

exclude residents from taking advantage of its benefits. Conversely, “firms” which benefit from a given regime may be explicitly or implicitly prohibited from operating in the domestic market.<sup>20</sup> Both of these provisions would ensure the off-shore center that criminal organizations that aim at benefiting from the regime do not “reside” in the off-shore center.

A similar goal is served by multi-tiered licensing systems. Under such a system, an off-shore center offers two rather different licenses to financial intermediaries, a “restricted” and an “unrestricted” license. A typical multi-tiered regime states that restricted licensees may not engage in transactions with residents inside the off-shore center. They may not collect deposits or even make certain investments. Similar restrictions may also apply to the ability of restricted licensees to solicit funds from the general public.

The *raison d'être* of rules of the type described above is easily perceived. They aim at generating externalities, or more precisely, at avoiding the internalization of costs associated with money laundering.

#### 4. INTERNATIONAL FINANCIAL REGULATION AND OFF-SHORE CENTRES

In the above paragraph we stressed that the meeting between the demand for money laundering expressed by organized crime and the supply of laundering services offered by an offshore country makes the objective function of the latter quite special.

The specific nature of this objective function must be considered when analyzing how best to design international regulations against money laundering, which is none other than the endogenous final result of strategic interaction between the club of the “virtuous” countries—virtuous in the sense of sensitivity or propensity to combat laundering—and the individual offshore countries. We shall analyze this problem area by using simple game theory formulations.

Let us assume initially that the game structure involves two players: the club of virtuous countries (A) and a generic country inclined to launder money (B). The analysis leads us to establish under which conditions the first player can ensure the collaboration of the second.

In this initial formulation, we use the simplest possible structure, a matrix representation. Let us bear in mind that this formulation implies a game in which the players enjoy perfect information, i.e. each is aware of the actions of the other.

The club can choose between two moves: “seek collaboration” (SC) or “not seek collaboration” (NSC). In the first case, it promises the laundering-inclined country recompense equal to  $T$  if the country undertakes to refrain from conduct damaging to the members of the club. If, on the other hand, it chooses the move “not seek collaboration” (NSC), it promises nothing and passively endures the actions of the laundering country.

Country (B), for its part, can choose between “favor laundering” (F) and “not favor laundering” (NF). In the first case it obtains a benefit equal to  $R$ , while in the second it must sustain costs and its *payoff* is equal to  $-C$ . In the case of NF, however, it can hope, if A has chosen SC, to obtain a subsidy of  $T$ .

The conduct of B generates the following consequences for A: if B conducts itself virtuously, A enjoys a greater level of integrity in the international financial system, and therefore obtains a *payoff* equal to  $I$ . In the opposite case, this integrity declines and A receives  $NI$ .

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<sup>20</sup> The example of “ring fencing” in the text is derived from OECD, (1998) at 27.

Summarizing the *payoffs* in a matrix (which shows the *payoffs* of A first and then those of B)

|                  | B<br>chooses NF      | B<br>chooses F |
|------------------|----------------------|----------------|
| A chooses<br>SC  | $I - T ; T$<br>$- C$ | NI ; R         |
| A chooses<br>NSC | $I ; - C$            | NI ; R         |

Now, for B “F” is a winning strategy (i.e. better whatever A's decision is), unless

$$R < T - C$$

that is

$$T > R + C \quad \textcircled{1}$$

i.e. the amount of the transfer must cover both the costs sustained and the benefits lost through non-cooperative conduct.

If this constraint is not satisfied, the only possible equilibrium is (NSC, F), because the cooperative solution is never profitable for B.

In addition to this constraint, the transfer must also satisfy the following:

$$I - T > NI$$

hence

$$T < I - NI \quad \textcircled{2}$$

the transfer must be less costly than the benefits derived from it. The club, in fact, absorbs the transfer costs only if this does not place it in a worse situation than the case where B chooses “F”. If this were not the case, “NSC” would become the winning strategy, nipping the possibility of cooperation in the bud.

Conditions ① and ② are sufficient for the creation of an alternative equilibrium equal to (SC, NF). We ask ourselves, however, whether they should also be regarded as realistic. We noted earlier that the benefits country B enjoys by maintaining non-virtuous conduct are likely to be inferior to the benefits A would obtain from B's collaboration. This conclusion is sustained by the fact that the evaluation must assign different weights to the two factors (often the relative dimensions of the two contracting parties in question are different). In spite of this consideration, condition ① seems fairly costly, so that the conduct of B must be completely “repaid” by A. Let us now see how the situation can be modified by requiring that the transfer  $T$  function as a simple incentive.

