TRADE BALANCE EFFECTS OF INFRASTRUCTURE SERVICES LIBERALIZATION … AND OF THEIR REGULATION

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I. Introduction

During the 1990s, in most regions of the world, governments restructured their infrastructure sectors to facilitate some form of private participation in the operation and financing of the sector. These reforms, generally associated with other macroeconomic reforms which included the liberalization of international capital, goods and services flows have often initially produced significant flows of foreign direct investments flows to small countries. Overtime however they have also been associated with reversed flows, first of profits and later, as international financial crisis exploded, of capital repatriation that often put pressure on the service trade balances. These facts contribute to explain why trade in services are now at the top of the WTO agenda forum and point to the need to try to improve our understanding of the interactions between the privatisation of infrastructure monopolies and associated trade flows.

Because regulatory issues are usually treated in partial equilibrium frameworks that ignore many of the indirect interactions of the regulated sectors with the rest of the economy, a key, yet underestimated, policy issue in the sector is the effect that the specific choice of the regulatory regime imposed on the private infrastructure operators has on the trade balance. [1] It seems indeed rational to expect that the recognition of the presence of a third party such as the rest of the world, exchanging goods and (capital) services with the regulated party is likely to influence the optimal contract between the regulator and the regulated operator.[2]

While there are a few studies of the impact of the choice of the regulatory regime on variables such as efficiency, equity or the fiscal balance, there are no studies of the

[1] Reformers had the choice between three main forms of regulation: a price cap, a cost plus or a hybrid regime. In most cases, reformers have chosen to try to promote incentives for efficiency in these sectors rather than to guarantee return through cost plus regimes. In Latin America, according to a data base put together by Guasch (2003) on 954 concessions contracts awarded from the mid 1980s to 2000, 56% of the contracts were regulated under a price cap regime, 20% under rate of return regulation. For 24% of the contract, the regime is a hybrid one.

[2] These optimal contracts are typically modelled in a Principal-Agent framework in the regulation literature. For an overview see for instance Laffont and Martimort or Laffont and Tirole

interactions between the choice of the regulatory regime and the trade performance of a country.[3]

The main purpose of the paper is to help close that gap. We do so by analysing the experience of Argentina, the former poster boy of privatisation and the first country to have a rather encompassing reform of the infrastructure sector, through simulations of a general equilibrium model built to assess the impact of regulatory regimes on the trade balance.[4]

The structure of the paper is the following. First, we motivate the use of a general equilibrium approach to the analysis and explain why we believe that a Ricardo-Viner framework is a useful way of modelling the problem. Second, we motivate the need to also model two of the key regulatory policy issues: service obligations imposed on operators for social reasons and restriction to entry often built-in long term contracts signed with these operators. In section III, we present the formal structure of the model; one version that includes tradable, regulated goods foreign goods and that also considers a wider class of non-tradable - paying attention to the rate of exchange defined endogenously. In section IV we present comparative static numerical explorations comparing the effects of price cap and or rate of return regulation.[5] We then do the simulations for two types of economies: a symmetric economy to provide a benchmark, and an economy with the basic asymmetric characteristics of the Argentine economy. Section VI considers explicitly the importance of unemployment, government intervention and external debt. Section VII compares an alternative mechanism of obligatory service: the use of a new technology. Section VIII summarizes the main findings of the paper .

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[3] Chisari et al (1999), Navajas (2000), and the papers included in Ugaz and Waddams (2003),

[4] To some extent, a rule for determining the tariff can be modelled as a distortion that modifies optimal trade policy (see Bhagwati *et al.* (2000), Ch.20). We are leaving aside the financial and temporal considerations; in fact, it could happen that a rate-of-return regulation favoured an bigger initial inflow of foreign capital.

[5] We adopt Piggott´s viewpoint, "that CGE models are theoretical models with numbers".

II. Motivating the use of a general equilibrium model

In order to pick up the interactions between all the sectors of the economy, a computable general equilibrium model of the economy seems to be appropriate. The model needs to reflect the fact that traditional trade theory guides how we should expect factor rewards to respond to commodity price changes under given factor endowments and how sector outputs vary with factor endowments changes under constant factor prices. The model also needs to reflect the fact that factor mobility assumptions should influence price changes. Since this factor mobility is highly specific to the regulated industries, we need to model this specificity explicitly and hence we believe that a Ricardo-Viner framework provides a useful analytical framework to simulate policy changes.[6] Our main concern is that comparative static effects can easily become undetermined when accounting for too many factors under the standard assumptions of the model. In particular, since we need to model the regulatory rule followed to determine prices in the infrastructure sectors, the net effect cannot be determined qualitatively directly. We thus suggest to assess it by adding up numerical (non-linear) impacts.

We will focus our attention on two questions, qualitative and quantitative respectively: (i) is it possible that the regulatory mechanism, mainly the rule for adjusting tariffs, biases trade balance and the exchange rate? (ii) If so, can we say that is relevant, not negligible, for a typical developing economy like that of Argentina?

There are two aspects that are relevant for addressing these questions: (i) the relative weight of price flexibility with respect to domestic or foreign ownership on trade performance, and (ii) the comparative advantage of using more capital or covering the excess of marginal cost over tariff with internal resources of the firm.

We have chosen the Argentine economy to address the second question for several reasons. Firstly, Argentina is a country where the process of privatisation has been wide, deep, and

[6] Hoque (1997) discusses international trade theorems when there is factor mobility between countries, but not between sectors; he finds that international mobility of factors can be seen as a substitute for inter-sectoral mobility, making valid the Stolper-Samuelson and Rybczynski propositions. See also Jones and Kierzkowski (1986).

where privatised sectors have a significant role in determining relative prices. Secondly, we have the data and we have been able to follow up the gains in productivity and efficiency that these sectors experienced. Finally, because Argentina put into practice a rate of exchange rule (currency board) that seems to have contributed to the non sustainability of the current account, it becomes interesting to know if there were or not other forces (the regulatory regime, perhaps?) pushing forward the economy to a dead end.

III. The need to model service obligations and restrictions to entry

To make the model as realistic as possible, it is particularly important to model two of the main institutional characteristics of the regulated infrastructure services. The first is the fact that since the sectors deliver services which are often perceived as essential to the well being of the poorest, contracts signed with private operators generally specify explicit large volumes of service obligations. The second is the fact that in many cases, economies of scales are such that there are de-facto restrictions to entry in the sector. In practice this restriction is often granted through exclusivity for the right to provide the service, at least for a specific duration.

