

The Theory and Practice of Regulation with Multinational Enterprises*

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Abstract

The ability of firms to operate in several different markets at the same time is changing regulators' tasks. Regulatory bodies are now having to deal with multinational firms which spread their business activities all over the world. This paper analyses the theory and practice of regulation in terms of the multinational dimensions of regulated firms. We show that the perceived theory of regulation is indeed affected, and that new issues arise both from a positive and normative point of view.

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1 Introduction

The phenomenon of business internationalization is a main aspect of today's economic systems. Firms may serve foreign markets by exporting goods or by turning into multinational enterprises (MNEs henceforth). In the former case they produce in one country and export abroad, while MNEs open production plants in different countries and provide markets with local production. An empirical comparison of these phenomena shows that in 1985, world sales of all MNEs' foreign affiliates equalled 99% of total world exports; the same figure rose to 122% in 1991. Thus, from at least 1991 onwards international production has surpassed exports as the principal means of delivering goods and services to foreign markets, and more recent figures confirm this trend (U.N.C.T.A.D. (1996)). Thus the process of international expansion is now mainly taking place through the setting-up of foreign subsidiaries.

In this paper we analyse the recent involvement of public utilities in this process of multinationalisation. Two events can be considered the main originating causes of this phenomenon, deregulation and privatisation, both of which have favoured the entry of new, often foreign, firms.

EDF, the former French electricity monopolist, has recently acquired London Electricity - an important energy distributor in the U.K. - and is planning to expand into the German electricity market. Similarly, United Utilities and Eastern Group control many of the former RECs (Regional Electricity Companies) in the UK. In 1997, ENDESA, the Spanish national energy group, acquired a 29.2% majority stake in the Chilean ENERSIS Group, thus becoming the largest electricity provider in the region. In 1993 the group Aguas Argentinas, led by the French multinational Vivendi, received a 30-year regulated franchise to provide water and wastewater services to 9 million inhabitants of metropolitan Buenos Aires. An

analogous story could be told regarding the telecommunications industry, where the process of liberalisation and privatisation which began in the late Eighties provided a strong impulse to internationalisation and to the expansion of MNEs (see Bohlin and Granstrand (1994) and Antonelli (1995)).¹ For instance, the UK firm Cable & Wireless had a majority stake in Hong Kong Telecom, the main local telecom services provider until 1997, and still supplies regulated services in Australia, Russia, the Caribbean and Sweden.

Many other examples can be found in financial sectors. The French insurance firm AXA owns Equitable Life, one of North America's biggest life insurers, together with Canada's Boréal Assurances, the country's fourth largest life insurer. As for the banking sector, the following quotation is particularly revealing: "... *United Bank of Switzerland ... operate(s) in more than 100 countries. As banks have become more global, however, their regulators have remained national.*" (The Economist 13-Dec-97). (For the proliferation of MNEs in banking see also Williams (1997).)

These facts show that the theory and practice of regulation has to be re-analysed in view of the fact that regulated firms are now deeply involved in the "globalisation" process. Firms' mobility and their ability to operate in several markets at the same time are changing regulators' tasks. Regulatory bodies are now faced with firms that spread their business activities all over the world, and as a consequence they sometimes directly regulate foreign-owned firms. We will show that in this case the traditional theory of regulation is subject to certain important modifications, and that new interesting areas of analysis arise.

Despite the importance of these developments, existing theoretical literature on MNE

¹At the same time there was a period of partial de-regulation in the sector. However, regulation is still required for a number of reasons, such as access pricing.

regulation is very limited. The aim of this paper is threefold. First, we review the few existing papers written on this topic. Secondly, we make use of some recent theoretical developments in contract theory to reinterpret them within the present context. Finally, we present some further areas of research.

Both exports and international production are new subjects for Regulation, and as such require specific analysis. Brainard and Martimort (1996) and Combes, Caillaud and Jullien (1997) analyse regulation with regard to exporting firms. We will mainly focus on international production for at least three reasons. Firstly, economic theory argues that MNEs tend to prevail over purely national firms when production requires intermediate inputs of a "public" nature from within the firm (e.g. technological knowledge and a firm's reputation).² Internal transfers of these almost-public goods lie at the basis of MNEs' success, and without them the additional costs of complex multinational organisations would lead to MNEs being dominated by traditional domestic firms. Interestingly enough, many regulated sectors are often characterised by the production and use of these intermediate inputs. Secondly, in the case of exporting firms, the two previous papers show that the link between national regulations originates from competition in international markets (as in Brander and Spencer (1985)). On the other hand, our analysis shows that in the case of MNEs the production process generates forms of interaction between different national regulations. Thirdly, output in several regulated sectors is often a non-tradeable service, so that international production remains the only way of serving foreign markets (Hirsch (1989)).³

²For a complete survey see Caves (1996).

³It is true that new information technologies may make some services tradeable. However, most of them remain non-tradeable. For example, the main Internet book seller, a US firm which *a priori* should not need foreign location, has recently decided to serve Europe by opening two sites *in loco* to save on transportation

According to the main stream of optimal regulation theory, we maintain that " *The focus is the design of regulatory policies that take into account the opportunities of strategic behavior provided by incomplete information and limited observability on the part of the regulator.*" (Baron (1989) (page 1349), see also Laffont (1994) and Laffont and Tirole (1993) page 34). The regulatory issues are then linked to *asymmetric information* between the regulated firm(s) and the regulating authority, *lack of commitment* by the regulators and imperfect regulators or *regulatory capture*.

We will concentrate on the case of monopoly regulation of privately informed multinationals. This is a stylized framework which obviously abstracts from numerous important features of the above-mentioned industries. Moreover, the analysis proposed in this paper concerns the utilities sectors (energy, telecommunications, transportation, water management, postal services etc.) more than it does other sectors (e.g. banking and insurance) as the latter need a more explicit treatment of competition. Deregulation and privatisation have often (but not always) reduced the monopoly power of the incumbent companies. However, our analysis enables us to single out the main new characteristics of the question in hand and provide a simple account of the presence of a competing fringe.

Two different viewpoints are of relevance to our analysis. Firstly, we are interested in studying how optimal regulation schemes change when the regulatory authority is faced with foreign-owned firms. Secondly, multinational enterprises - regulated by several countries at the same time - are in fact *common agents* of various national authorities, the *principals*. These firms are formed by several units operating in different countries, and one country's regulation may affect the activities of units located in other countries. This phenomenon

costs.

highlights the presence of links between the regulation of different countries.⁴ We will show that national regulations may affect each other not only by means of the (standard) external effects generated by regulated variables, but also through contract externalities affecting the regulators' ability to control the firm. The incentive schemes offered to a MNE by national regulators affect each other, and may be weakened as a consequence of this interdependence. Among the other effects, we show that a firm may be induced into cross-subsidising national activities to facilitate countries which attach greater importance to the firm's profit.

MNEs may also be able to "*... escape the regulatory reaches of any national government*" (Caves (1996) page 257). We show that these firms are indeed in a position to play national regulations against each other and take advantage of differences in the regulations of different countries. This ability will be an additional constraint on the regulators' problem, a third type of externality between regulations.