We assume that A, by choosing “SC”, not only promises incentives but can also threaten to inflict a certain damage on B if its conduct is not virtuous. Let us further assume that this **sanction**, amounting to  $S$ , entails no cost for A (an *embargo*, for example, restrictions on trade relations, etc.: for the single country affected this damage is often considerable, while for the other

countries the losses are generally limited or nil).

The situation is altered as follows:

|                  | B<br>chooses NF      | B<br>chooses F    |
|------------------|----------------------|-------------------|
| A chooses<br>SC  | $I - T ;$<br>$T - C$ | $NI ; R$<br>$- S$ |
| A chooses<br>NSC | $I ; - C$            | $NI ; R$          |

the *payoff* of B in the case (F; SC) is diminished, and “F” is no longer the winning strategy in any case. In fact, for

$$R - S < C$$

that is

$$S > C + R$$

collaboration becomes the winning strategy for B. We doubt, however, that this system can be used exclusively. Such measures, for one thing, would be extremely harsh and unacceptable in political-diplomatic terms. If the punitive approach is combined with incentives, however, the new effectiveness constraint for transfer  $T$  is:

$$R - S < T - C$$

that is

$$T > R + C - S$$

which suggests an incentive too costly for A: in fact, it must exceed the cost of the cooperative conduct of B and the earnings lost because it desists from favoring laundering, but it corrects this amount for the presence of a threat. The approach that links the sanction with an incentive is not only more efficient but is only costly to a point.

The result therefore demonstrates that cooperation is possible only if suitably modeled incentive systems are employed, responding both to the needs of the club and the needs and peculiarities of the offshore countries inclined toward money laundering. An active approach is certainly a necessary condition for achieving the result, as a watch-and-wait attitude or a mere appeal to B’s sense of morality would possibly fail.

On the other hand, the validity of the assumption clashes with the harshness of a reality that is much less schematic, characterized particularly by **information asymmetries** and **non-simultaneity of moves**.

The second approach we are proposing is a simple sequential game in which a third player, Nature, is present. Let us recall that in game theory Nature is a player characterized by an aleatory strategy: its moves are generated randomly according to an aleatory variable with known parameters. It represents the imponderable element, predictable only as an average, which can

condition how the player plays the game.

The sequential nature of the game and the aleatory element permit us to investigate the real possibility of obtaining the preceding results even when information is asymmetrical.

The first player to move is the club, which proposes to country B to collaborate in the war against money laundering. Country B has two possibilities: it can refuse or accept. If it refuses, it suffers a sanction equal to  $S$  but produces no effort to control laundering. If it accepts, it must make an effort but can choose between two levels of effort: high or low. In exchange, it receives a transfer equal to  $T$ . Let us say, therefore, that the level of effort expended by B (computing both the additional costs sustained and the benefits lost through virtuous conduct) can be equal to:

- zero, in the case where it rejects the proposal and does not collaborate;
- $E_l$ , in the case where it chooses a low level of effort;
- $E_h$ , in the case where it chooses a high level of effort.

The club, however, has no way to precisely verify whether B, after accepting the proposal of collaboration, is actually making an effort. Admission to the benefits of the club will therefore be subject to results of specific audits on the effort expended, whose outcome is aleatory and not totally controllable by either of the two players. This is where Nature comes into play, generating two possible outcomes for the audits:

- a low level of effort by country B with probability  $p$ ;
- an adequate level of effort by country B with probability  $1-p$ .

In the first case, the transfer is revoked, but expulsion from the club permits B to choose a zero level of effort. In the second case, the transfer is confirmed but country B must commit itself in accordance with the level chosen. Let us also admit that the probability of an inadequate level of effort being detected is inversely related to the effort expended:

$$p = p(E_i) \quad \text{with } i=a,b$$

$$p(E_h) < p(E_l)$$

Hereinafter, we shall assume that

$$p(E_i) = 1 - E_i$$

For country B the possible results are:

- $-S$  (if it refuses to collaborate or if an insufficient level of effort is discovered);
- $T - E_l$  (if it chooses a low level of effort and passes the audits);
- $T - E_h$  (if it chooses a high level of effort and passes the audits).