In the model, service obligation is interpreted as the passive adjustment of services supply to demand in the regulated sector. This is a very useful assumption to prevent the existence of rationing, but it is also realistic. Most regulatory regimes establish explicitly this obligation in the contract, and its violation has not only direct economic costs but also hinders on the reputation of the firm. If this assumption were not included, we would need to accept some form of rationing of customers (households or firms), and this will make the model much more complicated and ad-hoc. Service obligation increases costs to the firm (real and expected) and is compensated with the tariff and, very often, with the commitment by the regulator of protecting incumbents by legally blocking the entry of new competitors. The “no entry” condition guarantees a return on assets, that cannot be jeopardized by competitors.

With the Service Obligation hypothesis, it is possible to consider two contrasting alternatives: (i) that the firm will receive a subsidy to cover the difference between

marginal cost and regulated price, and (ii) that there is enough installed capacity to cover the necessities of costumers.

For the first case, we assume that the deficit is covered with a subsidy from the shareholders of the firm, in the case of the price-cap regime. With this strategy, existence of equilibrium can be shown using the proofs already available for the standard general equilibrium models with taxes. The price-cap or the rate-of-return regulation can be interpreted as special mark-up rules that are in fact taxes for which the revenue accrues to the owners of the firms[7]. For the second case, we will assume later (**Section VI**) that there is available a second technology that uses foreign capital to produce the regulated good. This second technology (with constant marginal costs) is used exceptionally when demand becomes too high. This second technology operates as an international given price for services and proof of existence of equilibrium is equivalent to the proof used in a model with trade (Ricardo-Viner version).

How will the firm react to a regulatory, technological or market shock? It is sensible to say that it will select the minimum cost response and it will prefer the alternative technology if it interprets that the shock is not temporary and considers that the cost of capital is lower than the subsidization of an old technology. However, we will not elaborate more deeply in these arguments, and will concentrate our discussion here on the impact for the domestic country of the two solutions.

We will also assume that government is an ethereal entity that settles the contract and regulates firms, but without any other economic activity in the economy. This hypothesis, as well the one that the economy does not have neither external debt nor unemployment helps to isolate the essential characteristics of the model from interesting effects that would make more obscure the causality.

It has already been mentioned that capital is installed and that we assume that the firm faces the tight constraint of service obligation, but that normally this is compensated with the protection of incumbents forbidding competitors entry.

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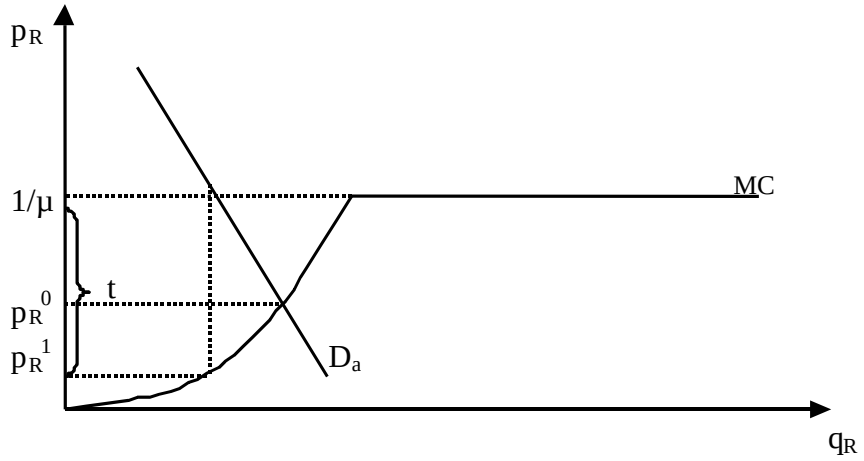
[7] Shoven and Whalley (1973) give a proof of existence. The natural requirement is that the mark-up function were homogenous of degree zero with respect to prices –see Ginsburgh and Keyzer (1997)- for a summary of the approach.

For the sake of clarity, it is better to present a graphical discussion beginning with the model of alternative technology. In fact, Graph 1 shows alternative (ii) when demand (D_a) is low enough as to have excess of installed capacity. P_R and q_R denote the tariff in terms of the numeraire and the production level in the regulated sector, respectively. MC represents the marginal cost of the existing technology (the increasing segment) and an alternative technology (the constant marginal cost section of the curve), and 1/μ stands for the benchmark regulated price.

Graph 1: Non-operative price-cap



Given D_a, p_R should fall to p_R^0. However, a tax t is imposed (mark-up) to compensate owners of capital so that $p_R^1(1+t) = p_R^*$ = 1/μ. For that (t > 0) to be satisfactory for the firm, it must be assumed that demand is inelastic enough. In the case of the model we will simulate, since the regulated good is also used as an intermediate input for the rest of the economy, substitution in consumption will not prevent that the total revenue requirement is reached[8].

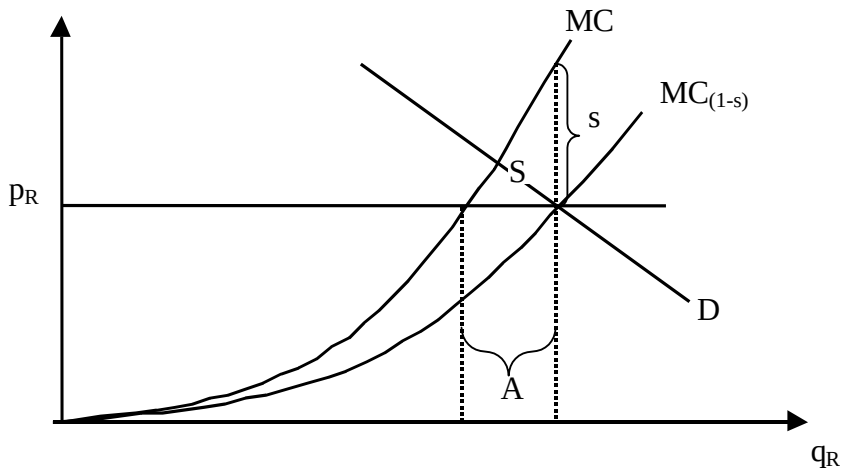
"Tax" revenue are transferred from customers to shareholders of the regulated firm.