The presence of externalities should in principle call for cooperation/coordination between countries. However, we will show this may not be the case for a number of reasons, such as the presence of non-benevolent regulators, or due to certain dynamic features or to lack of commitment. Moreover, should coordination prove preferable, some issues would still remain with regard to the implementation of coordination. For instance, a supra-national authority may be asked to regulate the MNE, while national authorities may be assigned the task of collecting information on regulated firms. Moreover, delegating all national powers to a supra-national regulatory body may be unrealistic, and an alternative would be to design an internationally optimal ownership structure which permitted independent national authorities

⁴The recent common agency, or multiprincipal, theory analyses models in which a privately informed common agent acts in the interest of several un-informed principals. See Baron (1985), Martimort (1992) and Stole (1992).

to regulate. Finally, another option we look at is that countries optimally design the industrial structure of regulated sectors with the possibility either to accept or ban the participation of MNEs.

The rest of the paper is organised as follows. In section 2 we begin by briefly summarising the main features of a basic model inspired by the theory of optimal regulation, and then show how we can account for foreign-owned firms in a simple way. In section 3 we extend this basic framework by studying the effects of many examples of national regulation of MNEs' behaviour. Section 4 looks at the normative issues, while section 5 concludes by providing suggestions for further research.

2 A basic regulatory framework

Information is a main ingredient in the Principal-Agent paradigm used in the new regulatory economics. The regulated firm (the Agent) has some private information about production costs and/or market demand. Faced with this informational disadvantage, the regulating authority (the Principal) has to design incentive schemes (or contracts) inducing the firm to behave in the authority's interest. Moreover, due to distributive concerns, the regulator evaluates firm's profit less than consumer surplus. As a consequence, leaving profits to the firm is costly. The regulator then has to trade off allocative and distributive efficiencies.

The regulated firm furnishes output y , the production of which requires some intermediate, internally-produced input q (e.g. cost-reducing effort), as well as an externally-acquired input L (e.g. labour) at price w . The production function is $y = f(q, L)$. To produce intermediate input q the firm bears a cost $\varphi(q, \beta)$ with $\varphi_q > 0$ (subscripts indicate partial derivatives) where β is an efficiency parameter, the smaller the β the more efficient the firm: $\varphi_\beta > 0$,

$\varphi_{\beta q} \geq 0$. Inverting the production function, one obtains labour demand $L = L(q, y)$ (with $L_q < 0$, $L_y > 0$).⁵ Let $R(y)$ denote the firm's revenue, $p(\cdot)$ the inverse demand and t the regulatory instrument (tax or subsidy, respectively, if $t > 0$ or $t < 0$). The firm's profit is thus

$$\Pi = p(y)y - C(\beta, q, y) + t, \quad (1)$$

where total cost $C(\beta, q, y) = \varphi(\beta, q) + wL(q, y)$ is composed of the cost of obtaining the intermediate input, and the final-stage production cost.

The regulator maximises a utilitarian objective function. Social domestic welfare is a weighted sum of net consumer surplus, tax receipts (or transfers to the regulated firm) and total firm profit. Let $V(y) = [S(y) - p(y)y]$ and $S(y)$ respectively denote the net and gross consumer surplus. The profit made by the firm is weighted with $\alpha < 1$. Finally, the objective function maximised by the regulator is

$$W = V(y) - t + \alpha\Pi$$

where, for the sake of simplicity, we assumed a zero cost of raising public funds.

The firm knows the true value of β while the regulator has only some priors on β according to a cumulative distribution function $F(\beta)$ and a density $f(\beta) > 0$ over an interval $B = [\underline{\beta}, \bar{\beta}]$. The asymmetric information parameter β affects the intermediate input production phase. Most of the literature on MNEs shows that MNEs differ from purely national firms in their ability to produce intermediate inputs which are used at low or zero additional costs by all the final stage subsidiaries. Internal production of intermediate inputs is then a key aspect of

⁵ $L(q, y)$ is obtained inverting $y = f(q, L)$ and subscripts denote partial derivatives. Standard production functions imply $L_{qy} < 0$ which simply states that, for a given q , the possibility of substituting L with q decreases as y increases.

MNEs' activities and can be reasonably considered a source of private information for MNEs.

The regulator observes the total production cost C , as in Laffont and Tirole (1993). Observing C and y , the regulator can infer q and then order the firm to produce a certain amount of intermediate input and output with a regulatory contract of the type $t(q, y)$.⁶

A fully informed regulator would be able to set regulation in order to equate marginal cost and benefit for both input and output, respectively $\varphi_q(\beta, q) = -wL_q(q, y)$ and $p = C_y$ where $-wL_q$ is the (marginal) reduction in the final stage production cost. When, on the contrary, the regulator does not know how efficient the firm is, he has to design a contract to maximise the expected value of social welfare under an incentive compatibility constraint (to anticipate the firm's production decisions) and a participation constraint which induces the firm into voluntarily accepting regulation. A necessary condition for incentive compatibility (see Baron (1989) page 1367) is

$$\Pi(\beta) = \int_{\beta}^{\bar{\beta}} \varphi_{\beta}(u, q(u)) du, \quad (2)$$

where $\Pi(\beta)$ is the profit earned by a firm with type β and positively depends on the amount of q . The optimality conditions for intermediate input and output (or price) in this case are

$$\varphi_q(\beta, q) + (1 - \alpha) \frac{F(\beta)}{f(\beta)} \varphi_{\beta q}(\beta, q) = -wL_q(q, y) \quad (3)$$

$$p = C_y. \quad (4)$$

Expression (3) shows that allocative efficiency is negatively affected by asymmetric information, and intermediate input is downward distorted. If the regulator increases q , he also increases the profit which is left to the firm (by (2)) and this explains the second term on the

⁶In some cases q may not be observable. As shown in a previous version of this paper, and in Calzolari (1999), our analysis still holds in this case, which corresponds to non-observable cost regulation.

left hand side of (3) increasing marginal input cost. On the contrary, output does not affect informational rent (see (2)) and is of no use in correcting incentive problems. It is chosen according to a non-distorted marginal-cost pricing rule, an application of the *incentive-pricing dichotomy* result in Laffont and Tirole (1993, page 178). Moreover, it can be easily shown that optimal regulation leaves the least efficient firm with zero profits. Anticipating some of the results in the next section, this may no longer be the case when the regulated firm has real outside opportunities.