Let us also admit the simplest possible utility function; in the three cases listed above, respectively,

$$V_B = \begin{matrix} -S \\ T - E_l \\ T - E_h \end{matrix}$$

The assumption of first-degree homogeneity, apparently innocuous, except for the degree of realism, generates significant implications regarding aversion to risk (found to be nil; B is

risk-neutral). The club assesses the level of effort with a function  $U_A$ ;  $U_A' > 0$ , and

$$U_A(E_h) > U_A(E_l) > U_A(0)$$

For A three results are possible:

- $U_A(0)$  if B refuses or if an insufficient level of effort is detected;
- $U_A(E_l) - T$  if B passes the audits and chooses a low level of effort;
- $U_A(E_h) - T$  if B passes the audits and chooses a high level of effort.

For greater clarity, let us summarize the results in the tree diagram shown in the following figure (the pairs of *payoff* show first those of A then those of B).

Let us now seek to understand what characteristics the promised transfers and the threatened sanctions should have to induce B to accept the cooperative solution and the higher level of effort.

First of all, B must be convinced to choose the lower portion of the tree, i.e. it must agree to collaborate. Being risk-neutral, it maximizes the expected value of its *payoff* (in risk-neutral individuals, maximization of the expected value maximizes the expected utility). We shall therefore ask:

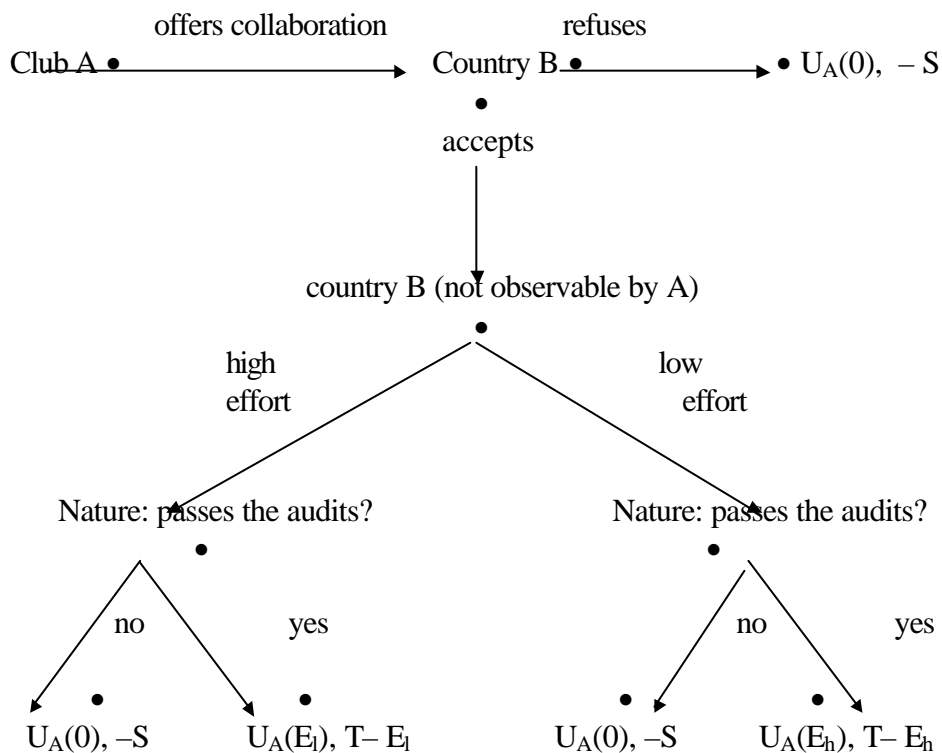


Figure 3.1

that the expected value in case of sanctions be lower than the expected value in the situation of collaboration:

$$-S < -S \cdot p + (T - E_i) \cdot (1 - p)$$

that is:

$$T - E_i > -S \quad \textcircled{3} \quad (\text{condition of participation})$$

the extent of the sanction must produce a situation of utility lower than that in which B selects virtuous conduct and passes the audits. We can also note that the expression can be transformed into:

$$T - (-S) > E_i$$

Reflected again in other terms, the expression tells us that for the *agent* the monetary difference between the incentive and the sanction must exceed the cost of the effort.