Note that t could be negative as it is shown in Graph 2, that is a subsidy s. If an alternative technology does not exist, the firm will continue operating if the additional

[8] Alternatively, it can be assumed a LES utility function, with minimum standards of consumption for regulated goods.

units (A) marginal costs are covered (triangle S). Since the obligation of service was established in the original contract between the regulators and shareholders, we will assume that the shareholders cover the excess costs –implicitly in the form of a subsidy to the operative management of the firm. This internal subsidy *s* can be seen in the figure below; in this case *s* is computed so that net price to customers equals the price-cap settled at level p_R .

Graph 2: Subsidy and alternative technology



In summary, Graph 2 shows the case of an internal subsidy, funded with a tax on shareholders of the regulated firm. We will see later that when shareholders are foreign, this subsidy will be accompanied by an inflow of capital that reduces the need of foreign currency.

Graph 2 also illustrates the case when the firm has the alternative of importing international capital. The incremental cost of the new technology is given by w^*A/μ, where w^* is the foreign factor reward and μ its average productivity. The firm will compare this cost with S, to choose the method for servicing the market. However, this will have consequences on the current account; if it covers the deficit with the existing technology there will be an inflow of capital; instead if the alternative technology is employed, the additional reward of foreign factors will impose a burden.

III. The structure of the analytical model

As any standard Ricardo-Viner model, each sector uses two different category of factors: one mobile, labor, and one non mobile, specific capital[9]. There are four domestic sectors of production (activities): I={1,2,N,R}, two of them are tradable sectors, T={1,2}, and the rest are producers of goods and services that are not tradable; sector N produces services and sector R represents sectors under regulation. Each activity produces only one commodity represented by J={1,2,N,R}. We assume that the utility and production functions correspond to the traditional neoclassical version. However, production sectors are related through input-output transactions, which play an important role in understanding the net impact of regulation on the economy. Prices of tradable goods are determined by the rest of the world[10], and domestic agents also import consumption goods that are imperfect substitutes of local production. Imports are not used for production.

The analytical representation of the aggregated regulated sector in this section deserves more attention. Though it is natural to think that the production function of that sector should exhibit some economies of scale or sub-additivity, we will assume that there are not non-convexities once specific capital is installed. This is a simplification with obvious theoretical costs, but it also contributes to concentrate our effort in determining the impact of regulatory mechanisms and not on the properties of the production set[11]. The main focus of the paper is in the short run, and when capital is installed the regulated sector is ex-post receiving a rent that compensates the initial investment. The alternative technology gives some hints on the long run effects; in that case, we assume constant returns to scale.

Domestic household

We assume that there is an only domestic agent that makes the decision on the consumption plan and receives all factor rewards (except for the regulated firm) and

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[9] A summary of the main characteristics of these models can be found in Bhagwati *et al*. (2000).

[10] The "small country assumption" in terms of Kehoe and Kehoe (1994).

[11] Dierker et al (1985) present an analysis of the existence of equilibrium when there are special pricing rules.

profits. So, we will not be paying attention to personal income distribution matters, though we can analyze factor distribution.

The domestic agent maximizes the utility function $u(c_1, c_2, c_N, c_R, m)$ subject to:

<1> $$\sum_T p_T c_T + p_R c_R + p_N c_N + p_m m = w\overline{L} + \sum_{I/\{R\}} r_I \overline{K}_I + \theta\pi^*_R + \theta t p_R G(L_R, K_R)$$

where θ is the share of domestic agents in profits of the regulated sector π^*_R and the last term corresponds to the compensatory transfer from domestic customers (t > 0) or to the firm from its shareholders (t < 0). In both cases, under price cap, t is computed so that $p_R = 1/\mu(1+t)$.

We obtain the familiar first order conditions for a maximum:

<2> $$u'_{c_T} / u'_m = p_T / p_m$$

<3> $$u'_R / u'_m = p_R / p_m$$

<4> $$u'_N / u'_m = p_N / p_m$$

c_T is consumption of domestic tradable goods, c_R is the consumption of goods and services under regulation and *m* are imports (a good produced abroad but not domestically) and p_T, p_R and p_m are their respective prices. *w* is the wage rate and r_I is the rate of return on capital in each sector. $\overline{L}$ and $\overline{K}$ represent the domestic agent endowments of labor and capital.

Domestic Production

F, H and *G* are the production function of the tradable, non-tradable and regulated sectors, respectively. We assume constant returns to scales in all cases.

i. Tradable Sectors

There is one firm that maximizes profits in each tradable sector. The net price for the firm is the price to consumers less the cost of intermediate inputs..

<5> $$\pi_T = \left[p_T - \sum_{J \neq T} a_{J,T} p_J - a_{R,T} p_R - a_{N,T} p_N \right] F_T(L_T, K_T) - wL_T - \sum_T r_T K_T$$

for every T=1,2. Notice that firms observe the incentive given by the net price after intermediate inputs costs. The maximum profit conditions are:

<6> $$\left[p_T - \sum_{J \neq T} a_{J,T} p_J - a_{R,T} p_R - a_{N,T} p_N \right] F_L = w$$

<7> $$\left[p_T - \sum_{J \neq T} a_{J,T} p_J - a_{R,T} p_R - a_{N,T} p_N \right] F_K = r_T$$

In both cases, the value of marginal product (corrected for intermediate costs) is equalized to the reward of the factor.

ii. Non-tradable Sector

<8> $$\pi_N = \left[p_N - \sum_T a_{T,N} p_T - a_{R,N} p_R \right] H(L_N, K_N) - wL_N - r_N K_N$$

<9> $$\left[p_N - \sum_T a_{T,N} p_T - a_{R,N} p_R \right] H_L = w$$

<10> $$\left[p_N - \sum_T a_{T,N} p_T - a_{R,N} p_R \right] H_N = r_N$$

iii. Regulated Sector

As we mentioned above, the regulated firm is treated as a neoclassical firm, and it behaves "competitively" though there is no entry. Net price is obtained as the difference between the regulated price and intermediate cost.

<11> $$\pi_R = \left[p_R - \sum_T a_{T,R} p_T - a_{N,R} p_N \right] G(L_R, K_R) - wL_R$$

Notice that in this expression K_R is given. The total rate of return of this sector is $r_R = \pi_R / K_R$. The optimal condition for profits is:

<12> $$\left[p_R - \sum_T a_{T,R} p_T - b_{N,R} p_N \right] G_L = w$$

$a_{R,T}$ and $a_{T,R}$ are input-output coefficients used to represent also technical gains due to privatization. A reduction in $a_{T,R}$ is an improvement of efficiency internal to the regulated firms, which reduces the requirement of intermediate inputs per unit of product. $a_{R,T}$ is a

reduction of the requirement of regulated input per unit of tradable output (due to a better performance of private operators).