A simple way of accounting for MNEs is through international ownership. If the regulated firm is a foreign MNE, then the owners are usually foreigners (a domestic MNE that also serves foreign markets will be considered later on). Let the domestic ownership share be θ such that $\theta_f = 1 - \theta$ is foreign ownership. Moreover, it is a well-documented fact that MNEs have strong bargaining power *vis-à-vis* host countries and may engage in country-specific lobbying activities in order to increase governments' interest in MNEs' profits (e.g. bribing national regulators or engaging in country-specific advertising campaigns to increase citizens' general interest in the firm). Albeit rather *ad hoc*, this simple description of lobbying enables us to study the imperfections in the delegation of regulatory authority to regulators with private agendas.⁷ Let σ denote the increase in the profit weight due to lobbying/bargaining aspects: the profit weight can be finally broken down into $\alpha = \theta + \sigma$ and will always pertain to the respective case with $\alpha < 1$ for any value of θ and σ .⁸ A simple inspection of optimality conditions shows that $\frac{\partial q}{\partial \alpha} > 0$ and $\frac{\partial y}{\partial q} > 0$. The more domestic citizens own the firm and/or

⁷Grossman and Helpman (1994), Feenstra and Lewis (1991) and Martimort (1996) use precisely this interpretation for profit weighting in social welfare functions. See also Graham and Krugman (1991).

⁸For $\alpha \geq 1$ the well-known Loeb-Magat paradox would apply. $\alpha < 1$ can be easily obtained in a realistic model with lobbying cost $C_l(\sigma; \alpha)$ such that $\lim_{\alpha \rightarrow 1} C_l(\sigma; \alpha) = +\infty$ for any $\sigma > 0$.

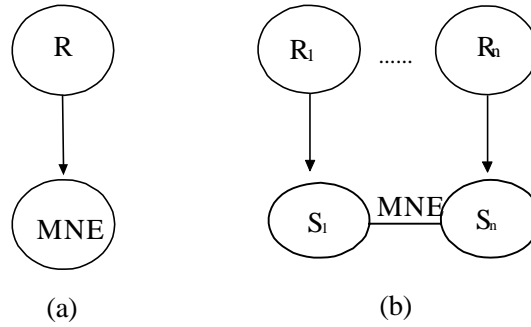


Figure 1:

the more the MNE lobbies the regulator, the larger input and output are going to be.

3 Regulation of a multinational by several national authorities: a positive approach

We now look at the effects of multiple national regulation on the behaviour of a regulated MNE. An MNE which is regulated by several countries at the same time, becomes a common agent of the national authorities (the principals). This change in perspective with respect to the previous section is illustrated in figure 1.

Case (a) refers to the traditional regulator-firm (respectively R and MNE in the figure) setting of the previous section. Case (b), describes the relationship between several national regulators (R_i) and an MNE. The subsidiaries (S_i) of an MNE are materially located in several different countries, and are under the jurisdiction of different regulatory agencies. As we have already pointed out, the activities of subsidiaries are generally not independent. Common production of intermediate inputs and internal allocation of resources create the links between subsidiaries' production and thus between national regulations. This gives

rise to several interesting issues which we are now going to list so as to provide a reader's guide to the analysis in this section. (1) *Links (externalities) between national regulations*; (2) *Common cost allocation*; (3) *Competition in national markets*; (4) *Differently uninformed national regulators*; (5) *Non-benevolent regulators and lobbying by MNEs* (this theme will be treated together with the previous ones).

3.1 Links between different national regulations

At least two types of externalities between different national regulations may arise when dealing with an MNE. Firstly, the variable(s) regulated in one country may directly affect the welfare of other regulatory authorities. As an example of this *standard externality* consider production and/or consumption in country i generating pollution which migrates to country j . Secondly, there is another externality which is closely linked to the presence of asymmetric information between the MNE and its regulators. This *contract externality* is ultimately related to the design of optimal regulatory contracts by uncooperative regulators with asymmetric information. Each uninformed regulator designs his optimal incentive regulation to make the informed MNE behave in his own interests, without taking into account the fact that he is also modifying the incentive relationships between the MNE and other regulators. Below we will mainly focus on this contractual externality, and consider standard externalities when they turn out to be of particular importance.

Regulatory agencies are limited by national jurisdiction. In almost all cases they are not allowed to directly interfere with production in other countries, and are limited to regulating just the local production phase.⁹ Moreover, what is produced abroad may well be unobserv-

⁹This means that jurisdictional boundaries give rise to incomplete contracts.

able and thus non-contractible. We will therefore assume that national regulators have the possibility of controlling and regulating those goods that subsidiaries produce within strictly domestic boundaries.

In accordance with the model given in the previous section, let us consider an MNE producing an intermediate input $Q = q_D + q_F$ (e.g. subsidiary-dedicated managerial effort or physical intermediate production factors) which is allocated to the output-producing subsidiaries located in country D and F . and let us assume that there is no opportunity of trading final outputs. The final production cost of subsidiary i is $w_i L(q_i, y_i)$. A modification of quantity q_i affects the marginal cost of producing q_j and thus also the decision concerning y_j . When input production exhibits decreasing returns to scale, a rise in q_i reduces q_j , whereas with increasing returns to scale it increases q_j . Thus, even if final production stages are physically separated, joint production and non constant returns to scale for intermediate inputs create links between national regulations. Moreover, outputs are substitutes (complements) when input technology exhibits decreasing returns to scale (increasing returns to scale).¹⁰ Each authority regulates domestic production, maximising national social welfare, $W_i = V(y_i) - t_i(q_i, y_i) + \alpha_i \Pi$ and, as usual, all elements of the model are common knowledge to the MNE and to the regulators. Note that the MNE is regulated on a consolidated basis, and the way input costs are allocated among subsidiaries is immaterial (see later for cost allocation).

If national authorities co-operate in regulating the MNE, then optimal production $(q_i, y_i)_{i=D,F}$

¹⁰A case of perfect complementarity occurs when the MNE produces a public input q used for production in all the final stage subsidiaries (e.g. headquarter managerial effort or R&D as in Helpman and Krugman (1985)).

satisfies

$$\varphi_{q_i} + (1 - \alpha_D - \alpha_F) \frac{F(\beta)}{f(\beta)} \varphi_{\beta q_i} = -w_i L_{q_i}$$

and $p(y_i) = C_{y_i}$ which parallel the two conditions (3 and 4) in the basic set up.

Calzolari (1999) shows that when regulators do not co-operate, conditions for optimal productions are then

$$\varphi_{q_i} + (1 - \alpha_i) \frac{F(\beta)}{f(\beta)} \left[\varphi_{\beta q_i} + \frac{\partial q_j}{\partial q_i} \right] = -w_i L_{q_i} \quad (5)$$

and $p(y_i) = C_{y_i}$.¹¹

There are two main differences with respect to cooperation. Firstly, profit weights are different. Secondly, when countries do not cooperate they generate contract externalities identified by the term $\frac{\partial q_j}{\partial q_i}$. Regulator i knows that, an increase of input q_i affects production in country j : q_i decreases if inputs are substitutes (decreasing returns to scale) $\frac{\partial q_j}{\partial q_i} < 0$, or increases if complements (decreasing returns to scale) $\frac{\partial q_j}{\partial q_i} > 0$. But these changes in the other country's production affect the MNE's profit by (2), profit decreases when inputs are substitutes and increases with complements. Thus, in the case of substitutes each regulator offers a higher powered incentive regulation to the MNE and competes with the other regulators increasing domestic production (recall that $\frac{\partial y_i}{\partial q_i} > 0$). In the case of complements, on the contrary each regulator offers a lower powered incentive regulation thus reducing domestic production.

