

RISK DIAGNOSIS AND EVALUATION VS. THE ALTERNATIVE STRATEGIES OF FINANCING THE COMPLEX RESOURCES-ECONOMY-ENVIRONMENT NETWORK WORKING IN AN INTEGRATIVE-REGENERATIVE INDUSTRIAL ECONOMY

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Abstract:

The problem of financing the complex resources-economy-environment network working in an integrative-regenerative industrial economy is a derivation of the fact either the above-mentioned network intends to minimize the costs of the aftermath of pollution, or to capitalize on new and 'green' technologies, it is clear from the start a pollutant, or, to put it into perspective, the resources-economy-environment network will inevitably face (extremely) large costs; once it is assumed such companies must 'clean' the environment which they polluted after their (economic) activities are done, they must bear, in any event, important costs, whose quantification cannot be sorted out without the use of a mathematical apparatus, analyzing both economics and human society; this apparatus cannot reject the qualities of NPV (Net Present Value), IRR (Internal Rate of Return) and, last but not least, ROE (Return on Equity) and MSC (Marginal Social Cost) indexes.

Key words: company, network, integrative, pollution, interest rate, risk.

JEL Classification System: G32

In the context of durable development, shaping a sustainable environment is not limited to the elaboration and implementation of specific policies, but also implies financial and economic behavior of the firms from the private sector. Investors perceive the sustainable economic behavior of firms as an enhanced management strategy, which drives them to diversify the financial portfolio and to invest in sustainable enterprises.

If, until two decades, in Romania, the development of the economic and social strategy whose important component is the policy of active environment protection was financed completely using public funds, lately the accent has been put on public-private partnerships or on collecting private capitals, as an alternative and optimal solution for development in this economic conjuncture.

Financing projects for promoting and consolidating environment protection using private financial sources (obtained from credit or leasing institutions) assures – apart from competent management and observation of

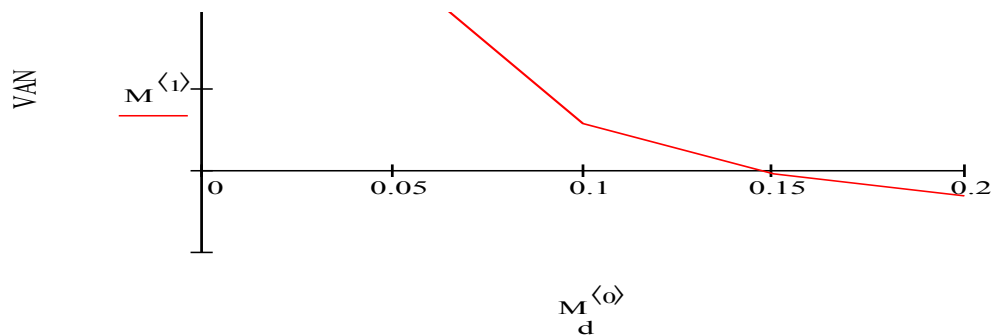
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contractual discipline –, through the leverage it generates, a financial yield superior to that obtained through state owned firms' investment. Thus, the private sources we are analyzing here imposed in the last years at international scale, as long term solution able to solve the difficulties of development non-pollutant economic activities in the conditions of an integrative-regenerative economy.

In the context of financing private sector's investment projects for the promotion and consolidation of environment protection, the partners involved (both banks and private investors) define accurate goals for the diminishing of possible risks – e.g. fixed payment contracts, no matter how large are the revenues yielded by the project, a safe and sound cash-flow and last but not least extra guaranties, besides warranting the loan itself through future revenues, generated by the investment' exploitation –, while private investors aim to obtain revenues *after* debt service payment and a certain level of ROE and IRR indexes.

The risks are generated by a multiple set of circumstances, the analysis of the financial realm requiring the perspective of a complex of risks, frequently interdependent, as they may have commune causes and may be able to 'produce' other risks in chain reaction.