Foreign Production

The rest of the world produces substitutes for our exports and import goods, using a factor of production F. Equations (16) to (18) give an alternative technology available for foreign owners to fulfill their obligation of services, using foreign capital.

<13> $\pi^*_m = p_m \alpha(F_m) - w^* F_m$

<14> $\pi^*_T = p_T \beta_T(F_T) - w^* F_T$

<15> $p_m \alpha' = w^*$

<16> $p_T \beta'_T = w^*$

<17> $m^s = \alpha(F_m)$

<18> $x^s = \beta_T(F_T)$

In the case of α' and β'_T constants, international terms of trade will be given by $p_T / p_m = \alpha / \beta_T$ (small economy assumption).

π^*_m and π^*_T represent profits in the foreign industries that produce import goods and perfect substitutes of tradables. w^*, the numeraire, is the wage rate of the only factor used abroad.

F_m and F_T are factor quantities employed in the corresponding industries. The production functions: $\alpha(F_m)$ and $\beta_T(F_T)$ give the total supply in equations (16), (17) and (18).

Foreign Agents

Foreign consumers receive the rents of foreign factors, including capital installed in the regulated sector as well as profits in that sector. It maximizes a utility function $v(x_T, m^*)$ that depends on the consumption of our tradable goods and of import goods. The budget condition is:

<19> $$p_m m^* + p_T x_T = w^* \overline{F} + (1-\theta)\pi_R + \pi_m^* + \sum_T \pi_T^* + tp_R G(L_R, K_R)$$

The foreign agent receives profits and capital return of the regulated sector, as well as the wage rate F and the proceedings of the mark-up factor. X_T are exports, that is domestic tradable goods bought by the foreign agent. The last term in equation <19> stands for the endogenous mark-up (positive) or internal subsidy (negative) computed as the difference between the benchmark tariff 1/μ (as seen by customers) and P_R (see section V).

Market equilibrium conditions

Equations (20) to (27) represent the equilibrium conditions for factors used domestically, and (28) is the equilibrium condition for the foreign factor. Equations (25) to (27) correspond to equilibrium in markets for goods: regulated, non regulated and imports.

<20> $$\overline{L} = L_1 + L_2 + L_R + L_N$$

<21> $$\overline{K}_T = K_T \qquad (T = 1, 2)$$

<22> $$\overline{K}_N = K_N$$

<23> $$\overline{F} = F_m + \sum_T F_T$$

<24> $$G(L_R, K_R) + q_R = \sum_T a_{R,T} F_T(L_T, K_T) + a_{R,N} H(L_N, K_N) + c_R$$

<25> $$F_T(L_T, K_T) + x_T^s = a_{T,R} G(L_R, K_R) + a_{T,N} H(L_N, K_N) + c_T + x_T$$

<26> $$H(L_N, K_N) = \sum_T a_{N,T} F_T(L_T, K_T) + a_{N,R} G(L_R, K_R) + c_N$$

<27> $$m^s = m + m^*$$

The solution includes determining the endogenous mark-up to cover differences between the current tariff and the one defined in the regulation in the price-cap case, i.e.: t such that $p_R = 1/\mu(1+t)$, or to cover the difference between the current overall rate of return on capital in the regulated sector and its benchmark in the rate-of return case, i.e.: t such that $\pi_R/K_R = w^*$.

Trade Balance

We can now see how the relation between the mark-up factor (and its mechanism of adjustement) and the trade balance arises in the model. From (1):

$$p_R c_R + \sum_{I/\{R\}} p_I c_I + p^* m = w\bar{L} + \sum_{I/\{R\}} r_I \bar{K}_I + \theta\pi_R + \theta t P_R G(L_R, K_R)$$

and since:

$$p_R c_R + \sum_{I/\{R\}} p_I c_I + px = w\bar{L} + \sum_{I/\{R\}} r_I \bar{K}_I + \pi_R + t P_R G(L_R, K_R)$$

$$px - p^* m = (1-\theta)[\pi_R + t p_R G(L_R, K_R)]$$

The left hand side is the trade balance and the right hand is the foreign share in regulated sector profits.[12]

This equation shows the interlink between the regulatory regime and the trade account. However this presentation is too restricted. In fact, domestic ownership is not sufficient to break the dilemma; domestic agents could reveal preference for foreign assets or goods, and put pressure on the trade balance anyhow. On the other hand, foreign ownership is not necessarily a source of stress on trade surplus, for example if profits are reinvested in the country.

A more general model should include more elaboration on the domestic and foreign agents portfolio and investment decisions.

Simulation of shocks

In the next section we consider the following shocks for the economy:

i. Change in $a_{R,I}$ in equations (5) and (8)

A reduction of $a_{R,I}$ could be interpreted as a savings obtained actively by the economy or as an improvement of quality of service or goods in the regulated sector supply that helps to reduce costs in other sectors. Domestic factors productivity increases and this consents a

[12] The trade balance must compensate the current account result. Notice that it is not influenced by entrance and exit of capital "in the same period": the net impact is: - $r_R K_R$.

reduction of the price of exports or an increase in domestic profits and wages. This in turn increases the demand for regulated services and imports. The net effect is not well determined ex-ante.

ii. Change in $a_{I,R}$ in equation (11)

Let us assume that regulated services use less inputs per unit of output. In turn, this reduces domestic costs through an increase of net supply of tradable goods and should encourage exports. However, prices of regulated inputs to domestic producers are only partially changed (rate-of-return) or not changed at all (price-cap) depending on the regulatory regime. It is expected an increase in domestic profits and in dividends paid abroad; this should impact on current account and will require a compensatory surplus in trade balance.

iii. Changes in terms of trade

An increase in the price of exports will foster production at the tradable sector, but the overall impact and response could depend on the indexation of critical inputs to the changing environment, like regulated goods[13]. The final response will depend on the size of the tradable sector with respect to the economy and on if the sector is intensive in the use of regulated inputs.

IV. Results of Simulations with the basic model

Table IV-1 presents the Social Accounting Matrix of the economy of our basic example. Columns represent agents and rows correspond to markets for goods or services. S1 and S2 are tradable sectors, SN stands for the non-tradable producer, while SR is our aggregate regulated industry. HH represents domestic households, and RW indicates the Rest of the World "agent". A positive entry represents a sale and negative one corresponds to a purchase or payment of service; budget constraints oblige to balance when adding up the

[13] The literature on Dutch Disease shows how the assumptions on mobility and indexation of factor prices become crucial for the final results. One interesting aspect of this paper is that it emphasizes the role of the rule for determining tariffs in the final industrial structure. Dutch Disease literature focuses in the structure of the tradable sector itself, when one of the subsectors experiences a sudden and significant increase in its price. See for example Corden and Neary (1982). We explore these effects in the case of Argentina, where export sectors are not symmetrical.

elements in a column. For example, sector S1 receives 60$ for selling C1, pays to the other industries 30$ for inputs, and uses 30$ to reward factors of production.