A number of interesting results arise in such a situation.

- With complementarity and non-co-operative regulators, production in both countries is always smaller than with co-operative regulators. The opposite is generally true when

¹¹Calzolari (1999) also analyses the case of unobservable input (or sub-cost).

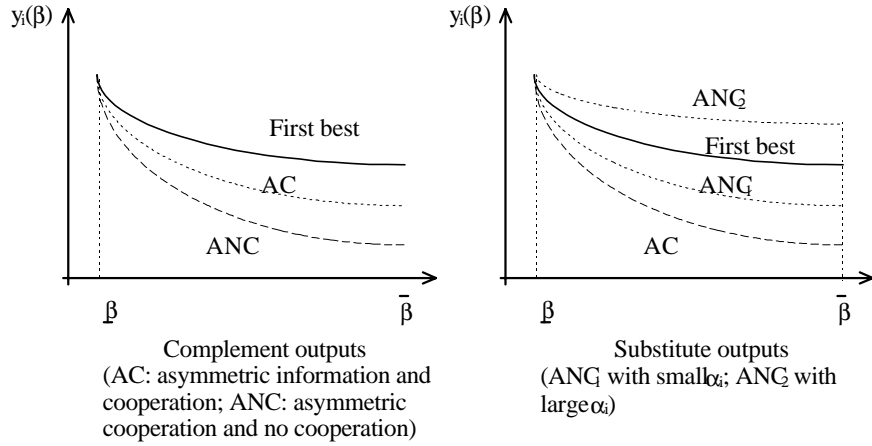


Figure 2:

outputs are substitutes. However, when the model is sufficiently asymmetric (i.e. when countries' profit weights and/or levels of demand elasticity are sufficiently different), production may be smaller in one country, and larger in the other, compared with cooperation. It can never be smaller in both countries (compared with cooperation) however.

- When profit weights are sufficiently different between one country and another (e.g. with the MNE mostly lobbying, and/or being mostly owned by, a single country) and in the presence of decreasing returns to scale, then consumption ends up being higher than in first best in the country with the largest profit weight while the other country under-consumes. Output y_i as a function of the inefficiency parameter β is given in diagram 2.
- This unusual over-consumption with respect to the first best can be explained if we acknowledge that in the case of substitutes, the contract externality $\frac{\partial q_i}{\partial q_j}$ may be negative

enough to make the whole marginal cost of product i smaller than in the case of the first best.

- The greater the number of regulators (i.e. the more the countries in which the MNE produces), the larger the contract externality. If, for the sake of simplicity, we consider a symmetric environment, the pricing condition becomes

$$\varphi_q + (1 - \alpha) \frac{F(\beta)}{f\beta} \left[\varphi_{\beta q} + (n - 1) \frac{\partial \hat{q}}{\partial q} \right] = -wL_q \quad (6)$$

where n is the number of countries and $\frac{\partial \hat{q}}{\partial q}$ is the externality generated by input q of any one country to all the other countries' production. The larger the n , the greater the distortionary term in absolute value. When $n = 1$ there are no more contractual externalities.

- Assume that country D owns a larger share of the MNE and/or is more intensively lobbied by the firm, so that country D 's profit weight is larger than F 's. In this case, output in country D is larger (and the price is lower) than in country F . Thus, $\alpha_i > \alpha_j$ implies $p_i < p_j$ and the MNE sells the same homogenous good at different prices in different markets (even if demand in the various countries is the same). The comparative statics with respect to profit weights is illustrated in diagram 3 (where α_D is increasing with a fixed α_F). Note that for sufficiently high α_D (α_D^3 in figure), output in country D does not depend on β , and regulator D is obliged to offer a pooling contract. For even larger α_D , output in country D may also increase in β . The contract externality is so high that the less efficient the MNE, the larger production in country D .¹²

¹²These two results are unusual from the point of view of incentive theory. Contrary to standard screening models, which require decreasing outputs for implementability, Calzolari (1999) shows that input q_D is feasible even when constant or increasing.

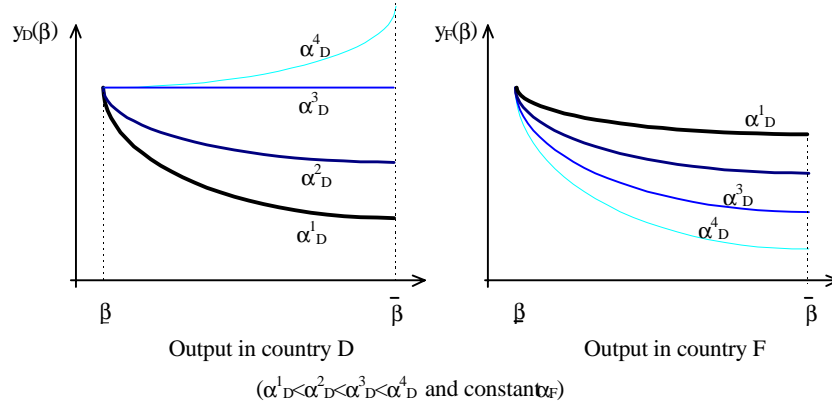


Figure 3:

- Similar results are given when demand in one country is particularly elastic. In this case, the country with the greatest elasticity of demand may over-consume with respect to the first best (the other may under-consume). A mixed effect can be obtained by adding both profit weight and demand asymmetries.
- Whenever output in country i is greater than in the other one, then intermediate input q_i is also larger than q_j . This implies that in order to produce the same amount of output, the subsidiary in country i employs less labour than the other, and assuming that wage rates are identical, $w_i L_i < w_j L_j$. The MNE *cross-subsidies* production in the country with the largest profit weight, and increases costs in the other country.
- With increasing returns to scale (complements) non-cooperation leads to under-provision of incentives, and thus outputs are reduced. Given that profit depends on output, the MNE prefers to be regulated by co-operating countries. This is also true with decreasing returns to scale (substitutability) and profit weights either sufficiently close to one or sufficiently similar. With decreasing returns to scale and profit weights sufficiently

close to zero, on the contrary, the MNE is able to take advantage of the non-cooperative behaviour of regulators, and gains more than it would in a situation of cooperation.

- All the previous results based on profit weights can be also reinterpreted in terms of the MNE's lobbying actions. Moreover, *ceteris paribus*, with increasing returns to scale the MNE concentrates all its lobbying resources in one country so as to raise local profit weight to the maximum. On the contrary, with decreasing returns to scale, the firm prefers to share lobbying resources out equally among countries. The two results hold because with increasing returns to scale, the MNE's lobbying program is convex, while with decreasing returns to scale it is concave.

Note that none of the variables regulated by a given country falls directly within in the objective function of the other country, and thus standard externalities are absent. Calzolari (1998) studies the example whereby countries positively view the amount of local labour employed by the MNE (e.g. due to unemployment). Finally, Bond and Gresik (1996) and Calzolari (1998) study a simpler model featuring a “minimal” MNE, where the firm only serves the foreign market, country D regulates the production and export of intermediate input q for market F , and country F regulates final output.