Once collaboration is assured, the system of incentives and sanctions must also ensure a high level of effort. For this we shall ask that the expected utility for a conduct that chooses  $E_l$  be lower than that for  $E_a$ . Recalling again that in our case utility and expected value are equal, we require that the following inequality occur

$$-S \cdot p(E_l) + (T - E_l) \cdot [1 - p(E_l)] < (-S) \cdot p(E_h) + (T - E_h) \cdot [1 - p(E_h)]$$

which can be rearranged to obtain the condition

$$(T + S) [p(E_l) - p(E_h)] > E_a [1 - p(E_h)] - E_l [1 - p(E_l)] \quad \textcircled{4}$$

(condition of efficiency)

The left-hand member contains two factors: the first must be read, as we previously did, as

$$T - (-S)$$

i.e. the difference, in monetary terms, that is generated by passing from the condition in which B is excluded from the benefits and is subject to sanctions to the condition in which it obtains admission to the club.

This change is corrected by the second factor, which indicates the difference in probability of exclusion in the case where B selects a low level of effort versus the case where it selects a high level of effort.

The second member contains the difference of effort expected from the case in which the choice is high effort versus the case of low effort. This difference is expected, since the two levels of effort are corrected for the probability that this effort is actually required: and this does not occur in any case, but only with a probability equivalent to  $1 - E_l$ .

Thus condition  $\textcircled{4}$  requires that the change in expected effort, for one following a virtuous conduct, be more than exceeded by the expected change in the recompense (intended as both greater transfers and lesser sanctions). In other words, the virtuous country must perceive that, beyond the veil of information asymmetries, *its conduct generates tangible effects on the value of its payoff*.

The structure of the incentives and the sanctions must reflect as nearly as possible the actions of the *agent*, who may notice a ***correlation between the incentives and his conduct***.

Club A is not informed of B's choices regarding the level of effort. The offer of collaboration must therefore consider the possibility that B will select  $E_l$ . The amount of the transfer must be limited to prevent A from finding itself in a worse situation, in the case of collaboration with little effort, than it would have been in if B had not accepted:

$$U_A(0) \cdot p + [U_A(E_l) - T] \cdot (1 - p) > U_A(0)$$

hence we find:

$$T < U_A(E_l) - U_A(0) \quad \textcircled{5} \quad (\text{condition of credibility})$$

the transfer cannot exceed the increase in utility obtained from the situation of zero effort to that of low effort.

On the other hand, if the transfer satisfies condition  $\textcircled{5}$ , the application of the sanction is no longer credible: it damages B but absolves it from any effort to collaborate, erasing the utility of A from  $U_A(E_l) - T$  to  $U_A(0)$ , a change that  $\textcircled{5}$  shows to be negative.

The threat is no longer credible because, if the opportunity presents itself, A has no real intention of applying it. In the more precise terms of game theory, the application of the sanction is not a subgame equilibrium given the occurrence of an outcome of the audits that reveals insufficient effort.

Country B is aware of the structure of the game and therefore *he payoff*. Knowing that the sanction is not credible, i.e. will never be applied, it can now decide between the two (non-aleatory!) alternatives  $(T - E_l)$  and  $(T - E_h)$  and clearly opts for the former.

At this point, Club A is assured the cooperation of B but has no hope of obtaining greater effort from it. The solution to these problems of fragility in the cooperative equilibrium, in game theory, usually lies—as stressed earlier—in two alternative directions:

- **the possibility of “tying its own hands”**: the club finds a system for constraining itself at the start of the game to the declared strategy of the adversary. In the relationships between individuals or companies, they usually resort to signing binding contracts. In our context, we might think of some form of treaty or recourse to a central authority, empowered to manage the club, shielded from the influences of the member states (and thus their temptation to deviate from the established strategy). But is the club willing to have its hands tied and, consequently, to accept the risks associated with the random nature of the audits?

**games repeated**: let us imagine that the game is repeated more than once (or infinite times) and that the sanction is applied only for the duration of one of the individual games. This application, through less than preferable in the first game, makes the threat credible for the subsequent repetitions and the damage generated by the first application is then recovered by the greater well-being it provides in future periods. B, in fact, is burned by the experience.