Balance must also be fulfilled when adding up elements in a row, in this case because a row represents a market and we are assuming that there is equilibrium in the benchmark. C1, C2, CN, and CR correspond to goods or services produced by tradable sectors, non-tradable and regulated industries, respectively. M1 and M2 are imports and L and K_i stand for factors of production. If we take the market for each K_i, we see that production sectors are contributing with 15$ each to pay for its services, 45$ go to domestic households and 15$ are dividends to the rest of the world.

Table IV-1:

A SAM of a symmetric economy

	S1	S2	SN	SR	HH	RW
C1	**60**	**-10**	**-10**	**-10**	**-20**	**-10**
C2	**-10**	**60**	**-10**	**-10**	**-20**	**-10**
CN	**-10**	**-10**	**60**	**-10**	**-30**	
CR	**-10**	**-10**	**-10**	**60**	**-30**	
L	**-15**	**-15**	**-15**	**-15**	**60**	
K1	**-15**				**15**	
K2		**-15**			**15**	
KN			**-15**		**15**	
KR				**-15**		**15**
M1					**-2.5**	**2.5**
M2					**-2.5**	**2.5**

Source: Own elaboration

Reduction in the economy requirements of the regulated good.

Let us consider first the results of assuming that the production sectors are receiving the service or good with a better quality. Alternatively, this change could be interpreted as a technological progress that reduces the regulated good-intensity of the economy. Notice that in any case, the regulated sector is losing relative efficiency to the rest of the economy and its relative rate of profit will fall, as well as the demand for the industry; that is the reason it would be necessary some kind of compensation. Moreover, there will be

increases in nominal wages due to scale effects in manufactures. Domestic welfare[14] improves, anyhow, because the economy has a windfall gain in productivity.

Table IV-2 presents the results of assuming a 25% reduction in coefficient $a_{R,I}$, defined in previous sections. The scenarios represent a regulated firm that continues using the same technology but needs some kind of subsidy or compensation to cover deficits. Column PL represents a conceptual exercise for a pure walrasian model without regulation. Prices are freely determined within the economic process and the results help us to understand what is going on in an economy under regulation. Since we have assumed that there are no non-convexities, this is the case of a Ricardo-Viner traditional model with standard results. Columns PC and RR give the outcomes under price-cap and rate-of-return regulation, respectively.

In this case, when productivity of the economy is improving but the regulated firm is left behind, the regulated price should fall; however there are monopolistic rents to protect and therefore, we compute an increase in the mark-up (1+t), so that demand price remains at its initial level.

Table IV-2:

Reduction (25%) in the economy requirements of the regulated good

	PL	PC	RR
Domestic Welfare	**8.4**	**8.1**	**7.2**
Wage rate	**6.3**	**6.1**	**5.3**
r_R (3)	**-8.3**	**-6.2**	**0.0**
P_R (2)	**-0.5**	**0.0**	**1.5**
Exchange Rate(1)	**0.1**	**0.3**	**0.9**
Exports	**-4.1**	**-2.5**	**1.9**
X / GDP (16.7%)	**14.4**	**14.7**	**15.7**
GDP	**6.3**	**6.3**	**6.2**

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R.total rate of return of the regulated service

[14] The welfare changes are computed in terms of the equivalent variation as a percentage of household income.

Source: Own elaboration

As expected, domestic welfare increases in all cases, though the highest increment is observed under full prices adjustment, PL, that is without intervention. We know that this is impossible or at least highly improbable, because due to the technology or the size of the market, the firm is a monopoly, and we are obliging it to mimic the workings of a competitive market. Since one of the fundamental questions of this paper is referred to trade performance under different regulatory regimes, we show in the table the performance of exports. Total exports diminish relative to the benchmark and this is due to a fall in the regulated industry profits: demand for regulated goods now is lower than initially and the wage rate is higher.

Let us compare now these results with the PC solution. Under this solution, the price to the firm must be pushed back to its initial level in terms of foreign currency. This is accomplished, in terms of the model, with an additional tax or mark-up increase that is paid by domestic customers to the firm; dividends are sent to foreign shareholders, and this obliges the country to improve its trade balance (now, exports are reduced less than in the case of flexible prices). Domestic welfare is increasing less than in the case of flexible prices, PL.

The welfare improvement is still lower under rate-of-return regulation, RR. In this case, the mark up is moved up to restore the rate of return of capital to its initial level, given in terms of the numeraire (foreign currency). Since prices and profits of the regulated sector were falling, the additional mark up compensates regulated capital and therefore the same amount of dividends can be sent to shareholders. Notice that exports grow and this is due to the restoration of the mentioned flow of dividends. In fact, incentives to export are not inducing a reallocation of resources to export industries; non-tradable goods are appreciating in all scenarios with respect to tradable.

Though these exercises are interesting themselves, they do not put the accent in the trade-off between controlling bad performance of the agent and having a good macroeconomic performance for the principal. The reason is that parameter $a_{R,I}$ is not necessarily a variable

under control of the agent, or that it is not internalized by the firm, and we must explore changes in $a_{I,R}$.

Efficiency gains within the regulated industry.

The efficiency gains in the regulated sector can be captured through reductions of $a_{I,R}$, the coefficient that represents inputs requirements from the rest of the economy, or by reductions in labor requirements per unit of output. Table IV-3 shows the results of assuming a 25% reduction of $a_{I,R}$. This is an internal gain of the regulated firm[15], normally expected as the result of a high-powered regulatory mechanism (price-cap).

A very interesting result is that domestic total welfare is not increased the most under PL, but under RR. The reason is that there is an efficiency gain obtained by the firm, but it is not allowed to keep it as part of its rate of return and it is fully transferred to domestic households and producers in the form of a price reduction. There is a pass-through from foreign agents to domestic agents[16].