Competing national regulations When firms acquire international status they can actually threaten host regulators that they will shut down production and leave the country. Similarly, if a firm has to choose the country in which to install a new plant, it can make generate competition between regulations in different countries. Competition is even stronger when a firm's investment is indivisible, so it has to choose which country to serve. Of course the ability to get regulators to compete among themselves is not an exclusive prerogative of

MNEs. However, the fact they are already active in other countries makes the MNE's threat to "fly" away that much more credible. We are now going to examine how the incentives provided to an informed firm are modified by the desire to attract that firm to the country.

When MNEs can decide to produce for one, both or neither country, then the relevant participation constraint, say for country D , is

$$\Pi(\beta) \geq \text{Max} \left\{ \Pi_R, \text{Max}_{y_F} [R_F(y_F) - C(0, y_F, \beta) - T_F(y_F)] \right\}$$

where $\Pi(\beta) = \text{Max}_{y_D, y_F} [\sum_i R_i(y_i) - C(y_D, y_F, \beta) - \sum_i T_i(y_i)]$ and Π_R is the reservation profit the firm can obtain by leaving the two countries. It must be more profitable for the MNE to produce in both countries (the left hand side) than in just one country F or in neither of them. Calzolari (1999) shows that if regulators can differentiate regulations according to the firm's involvement in other countries (i.e. imposing contracts T_i and T_i^D respectively when the firm does, or does not, produce abroad), then production and profit are not affected by the threat to pull out. Calzolari and Scarpa (1999 a) show that when outputs are complementary, regulators know that the firm prefers to produce for both countries (marginal costs are smaller in this case), and thus the threat to "fly" away is hardly credible. On the contrary, in the case of substitutability, the firm prefers to produce for just one country (costs are lower). The threat is now credible, and the MNE may gain extra-rents. The least efficient firm, which usually gets the reservation profit, here obtains a profit that is larger than Π_R . Interestingly, this increase in profit to be left to the MNE, in equilibrium, may force one regulator to shut down the firm (e.g. when domestic consumer surplus is small).¹³

Results are different when the firm's *investment is indivisible* and only competitive inter-

¹³The possibility an agent may gain extra profits with substitutability has also been shown by Ivaldi and Martimort (1994).

action between national regulations is possible. Biglaiser and Mezzetti (1993) analyse a case in which national regulatory agencies simultaneously commit themselves to adopting regulatory incentive mechanisms to be used if the firm decides to operate in the country. Countries are thus differentiated: one obtains greater benefits (with respect to the other) from firms producing low quantities (i.e. poorly efficient firms), while the other obtains greater benefits from firms producing high quantities (i.e. efficient firms). In this way the relative power to attract firms is strongly differentiated, between the least and the most efficient firms, and thus competition for these firms is low. The country obtaining the greater advantage is in a position to offer more interesting contracts to the firm most likely to accept. On the contrary, fierce competition exists for intermediate firms, because from the point of view of these firms the two countries are equally as attractive. Countries cannot screen using the efficiency parameter of these intermediate firms, and pooling contracts are offered. Furthermore, competition between countries may become so strong that national welfares go to zero and the total surplus from consumption is transferred to firms. Interestingly enough, when the power of one country to attract firms is always greater than the other country's, the presence of a potentially competing country is a constraint upon the (invariable) victor. Unusually large rents are left to firms and pooling contracts are used for some sub-sets of types.

3.2 Common cost allocation

Non-constant returns to scale in input production, public intermediate inputs, and common fixed costs imply the absence of any clearly-defined cost allocations among subsidiaries. In some circumstances the MNEs may gain shifting profits from among subsidiaries (e.g. when countries employ different corporate tax rates) and non-allocated cost may serve this purpose.

Suppose, for example, that national regulators regulate local subsidiaries on the basis of the latter's cost, and fail to bear in mind the MNE's ability to allocate joint costs among subsidiaries. Let the cost plus regulatory transfer be $t_i = a_i + b_i C_i$ with $b_i \geq 1$ implying that regulation at least reimburses all the subsidiary's cost. The MNE would try to allocate higher cost shares to the subsidiary located in the country with the highest b_i (i.e. with the weakest incentive scheme), thus generating international cross-subsidisation.¹⁴

To counter this practice, governments generally impose certain rules on profit calculation (e.g. on MNEs' R&D expenses, see Hines (1993)). However, these sharing rules may themselves produce externalities among national regulations. Consider, for example, a simple MNE which produces a common facility at constant cost β . Assume the common "volume-based" cost sharing rule is in force, so that the fixed cost must be shared by subsidiaries in proportion to their respective volumes of production. Subsidiary i 's cost becomes $\beta y_i / (y_d + y_f)$. In this simple setting, the MNE only has to partially own one of the two subsidiaries in order that there be links between different regulations. In fact, the profit (net of regulatory transfers) would be $\Pi = \Pi_d + (1 - \rho)\Pi_f$, where ρ is the share of subsidiary f owned by other firms, and $\Pi_i = R_i(y_i) - \beta y_i / (y_d + y_f)$. We then have $\frac{\partial^2 \Pi}{\partial y_d \partial y_f} = -\beta \rho \frac{(y_d - y_f)}{(y_d + y_f)^3}$ which differs from zero as long as $y_d \neq y_f$ and $\rho \neq 0$. Production is a complement (a substitute) whenever domestic output is smaller (larger) than foreign output. On the contrary, without the cost allocation rule production would be independent.

In some circumstances, even if in theory it is possible to allocate costs to the MNE's subsidiaries, only the MNE may know the exact contribution to total cost made by different productions. For example, it may be that production y_i accounted for β_i percent of unit cost

¹⁴International transfer price is also often used by MNEs for profit shifting. See the survey by Gresik (1998).

and production y_j for $\beta_j = 1 - \beta_i$ percent. Mezzetti (1997) studies a multi-principal model which can be used to analyse this situation. He shows that the firm faces countervailing incentives as it would like to understate costs to one country and overstate them to the other. One result of this is that firms whose production makes similar contributions to total costs (i.e. similar β_i and β_j) are subjected to pooling regulations: they are asked to produce the same quantities (regardless of the true cost share) and face flat regulatory transfers.

Finally, Calzolari and Scarpa (1999 b) study a model in which the home regulator differently evaluates domestic and foreign earnings which are calculated by attributing stand-alone costs to domestic profits and incremental costs to foreign profits.

3.3 Regulated MNEs and competition

The increasing spread of MNEs is in part due to the processes of deregulation and privatisation which generally lead to stronger competition. There are now several documented cases in the utility sectors of services providers that are regulated at home but have unregulated subsidiaries in foreign countries.

