1 and Cg2 will be temporary, provided that there is transport capacity available. Thus with competition in at least one of the basins a necessary condition for the presence of upstream market power is the existence of capacity constraints[6]. It is only in this setting

[6] The presence of capacity constraints is one of the ways in which Bertrand price competition cannot be sustained (see for example Tirole (1988), Chapter 5). Two suppliers located at each of the two basins can compete in prices and arrive at a Bertrand competitive result if demand react to price differentials and there is no capacity constraints. With capacity constraints a Cournot duopoly may emerge (see Kreps and Sheikman, 1983) and prices from both basins will equalise but above marginal (here equal to average) cost.

in which one can extend the analysis of the basic reference problem of section 3 to evaluate whether the pricing rule (5) has an anti-competitive bias for the unregulated market segment and a negative impact on prices in the regulated segment.

The last result of this section shows that in the absence of gas to gas competition the basic spillover of the reference case shown in section 3 is also present in this setting.

**Proposition 3**. *Suppose that transport capacity for firm contracts is full at basin 2 (without loss of generality) and that there is market power that can be exercised at basin 1 so that Cg1>Cg2 can be sustained. Then, new business in the unregulated segment that must be supplied from basin 1 benefit from the passthrough pricing of formula (5) while consumers in the regulated segment pay a higher price*.

Proof. With transport capacity available only from basin 1 ($\mu 1=0$) any new venture for the unregulated segment has to be evaluated according to condition (12) as:

$$\partial \boldsymbol{p} / \partial Xu1 = pu - Cg1 - Cu' + Xr.(X2/(X1+X2)^2).(Cg1 - Cg2)$$

$$= pu\text{-}Cg1\text{-}Cu'\text{+}Xr.(\partial pr/\partial Xu1) \qquad (17)$$

where,

$$\partial pr / \partial Xu1 = Xr.(X2/(X1+X2)^2).(Cg1 - Cg2) > 0$$

is the basic positive spillover of the pricing formula (5) on unregulated sales.

## 5. Variable vs. Fixed Weights in the Passthrough Formula.

At the end of section 3 we argue that even in the basic reference case spillovers between regulated and unregulated activities could be eliminated by making the regulated price pr independent of purchases for the unregulated segment. In the model of the previous section, given that costs are linear, we can make pr independent of Xu by just fixing the share of each basin in the total purchase of gas. Thus we define "fixed weights" by a variant of formula (5) where the proportions of purchases from each basin are set in advance. That is Xi/(Xi+Xj) are fixed numbers and cannot be affected by changes in the mix of purchases.

The consequences of moving to a fixed weight formula can be evaluated in terms of the three results obtained in the previous section.

**Corollary 1**. *Proposition 1 remains unchanged by the choice between variable and fixed weights in the pricing formula*.

In our setting, however, there is competition in one of the basins and the effect of the competitive fringe located at basin 2 is neutralised by the capacity constraint even though prices at that basin remain at competitive levels. This allows distinguishing between prices from different basins.

**Corollary 2**. *Under the assumptions of Proposition 2 the fixed-weights pricing formula does not change, qualitatively, the incentive to buy from the cheapest basin. The magnitude of the incentive is increased by fixing the weights.*

**Corollary 3**. *The spillover described in Proposition 3 is eliminated under a fixed-weights pricing formula since by definition ¶pr/¶Xu1=0.*

## 6. Final Remarks.

The results of this paper have been obtained from previous insights of the received literature on gas regulation which have been adapted to the argentine case. They can be seen as addressing two main issues observed in recent regulatory discussions.

The first issue is whether the variable-weights rule implicit in passthrough pricing gives incentives to buy gas at expensive basins. The results stated in propositions 1 and 2 show that this is not the case and that the regulated firm will minimize purchasing costs. In general, even though the Distco may benefit from the spillover created by the passthrough formula, it has incentives to behave cost effectively when cheaper alternatives are available. In the argentine case, the regulators seemed to have reacted to this potential problem of cost effectiveness. In this paper we argue, however, that the Distcos have incentives to minimize costs of acquisition of gas even when there are spillovers given the passthrough formula.

The second issue is whether the current variable-weights rule (when compared to a fixed-weights alternative) gives the Distcos more incentives to look for new "business" in the unregulated segment. That is, whether it gives an instrument to have a cost advantage in other competitive segments. Unlike the previous issue, the answer to this question seems positive. The advantage comes from the fact that being in the regulated segment the Distco benefits from the spillover effect of the passthrough rule. Under the current variable-weights rule implicit in passthrough pricing, the Distco has incentives to minimize costs of acquisition (i.e. buy from the cheapest available source) but it has an incentive to sell more gas in the unregulated segment.[7]

While it seems clear that the (variable weights) passthrough-pricing rule has both regulatory (i.e. it hurts customers in regulated segments) and competitive effects, the move to a fixed-weights pricing formula makes them vanish. It is nevertheless a dear solution since it implies that the Distco has to bear changes in the cost of gas. This seems particularly uneven since, as it has been illustrated in the paper, the conditions for the

[7] There is a third issue on whether the variable-weights rule is more difficult to monitor given the moral hazard problems that arise with costly observation of decisions by the Distcos. In fact, the variable-weights rule reacts to changes in the cost of gas in a sort of cost plus fashion, unlike a fixed-weights variant which would be more coherent with the price cap regulation that is used in Argentina. Of course, price cap with automatic passthrogh means a cost plus adjustment for the cost of gas acquisition and this is what had been in trouble here, as it had been in other experiences. Nevertheless, with positive costs of monitoring decisions by the Distcos a fixed-weights rule would have simplified the regulatory process and reduced conflicts around reporting and interpretation as in the case described before.

existence of spillovers crucially depends on up-stream distortions in terms of absence of gas to gas competition. This brings the issue, which is beyond the focus of this paper, on how to promote competition and arbitrage between basins in the future. While responses are found in the medium term, the ENARGAS seems to have correctly reacted in the short run in defence of customers in regulated markets.

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