Table IV-3:

Efficiency gains (25%) within the regulated industry

	PL	PC	RR
Domestic Welfare	**5.3**	**-0.3**	**7.4**
Wage rate	**4.2**	**-1.0**	**6.2**
r_R (3)	**14.7**	**51.6**	**0.0**
P_R (2)	**-7.9**	**0.0**	**-10.7**
Exchange Rate(1)	**-4.2**	**-1.0**	**-5.3**
Exports	**11.7**	**38.6**	**1.0**
X / GDP (16.7%)	**17.4**	**21.7**	**15.8**
GDP	**6.7**	**6.3**	**6.6**

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R.total rate of return of the regulated service

Source: Own elaboration

[15] Simulations considering efficiency loss of the same magnitude gave similar results but with the opposite sign.

[16] Owners of the firm will not necessarily have incentives to introduce the efficiency gains, however.

Exports performance exhibits dramatic differences: under PC exports must grow more that 38% while under RR, they almost do not react (they grow only 1%) because there is not outflow of dividends. Long run incentives to exports seem to be stronger under RR, quite close to PL. PN/PT is lower under RR than under PC.

We can give the following conjecture (obtained from an example; though general, an example still) as a corollary of this discussion. *PC gives incentives to improve efficiency; once obtained, the macroeconomic performance of the economy (particularly regarding the trade balance) could be satisfactory (because of the increase of exports). But, though PC could give the impression of fostering relatively exports more than RR, that could simply be the result of a passive adjustment to movements in the capital account*.

This arises a dramatic question: will the economy be able to open enough to cover the capital account deficit?. In fact, relative prices favor more exports under RR and PL than under PC, because PN/PT falls and tradable sectors find domestic costs lower. PC gives the impression of pushing exports, but RR replicates better the workings of a fully flexible economy, and though export performance is not that brilliant it establishes more sensible long run prices adjustments.

Increase in price of exports.

Table IV-4 shows the results of assuming a 10% increase in the price of one of export goods. In this case, the selection of the export sector is neutral due to symmetry. Under PL, welfare of domestic households increases though total exports are reduced; the reason is that the price of the second export industry stays behind not only of the other export good, but also of the non-tradable industries.

Table IV-4:

Increase in price of exports (10%)

	PL	PC	RR
Domestic Welfare	*0.4*	*4.1*	*1.1*
Wage rate	*5.4*	*9.5*	*6.1*
r_R (3)	*5.3*	*-22.6*	*0.0*
P_R (2)	*0.2*	*-4.8*	*-0.9*
Exchange Rate(1)	*0.2*	*-1.5*	*-0.2*
Exports	*-3.9*	*-22.5*	*-7.5*
X / GDP (16.7%)	*16.0*	*12.9*	*15.4*
GDP	*0.3*	*0.3*	*0.3*

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R.total rate of return of the regulated service

Source: Own elaboration

PC will give the highest improvement for domestic welfare, because there is an increase in domestic costs, specially the wage rate, and the increment of costs cannot be passed to customers; instead they are absorbed by shareholders reducing the flow of dividends abroad or increasing the inflow of "subsidies" to the firm by their owners.

V. Simulations for the Argentine economy.

Table V-1 presents the Social Accounting Matrix of an economy that replicates the main features of the Argentine economy as of 1997[17]. We have left aside financial transactions, as well as government and imperfections, such as unemployment.

What the matrix does, after that purification, is to show the relative intensity in the use of factors, the burden given by the dividends to be paid abroad and the relative weight of the regulated sector in total GDP.

[17] Considering the information available from National Accounts and Input-Output estimations (INDEC, 2001)

Regulated sectors represent about 10% of total GDP and total dividends paid abroad are estimated as 3% of GDP. We can see that Industry, Sector 2, is the heavier user of regulated sector products and services, followed by non-tradable sectors. Ownership of regulated firms is not concentrated in foreign agents as we assumed in the example; in fact, the profit tax (35%) itself explains why such assumption would not be tenable; our best approximation is $\theta = 0.5$, in terms of the model of Section III.

Table V-1:

A SAM based on Argentina (1997)

	S1	**S2**	**SN**	**SR**	**HH**	**RW**
C1	**13.2**	**-8.9**	**-0.2**	**-0.1**	**-1.2**	**-2.9**
C2	**-2.2**	**50.1**	**-8.0**	**-2.2**	**-28.6**	**-9.2**
CN	**-1.2**	**-9.0**	**82.8**	**-3.1**	**-69.5**	
CR	**-0.5**	**-4.5**	**-4.1**	**17.8**	**-8.7**	
L	**-2.3**	**-11.0**	**-31.2**	**-5.0**	**49.5**	
K1	**-7.1**				**7.1**	
K2		**-16.7**			**16.7**	
KN			**-39.3**		**39.3**	
KR				**-7.4**	**3.7**	**3.7**
M1					**-0.3**	**0.3**
M2					**-8.1**	**8.1**

Source: Own elaboration

Table V-2, Table V-3 and Table V-4 correspond one-to-one to the simulations performed in the previous section. General results respond to the same pattern we observed in the simulations of the symmetric economy.

Table V-2:

Reduction (25%) in the economy requirements of the regulated good

	PL	PC	RR
Domestic Welfare	**3.0**	**2.2**	**2.5**
Wage rate	**4.1**	**1.6**	**2.3**
r_R (3)	**-17.0**	**5.9**	**0.0**
P_R (2)	**-10.0**	**0.0**	**-2.7**
Exchange Rate(1)	**0.7**	**1.4**	**1.2**
Exports	**-2.1**	**4.3**	**2.7**
X / GDP (10%)	**9.6**	**10.2**	**10.0**
GDP	**2.3**	**2.2**	**2.3**

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R.total rate of return of the regulated service

Source: Own elaboration

Overall changes in GDP are lower than in Table IV-2: given the same magnitude for every shock. The reason is that the regulated sector share in GDP is also smaller than in the case of the symmetric economy we presented above. However, total changes are still important for, in the case of efficiency, they amount to 2% of GDP.

PL still represents a reference without correlation to reality, because we have admitted that regulated sectors technology and market structure would not consent the functioning of a competitive solution. Ideally, this rule should give the maximum *total* welfare improvements.

Accordingly, PL maximizes the domestic welfare change when the economy is experiencing an improvement of efficiency (Table V-2), but *that is not true when the regulated sector is gaining efficiency* (Table V-3). In fact, in the second case, the RR regime (rate of return fixed in foreign currency) increases welfare more than PL because the excessive profits are transferred to domestic customers via a reduction of price[18]. Remember that we are quoting domestic welfare in the Tables, and the proposition that

[18] They become implicit shareholders who have to cover also the increase in wage rate.

welfare improves the most under flexible prices would be shown true if we added up domestic and foreign welfare.