Let us assume that the MNE is domestically regulated in country D . The optimality input condition in market D is as in (5). Regulator D knows that, due to the impossibility of subdividing the cost function, a change in input q_D affects the MNE's production in country F , thus modifying the firm's profit. However, the MNE is now free to decide how much to produce in the foreign country. In the two extremes of perfect competition and unregulated monopoly in the foreign market, quantity y_F is chosen according to $p_F = C_{y_F}$ and $dR_F/dy_F = C_{y_F}$ respectively, where R_F is the revenue in the foreign market. When imperfect competition holds abroad, the domestic regulator has to foresee not only how the MNE's production

abroad is going to be affected by domestic output ($\partial y_F / \partial y_D$) but also how the other firms' output is going to be affected ($\partial y_F^* / \partial y_D$). In the case of a competitive foreign market, it can be shown that over-production with regard to the first best results in the foreign country when inputs are substitutes. Similarly, when the MNE is an unregulated monopoly, it sells a larger output in country F than it would sell if it produced exclusively for that market.

With imperfect competition abroad, Calzolari and Scarpa (1999 b) show how a different evaluation of domestic and foreign profits eventually leads to cross-subsidies among subsidiaries. Moreover, if domestic regulation takes place before foreign competition, then the home regulator may distort home consumption to increase the foreign competitiveness of the MNE (an argument à la Brander and Spencer (1985))

3.4 Asymmetrically uninformed regulators

The domestic authority is generally better informed than the foreign one, since it interacts more often with the regulated firm. Let us assume, for the sake of simplicity, that the domestic regulatory authority is perfectly well informed about the MNE's characteristics, while the foreign one is completely uninformed. Both informed players, the MNE and the domestic regulatory authority, prefer to conceal their private information from the foreign regulator. As usual, in reporting an unrealistically high cost, the former is left with higher profits, while the latter may be able to extract a larger share of the MNE's profit. Interestingly enough, information may be exchanged among regulators. In Bond and Gresik (1997) the two regulators act simultaneously, and the authors show that when the MNE reports to the foreign (uninformed) authority, a pooling equilibrium may arise, indicating that the uninformed regulator has learnt nothing. This happens because the informed domestic authority may be

in a position to extract all the profits from the MNE and then the foreign authority has no reasons to distort incentives in order to reduce profits. Moreover, even if one regulator is completely informed, competing in terms of regulations with uninformed regulators may lead to an equilibrium position in which some MNEs still make informational profits.

Calzolari, Diaw and Pouyet (1999) show that when national regulators are better informed than foreign regulators about the MNE's activities in the domestic market, then competition between regulators (see the previous sub-section) is tougher. This may lead to asymmetric equilibria, whereby the firm produces only for one country, being more plausible than equilibria with the firm serving both markets.

Finally, a theoretical paper on sequential common agency by Calzolari and Pavan (2000) expressly deals with the informational advantage of the domestic regulator. The home regulator generally interacts first with the MNE, learns some information about the firm and is in a position to reveal some of this information to the foreign regulator before the latter deals with the same MNE. Reinterpreting some of the results given, it can be shown that the home regulator acts as a Stackelberg leader, and with complementary outputs he may find it an advantage to partially inform the foreign regulator. Information-sharing among regulators is then proved to be welfare-improving for both the regulators, and in certain circumstances also for the MNE. The basic idea behind this result is that information transmission reduces the informational distortion in both the regulatory processes.

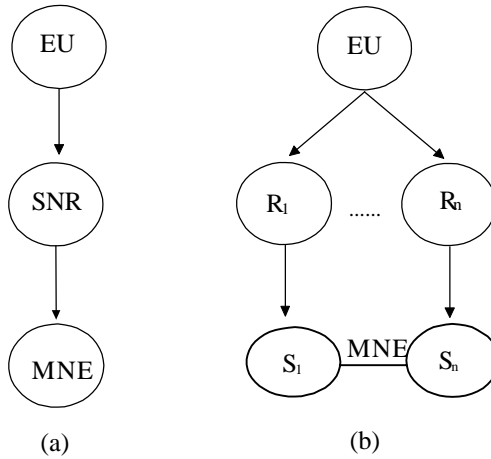


Figure 4:

4 Regulation links with multinationals: normative issues

Externalities among national regulators may require joint action towards regulating MNEs. However, the regulatory process is an imperfect one (due to asymmetric information, regulatory capture and lack of commitment) and the very joint action of national regulators may produce undesirable effects. Figure 4.1 represents two possible forms of regulation in a context like that of the European Union.

In (a) all the regulatory powers are delegated to a supranational (e.g. European) regulator that behaves in the general interests of the EU. In (b) the EU leaves all regulatory powers to national authorities, as in the previous sections. We do not wish to analyse the vast number of writings on centralisation and decentralisation: our aim is rather to present various forms of joint action towards international regulation, and then discuss their respective pros and cons.

Regulatory capture Regulatory capture supplies a second type of cost for the supranational regulator. Regulators, as agents acting out of self-interest, tend to maximise personal agendas, and this has to be taken into account in designing the optimal regulatory chart for MNEs. As the private information held by the MNE provides the firm with an informational rent, the MNE may share this rent with his regulator(s) in exchange for a more favourable form of regulation. Laffont and Martimort (1997) stress that the separation of regulatory powers acts against regulatory capture in the following way. Let us define the *power* of a regulator as his ability to use (private) information, thus leading to discretion, and let us assume that an MNE has two pieces of uncorrelated private information, one for each of two national markets. An auditing device provides a signal, one for each piece of information, and signals are correlated with information. Separating the regulatory agencies reduces their private information (they receive only one signal), as well as their power and discretion. Regulators (national or supra-national) are provided with a reward scheme for monitoring activity, and also to avoid collusion with the MNE. With independent national regulators, any monopoly over information acquisition is eliminated. National regulators do not co-operate in colluding with the MNE, and inflict externalities upon each others. The (Bayes-Nash) behaviour between regulators leads to inefficiencies in the process of collusion with the MNE. On the contrary, with the centralisation of regulation, a coalition between the MNE and the supranational regulator can lead to a more efficient collusive agreement, which would be costlier to prevent. The cost of avoiding collusion (in terms of distortions from the second-best regulatory contract with asymmetric information) may well be higher when countries cooperate and decide to regulate with an integrated authority. Such an integrated authority has to be paid higher rewards (rents) than the sum of the rewards due to

independent national regulators.¹⁵

Another *pro* in favour of the separation of regulatory bodies pertains to the supply side of the collusion exchange. If the MNE has to bribe several independent regulatory authorities, one for each country, then the cost of these bribes may be greater than that of bribing one single supranational regulator.¹⁶ Calzolari(1999) similarly shows that when the MNE has sufficiently strong lobbying power (σ sufficiently great in the model described in the previous sections) then this power would be better if it were 'diluted' among diverse national regulators. Letting the MNE concentrate intense lobbying in the direction of a single regulator would be harmful from the point of view of the sum of the various countries' social welfare.

Lack of commitment The results of the previous analysis are based on a simple but important fact: adding distortions to a second-best situation may improve welfare. This observation underlies another *pro* in favour of the separation of regulation, which refers to the dynamics of regulation and the lack of commitment by regulators to stipulate long-term contracts (see Olsen and Torsvik (1995) and Martimort (1999)). Let us suppose that regulation takes place during two periods t_1 and t_2 , and that regulators lack the commitment power to write multi-period contracts. Assume, for simplicity's sake, that the efficiency parameter (the MNE's private information) can be either low or high. As regulators are not able to commit themselves fully to a long-term contract, the MNE realizes that any information revealed in t_1 will be exploited by the regulatory authorities tomorrow. For this reason, the following may

¹⁵Note that the Basle Treaty on international banking regulation requires that multinational banks be regulated on a consolidated basis by the home country. This procedure raises issues of collusion between the multinational banks and the national regulatory authority.