Table V-3:

Efficiency gains (25%) within the regulated industry

	PL	PC	RR
Domestic Welfare	**1.7**	**0.9**	**1.9**
Wage rate	**1.6**	**-1.2**	**2.1**
r_R (3)	**4.4**	**29.3**	**0.0**
P_R (2)	**-9.4**	**0.0**	**-11.0**
Exchange Rate(1)	**-1.1**	**-0.7**	**-1.1**
Exports	**2.4**	**9.3**	**1.2**
X / GDP (10%)	**10.1**	**10.7**	**10.0**
GDP	**1.8**	**1.8**	**1.7**

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R.total rate of return of the regulated service

Source: Own elaboration

Exports do not augment in the same proportion under RR than under PC because dividends are smaller and the domestic propensity to import is less than one. PC is more demanding of a domestic effort to repay the initial investment in the privatized sectors; in fact, the required increments under PC are very significant for Argentina: around 9%. This puts high pressure on the economy, not used to accessing easily international markets. The necessary increments under any of the rate-of-return adjustment mechanisms are much more modest, between 1 and 2%.

Though it is true that PC incentives efficiency, from the point of view of welfare improvement and exports effort, the domestic society could have reasons to adopt a low-powered incentive scheme when the efficiency gains are expected within the privatized sector.

Table V-4 illustrates the relevance of relative factor intensity for increases in price of exports. It shows the results of assuming a 10% increase in international prices of export primary goods and in international prices of export industrial goods. The impact on wages

is different because primary goods do not use labor intensively. In fact, when primary goods price goes up, wages fall in terms of foreign currency (remember that we are assuming nor unemployment neither wage rigidities) though they grow in terms of non-tradable goods (the most labor-intensive sector of the economy).

There are no significant differences due to the regulatory regime, when it is primary exports prices that are increased, all of them imply a reduction in total exports. Exports fall because there is substitution of value added manufactured goods for raw primary exports.

Table V-4:

Increase in price of exports

	10% Increase in price of primary exports			**10% Increase in price of industrial exports**		
	PL	**PC**	**RR**	**PL**	**PC**	**RR**
Domestic Welfare	**0.3**	**0.2**	**0.3**	*-0.2*	*0.6*	*0.1*
Wage rate	**-1.0**	**-1.3**	**-1.2**	*11.1*	*14.7*	*12.4*
r_R (3)	**-1.7**	**1.2**	**0.0**	*11.7*	*-20.8*	*0.0*
P_R (2)	**-3.4**	**-2.3**	**-2.8**	*3.2*	*-7.1*	*-0.7*
Exchange Rate(1)	**-3.2**	**-3.1**	**-3.1**	*3.1*	*2.7*	*2.9*
Exports	**-4.0**	**-3.2**	**-3.6**	*2.2*	*-6.0*	*-0.8*
X / GDP (10%)	**9.6**	**9.7**	**9.6**	*10.3*	*9.4*	*10.0*
GDP	**0.4**	**0.4**	**0.4**	*-0.3*	*-0.4*	*-0.3*

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). PL: Walrasian model, PC: model with price cap regulation, RR: model with Rate of Return regulation.(1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R .total rate of return of the regulated service

Source: Own elaboration

It is also important to take into account the relative size –see Table 6- of the sectors: industry represents a higher proportion of total exports (considering primary manufactured goods as industrial). Notice that total welfare is being reduced in PL, but this does not take into account the gains of foreign shareholders of privatized firms; under PC, when the regulated price is prevented from growing, the welfare improvement for domestic agents is maximum.

But it is also significant the difference in terms of welfare improvement under different regulatory regimes. We can see that the higher increase in domestic welfare is achieved under PC. This is due to the fact that the regulated price should grow but it is limited by the cap, and since domestic prices are going up (specially because non-tradable goods are highly demanded by industry) the regulated firm is experiencing a shrinking of profits.

There are also several interesting comparative effects of the increase of prices of primary and industrial goods. The first implies a reduction of the price of non-tradable goods relative to tradable; the exchange rate is under-appreciated, and that appreciation is independent of the regulatory regime. Primary sectors are not intensive users of regulated goods and services. The situation is the opposite when it is manufactures export prices that are increased; the exchange rate depreciates because there is an increase in domestic demand for non-tradable goods[19].

VI. An appraisal of the long-run solution

To represent the workings of the price-cap we have considered an alternative way for modeling service obligation. We have the case of a firm that has an alternative technology that substitutes local technology. The firm will choose the less costly between the internal subsidy or the alternative technology. This new investment could influence trade balance. However, notice that the net effect of the initial inflow and the final outflow (assumed to happen in the same period) is simply the opportunity cost of foreign capital.

Table VI-1 presents the results of a reduction of efficiency of the firm. In this case we allow the firm to use a second technology to compensate the cost increase. Since $\boldsymbol{a_{I,R}}$ is a parameter under control of the regulated firm, the decision on how to cover deficits of the firm is in its shareholders´ hands, and it should be expected that they will choose the

[19] The simulations show also evidence of Dutch Disease, in terms of activity levels of tradable sectors that are not benefiting from price increases. In both cases, resources are reallocated to the booming sector and this implies reduction of the activity level of the other export industry. Corden and Neary (1982) consider two effects of a boom, a "resource movement effect" and a "spending effect", referred to the drawing of resources from the rest of the economy and to the extra spending due to higher real income.

minimum cost strategy. This is specially important for the case of a loss of efficiency, for the firm could substitute the local methods for imported capital.

The use of a second technology can be cheaper but implies dividends outflows. This can be compared with the same exercise but financing the difference between the price cap and the marginal cost through a monetary contribution form shareholders (columns SU).

Table VI-1:

Efficiency loss 25% within the regulated industry in a model with price-cap regulation

	Symmetric Model		*Argentine Model*	
	NT	**SU**	**NT**	**SU**
Domestic Welfare	**-0.9**	*0.4*	**-1.0**	*-0.9*
Wage rate	**-6.1**	*1.1*	**-2.7**	*1.4*
r_R (3)	**-38.9**	*-53.1*	**-25.7**	*-32.7*
P_R (2)	**0.0**	*0.0*	**0.0**	*0.0*
Exchange Rate(1)	**-0.9**	*1.1*	**-1.3**	*0.8*
Exports	**34.9**	*-39.6*	**13.0**	*-10.3*
X / GDP (16.7% / 10.0%)	**23.6**	*10.8*	**11.5**	*9.2*
GDP	**-4.6**	*-6.4*	**-1.6**	*-2.0*

N.B.: changes in percentage levels, except for X/GDP (benchmark in brackets). SU Subsidy, NT: New Tecnology. (1) Exchange Rate: weighted average price ratio between non-tradables and tradables (P_N/P_T); (2) P_R:Price of the regulated service; (3) r_R .total rate of return of the regulated service

Source: Own elaboration

In the Argentine case, under PC, the firm experiences a lower loss when the second technology is introduced (-26% instead of –33%) but that is a bad solution for the economy because in the second case exports have to grow 13%, *while in the first solution exports can fall*!

The solution with an internal subsidy gives an illusory increase in welfare too (symmetric model). The economy is less productive, but the problem is covered by the shareholders who agree to subsidize the firm operation. This capital inflow helps to relax exports and leaves more goods in the hands of domestic households. There is no doubt that that solution is transitory; and it is clear that it cannot last too much. With respect to the

long run incentives to export, the SU solution is harmful since relative price of tradable to non-tradable goods is falling.

VII. Final remarks

The problem of regulation encompasses the trade off between risk sharing and asymmetric information costs.

The choice between low and high-powered incentive regimes depends therefore on the relative weight of those elements on expected benefits and on the social costs ; the latter stem mainly from the distortion introduced in the economy when the regulated firm is subsidized with more taxes.

This paper helps to understand that:

1. Those costs may underestimate the true costs if international trade, the relation of the economy with the rest of the world, is not taken into account.
2. In this vein, the capital account and the rate of exchange regime could be key elements to select the regulatory regime. For example, a currency board regime (or the lack of domestic opportunities for profits reinvestment) could be too demanding on the trade account under a pure price-cap regime. That is, the potential inconsistency between the international trade regime and the regulatory regime should not be rejected a priori.
3. There are also obvious differences between the short and the long run adjustments, and this has to be taken into account to evaluate the impact of temporary or permanent shocks. For example, a loss of comparative efficiency of the regulated sector could be faced with the same technology or with new investments; the first solution puts less pressure on the trade performance of the host country.
4. The response to an increase in industrial exports prices should be an increase in exports; however a price-cap regime could reverse that expected reaction. The booming of exporting industries increases domestic prices of inputs and factors; the regulated firm sees an increase in costs and a reduction of profits, reducing the pressure on the capital account, as well as on the necessary trade surplus.

To address these issues we have worked both with a simulated theoretical model and with a CGE model for Argentina. The magnitude of the effects found are not negligible.

	Reduction (25%) in the economy requirements of the regulated good	Efficiency gain (25%) within the regulated industry	Increase in price of manufacturing exports (10%)
Exports	(SYM) RR > PC > PL (ARG) PC > RR > PL	(SYM) PC > PL > RR (ARG) PC > PL > RR	(SYM) PL > RR > PC (ARG) PL > RR > PC
Incentives to exports	(SYM) PL > PC > RR (ARG) PL > RR > PC	(SYM) RR > PL > PC (ARG) RR > PL > PC	(SYM) PC > RR > PL (ARG) PC > RR > PL
Domestic welfare	(SYM) PL > PC > RR (ARG) PL > RR > PC	(SYM) RR > PL > PC (ARG) RR > PL > PC	(SYM) PC > RR > PL (ARG) PC > RR > PL

In the table above we are comparing the performance of the different regimes with respect to exports, exchange rate (incentives to exports) and domestic welfare in the cases of a symmetric economy (SYM) and of the Argentine economy (ARG).

One interesting thing is that SYM and ARG effects are similar in the case of and efficiency gain internal to the firm. That is, factor intensity differences among sectors are not relevant for the qualitative performance of regulatory regimes.

VIII. References

Bhagwati, J.N., A. Panagariya and T.N. Srinivasan (1998), *Lectures on International Trade*, Second Edition (Cambridge MA: The MIT Press).

Corden W.M. and J.P. Neary (1982), "Booming Sector and De-Industrialisation in a Small Open Economy", *The Economic Journal*, Vol.92, Issue 368, December, 825-848.

Chisari O.O., A. Estache and C. Romero (1999), "Winners and Losers of Privatization and Regulation of Utilities: Lesson from a General Equilibrium Model of Argentina", *The World Bank Economic Review*, May, Vol.13, no.2, pp.357-378.

Dierker E., R. Guesnerie and W. Neuefeind (1985), "General Equilibrium When Some Firms Follow Special Rules", *Econometrica*, Vol.53, No.6, pp.1369-1393, November.

Ginsburgh V. and M. Keyzer (1997), *The Structure of Applied General Equilibrium Models*, (Cambridge MA: The MIT Press).

Guasch, J. L. (2003), "Concessions: Bust or Boom? An Empirical Analysis of Ten Years of Experience in Concessions in Latin America and Caribbean" *The World Bank Insitute*, Washington DC.

Hoque A. (1997), "Effects of Tariffs and Factor Endowments on Income Distribution and Output Composition", *Economic Notes*, 3, 549-566.

Jones R. and H. Kierzkowski (1986), "Neighbourhood Production Structures with an Application to International Trade", *Oxford Economic Papers*, 38, 59-76.

Kehoe P.J. and T.J. Kehoe (1994), "A Primer on Static Applied General Equilibrium Models", *Federal Reserve of Minneapolis Quarterly Review*, Spring, Vol.18, No.1.

Laffont J.J. and Martimort (2002), *The Theory of Incentives: The Principal - Agent Model*, (Princeton (NJ): Princeton University Press)

Laffont J.J. and J.Tirole (1993), *A Theory of Incentives in Procurement and Regulation*, (Cambridge (MA): The MIT Press)

INDEC. (2001), *Matriz insumo Producto Argentina 1997*, Ministerio de Economía. Buenos Aires, Argentina.

Navajas F. (2000), "El impacto distributivo de los cambios en los precios relativos en la Argentina entre 1988-1998 y los efectos de las privatizaciones y la desregulación económica" in La Distribución del Ingreso en la Argentina. Fundación de Investigaciones Económicas Latinoamericanas. Buenos Aires, Argentina: FIEL.

Shoven J.B. and J. Whalley (1973), "General Equilibrium With Taxes: A Computational Procedure and an Existence Proof", *The Review of Economic Studies*, Vol. 40, Issue 4 (October), 475-489.

Ugaz C. and C. Waddams-Price eds.(2003), *Utility Privatization and Regulation*, E.Elgar, forthcoming.

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