¹⁶This "influence activities" argument in favour of decentralisation has been emphasised by the Public Choice School when designing general institutional structures (see for example Congleton (1984)).

happen: either highly productive MNEs are given large rents in t_1 (to exactly offset the rent lost tomorrow if the truth is revealed today) or, if they are not given these large rents, they will prefer to mimic less productive MNEs and leave the regulating agencies with less valuable information in t_1 . With independent regulators there are then two distortions at play: a first contractual distortion due to multiple-principals (discussed in the previous sections), and a second distortion due to the lack of commitment. Combining the two, it may be better, under certain conditions, to let each country independently regulate the MNE. In fact, the MNE may be worse off being regulated by several national regulators (due to contract externalities), as the rents the efficient MNE can expect in t_2 would be lower than if it were regulated by a supranational regulator. As a result, regulators have to pay less in order to obtain the proper incentives today. The two inefficiencies, which taken independently both reduce the welfare of the countries involved, when taken together may turn out to be potentially beneficial with separated national regulators.

Issues concerning information acquisition Arrow (1974) argues that centralisation decreases communication costs and helps coordination, thus increasing total surplus. However, in the light of recent developments in yardstick competition theory (see Dana (1993)), it can now be shown that it may be beneficial to let national authorities separately regulate MNEs. National regulators independently acquire information about MNEs and are played off against each other in this process, thus reinforcing information transmission towards the top of the pyramid.

Another argument against centralisation based on information acquisition considers the dynamic interaction between the regulated MNE and the regulator(s). Consider a simple two-period setting in which the MNE operates firstly in the domestic market and then subsequently

in the foreign market. If the sole supranational regulator employed the static one-period regulatory contract, at the end of the first period he would be completely informed about the MNE's efficiency. As we have already shown, this would make it extremely costly to convince the firm to reveal private information in the first period and would possibly prevent all information being disclosed.¹⁷ On the contrary, with two independent national regulators acting sequentially, this question may not arise even if the second regulator to act observes the contract (but not the firm's choice) proposed by the first regulator. Calzolari and Pavan (2000) show that in this case regulators may also have to share some of the information (not all, otherwise the ratchet effect comes back) initially acquired by the domestic regulator (see above).

Partial delegation The previous analysis focused on the possibility of delegating all regulatory powers to a supranational regulator. However, in some circumstances partial delegation may be preferable. This latter option still needs to be fully analysed, although an initial case is investigated in Calzolari (1999). In section 3 we showed how the international ownership structure of a regulated MNE affects consumption in all countries involved, as well as the profits of the MNE itself. Before national regulation take place, an optimal ownership structure can be designed to maximise the sum of national welfare. It turns out that in the model in section 3, the optimal national ownership of a country is the greater, the more (less) elastic is foreign (domestic) demand. On the contrary, in a completely symmetric world, there are no reasons for differentiating national ownership, and MNEs are better off when owned equally by all the regulating countries.

¹⁷This question involving dynamic Principal-Agent models is known as the *ratchet effect*. See Laffont and Tirole (1993) chapter 8.

Another interesting application of partial delegation in the regulation of MNEs relates to international transfer pricing. When an MNE transfers an observable intermediate input to the output producing subsidiaries, the issue arises of the price of these exchanges. National regulators may want to delegate international transfer pricing regulation to a supranational regulator. It would therefore be interesting to study if, and when, the delegation of transfer pricing regulation to a supranational regulator helps national regulations get the MNE to behave, and how welfare improvements are distributed among the various countries. Similarly, in the case of cost observability (as in Laffont and Tirole (1993)), one could delegate transfer-price-fixing powers to a supranational regulator, and let national regulators draw up cost reimbursement contracts.

Should the transportation of outputs be feasible, countries could compare international production and welfare with MNEs and traditional firms. A first preliminary analysis shows the existence of a trade-off. With increasing (decreasing) returns to scale, the joint production of an MNE costs less (more) than with two separate firms. However, contract externalities exist in the case of an MNE, but vanish with two independent nationally-regulated firms. Interestingly enough, this trade-off also affects the firm(s)' payoffs. Calzolari (1999) gives an example showing that the profit of an MNE tends to be smaller than the sum of the profits of separate firms when there are decreasing returns to scale; the contrary holds with increasing returns to scale. We should then expect that MNEs prevail in regulated sectors with increasing returns to scale, and that independent firms would be encouraged to merge into a single MNE. On the contrary, national firms should prevail in a situation of decreasing returns to scale, while MNEs would split up into independent national firms. When outputs are internationally tradable, regulators also have the chance to allow national firms to provide foreign markets

with exports. When national firms are allowed to trade, a different externality arises among national regulation processes taking place *via* market competition (see Combes, Caillaud and Jullien (1997)). Thus, one has to compare the two types of contractual externalities (through MNE's production and through market competition) and the effects of separating or concentrating the production process. The comparison of all these various effects remains a largely unexplored area of research.

5 Conclusions

MNEs are spreading throughout the world, and we will all benefit from the greater competition and efficiency produced by these firms. However, these benefits will be lost if we fail to realise that the game played by MNEs is likely to be different from what regulators are used to.

In this paper we are concerned with studying how MNEs change the theory and practice of regulation. New features and issues arise both from a positive and normative point of view. Employing some recent developments in theoretical writings on multi-principals, we have surveyed the existing literature dealing with some of these issues and investigated others which still await theoretical inquiry.

MNEs generally employ an international production process involving the use of internally produced inputs. This intermediate stage makes final production interdependent, even if yielded in different countries. Interdependent production is the source of links among national regulations. In this paper we have shown how national regulations interact when dealing with such multinational firms. We emphasised the fact that asymmetric information passing between a regulated MNE and regulatory authorities lies at the heart of links between national regulations. Hence, information becomes an even more crucial aspect of regulation of

MNEs. If regulating countries fail to co-operate, the resulting reciprocal externalities lead to under- or over-consumption of the regulated good (depending on the underlying production technologies characterising inputs and outputs). MNEs are shown to cross-subsidise production in countries which are of greater interest from the point of view of the MNEs' profits. Moreover, a firm's ability to play regulators off against each other reduces the regulatory power of national authorities, thus leading to extra profits for the firm.

MNEs have considerable arbitration powers, and thus from the normative point of view, regulators should place more importance on employing traditional regulatory mechanisms. A major problem is that of understanding whether integration or separation of national regulations is the best way of tackling regulated MNEs. We analysed the pros and cons of these two alternatives, considering questions of information acquisition, non-benevolent regulators and the lack of commitment to regulatory schemes. Finally, we investigated a third way consisting in the centralisation of certain features of regulation, and in the decentralisation of others to national authorities.

Along with a survey of the mainstream theory of optimal regulation, we have concentrated on the kind of regulation particularly suited to the public utilities sector. However, the presence of MNEs is also relevant to other kinds of public intervention. For example, the presence of MNEs is of importance to the interaction between national competition policies (see the Kodak/Fuji case, in Baron (1997)). In such cases, MNEs are common agents of various national antitrust authorities. A similar thing occurs with international taxation issues, where the informational asymmetries among firms and tax authorities turn out to be of crucial importance. Finally, there are some regulated sectors, such as banking, which need, and are still waiting for, a sector-specific analysis of MNE regulation.

References

- [1] Antonelli, C., 1995, Technological Change and Multinational Growth in International Telecommunication Services, *Review of Industrial Organization*, 10: 161-180.
- [2] Arrow K., 1974, *The Limits of Organization*, Cambridge University Press, Cambridge.
- [3] Baron, D., 1985 Non-cooperative regulation of a non-localized externality, *Rand Journal of Economics*, 16, 4, 553-567.
- [4] Baron, D., R. Myerson, 1982, Regulating a monopolist with unknown costs, *Econometrica*, 50: 911-930.
- [5] Baron, D., 1989, Design of regulatory mechanisms and institutions, in *Handbook of Industrial Economics*, Schmalensee R. and R.D.Willig Ed.s, Elsevier Science Publishers.
- [6] Baron, D., 1997, Integrated strategies and international trade disputes: the Kodak-Fujifilm case, *Journal of Economics & Management Strategies*, 6,2,: 291-346.
- [7] Bernheim, B.D and M.D. Whinston, 1986, Common Agency, *Econometrica* 1995, July: 923-42.
- [8] Biglaiser, G. and C. Mezzetti, 1993, Principals Competing for an Agent in the Presence of Adverse Selection and Moral Hazard *Journal of Economic Theory*, 61: 302-330.
- [9] Bohlin E. and O. Granstrand 1994 *The race to European eminence: who are the coming tele-service multinationals?*, Bohlin and Granstrand Editors, North-Holland.

- [10] Bond, E. and T. Gresik, 199a, Regulation of Multinational Firms with Two Active Governments: A Common Agency Approach, *Journal of Public Economics* 59: 33-53.
- [11] Bond, E. and T. Gresik, 1997, Information Sharing between Asymmetrically Informed Principals, mimeo, PennState University.
- [12] Brainard L., D., Martimort 1996, Strategic Trade Policy design with Asymmetric Information and Public Contracts, *Review of Economic Studies*, 63: 81-105.
- [13] Brander, J. and B. Spencer 1985, Export subsidies and international market share rivalry, *Journal of International Economics*, 18: 83-100.
- [14] Calzolari, G., 1998, Regulation in an international setting, the case of a Multinational Enterprise, working paper GREMAQ, University of Toulouse.
- [15] Calzolari, G., 1999, Optimal regulation of multinational enterprises, working paper GREMAQ, University of Toulouse.
- [16] Calzolari, G., K. Diaw and J. Pouyet, 1999, Regulatory Competition and Exclusion in an International Context, mimeo, University of Toulouse.
- [17] Calzolari, G. and A. Pavan, 2000, Dynamic Interaction Between Mechanism Designers: the Role of Information Sharing, mimeo GREMAQ, University of Toulouse.
- [18] Calzolari, G. and C. Scarpa, 1999 a, Non-intrinsic common agency, working paper 84.99, FEEM Fondazione E. Mattei.
- [19] Calzolari, G. and C. Scarpa, 1999 b, Regulation at Home, Competition Abroad: a theoretical analysis, working paper University of Bologna.

- [20] Caves, R.E., 1996, *Multinational Enterprise and Economic Analysis*, Cambridge University Press.
- [21] Combes, P., Caillaud, and B., Jullien, 1997, Common Market with Regulated Firms, mimeo University of Toulouse.
- [22] Congleton R., 1984, Committees and Rent-Seeking Effort, *Journal of Public Economics*, 25: 197-209.
- [23] Dana J., 1993, The Organization and Scope of Agents: Regulating Multiproduct Industries, *Journal of Economic Theory*, 59: 288-310.
- [24] Epstein L.G. and M. Peters (1999) A revelation principle for competing mechanisms, *Journal of Economic Theory*, 88, 119-160.
- [25] Feenstra, R. and T. Lewis, 1991, Negotiated trade restrictions with private political pressure, *Quarterly Journal of Economics*, 56: 1287-1307.
- [26] Grahan E.M. and P.R. Krugman (1991) *Foreign Direct Investment in the United States*, 2nd edition, Washington Institute for International Economics.
- [27] Gresik, T. 1998, The task of Taxing Transnationals, mimeo, keynote speech for the Petropol Research Conference on Nation Resource Management, Bergen Norway, 22-23 October.
- [28] Grossman, G. and E. Helpman, 1994, Protection for sale, *American Economic Review*, 84: 883-850.

- [29] Hines, J. R., 1993, On the sensitivity of R&D to delicate tax changes: The behavior of U.S. Multinationals, in *Studies in international taxation*, edited by A. Giovannini, R.G. Hubbard and J. Slemrod E.ds, University of Chicago Press.
- [30] Hirsch, S. 1976, An international trade and investment theory of the firm, *Oxford Economics Paper*, 28, 258-69.
- [31] Ivaldi, M. and D. Martimort, 1994, Competition under nonlinear pricing, *Annales d'Économie et de Statistique*, 34, 71-114.
- [32] Laffont J.J., 1994, The New Regulatory Economics: Ten Years After, *Econometrica*, 62: 507-538.
- [33] Laffont, J.J., and D. Martimort, 1997, Separation of Regulators Against Collusive Behavior, mimeo Université de Toulouse GREMAQ.
- [34] Laffont J.J. and J. Tirole, 1993, *A Theory of Incentives in Procurement and Regulation*, The MIT Press, Cambridge Massachusetts.
- [35] Martimort, D. 1992, Multi-principaux avec anti-selection, *Annales d'économie et de Statistique*, 28: 1-37.
- [36] Martimort, D., 1996, The multiprincipal nature of government, *European Economic Review*, 40: 673-685.
- [37] Martimort, D., 1999, Renegotiation Design with Multiple Regulators, mimeo Université de Toulouse GREMAQ.

- [38] Martimort, D. and L. Stole, 1997, Communication Spaces, Equilibria Sets, and the Revelation Principle under Common Agency, The University of Chicago Graduate School of Business discussion paper N. STE029.
- [39] Mezzetti, C., 1997, Common agency with horizontally differentiated principals, *The Rand Journal of Economics*, 28, 2: 323-345.
- [40] Olsen, T.E. and G. Torvik, 1995, Intertemporal Common Agency and Organizational Design: How Much Decentralization?, *European Economic Review*, 39: 1405-1428.
- [41] U.N.C.T.A.D. 1996 *World Investment Report 1996*, New York: United Nations Program on Transnational Corporations.
- [42] Williams, B., 1994, Positive Theories of Multinational Banking: Eclectic Theory versus Internationalization Theory, *Journal of Economic Surveys*, 11, 1: 71-100.