This is the general picture, both of the real economy and of NPV dynamics, as measured from the perspective of market interest rate (d), as for the relatively 'green' businesses. But, as, in order to obtain a regenerative economy, the policymakers must take into account the probability of risk occurrence, we will try ourselves to play the role of a policymaker of regenerative economy here and, for this, to assume pollutant economic activities are neither the rule nor the exception – in the real economy, and in absolute terms.



Since risk is especially linked with pollutant economic activities, confronting the costs generated by the need of active environment protection, whose quantification, and moreover **management** is, in theory, designable starting from the peculiarities of NPV mathematics, in the context of assuming the environment will be polluted – and the indomitable character of the ever continued financial efforts needed by the activity of environment 'cleaning'.

The exception NPV dynamics constitutes – in relation to d (market interest rate) – is the typical situation for pollutant economic activities, which

cannot be run unless the investor foresees, in his financial plans, and moreover in the firm's *budget*, the items required by the necessity of financial covering of the *terminal costs* of the enterprise.

Hereinafter, we will describe in detail the problematic of terminal costs, with the necessary explanations and with the no less necessary observations regarding (also) the use of the theory of **terminal costs management** (in the – pollutant – real economy) in our field of interest – financing environment protection in order to obtain a regenerative economy.

It must be underlined the economic agent that must bear short term costs, in the hope of obtaining profits in the long term, will be discouraged if market interest rate tends to rise – in the long term.

Furthermore, the perspectives are even more precarious: the economic environment characterized by an ascendant trend of the values of market interest rate affects the survival capacity but moreover the **development capacity** of a pollutant economic agent, from many points of view, inclusive from the point of view of the firm's capacity of *bearing the brunt of the (e.g. financial) consequences of its own pollution*.

This is one perspective: regenerative economy is designed to be the upper 'floor' of a market economy; due to this, there are several mechanisms, built around (market) interest rate, which, to put it simple, *paying* the bill of environment damage can be facilitated by the very (pollutant) economic activities – of the economic agent.

As mentioned before, alongside of both economic and financial risks, companies running in the field of environment protection face also business risks, adjacent to the level of macroeconomic development. In the (inclusive) financial crisis an immediate effect was that of rising loan interest rates in the banking system, effect which led to an increase of the aversion towards risk and to the limitation of investment positions. Thus, deterioration of macroeconomic frame and business environment generated a feeling of distrust in the midst of investors and produced a rise in the cost of external financing.

The same ascendant trend of market interest rate proves to be, at least in the long term – that is, in business strategy –, unfavorable to the firm also from another point of view: from the perspective of the market interest rate influences on the dynamics of firm's *cash-flow* – term which denotes, in theory, the system of the dynamics of resources and payment obligations inside a firm, whose financial base is constituted by the inflows and outflows of cash recorded by the firms.

The economic risk, materialized in the lack of materialization of the due positive *cash-flows*, occurs when the environment investment does not generate the expected receipts, and the debtors pay back after the deadlines the contracted loans.

Diagnosing the economic risk is done through quantification of *cash-flow* dynamics, as a sum of *cash-flow variations* recorded by the firm, in a given period of time. But, in this analysis, understanding the etiology of *cash-flow variations* is

of the utmost importance; its 'key' is by far the most important for understanding the **price** of polluting output (of goods and services).

Here are important the following influences: *cash-flow* variations are caused by the dynamics of cash and cash equivalents received and, respective, paid by the firm on the basis of:

- (a) Management operations;
- (b) Investment operations;
- (c) Financing operations (self-financing and/or loan based financial funds).

Inclusive from the perspective of companies granting loans to the pollutant firm *cash-flow* dynamics exhibit *mainly* its own financing sources. The existence of creditors is due to the direct link that exists between the dynamics of market interest rate and the development of economic activity of the indebted company, through *cash-flow dynamics*, link with powerful implications on the business strategy of the lenders.

The increase of market interest rate makes more difficult, or extremely difficult, collecting financial funds by the firm; as a result, inflows and outflows of cash (and of cash equivalents) will end with a decreased amplitude, to the extend that **potential** lenders will have an even more circumspect lending behavior, even severe, when such a firm asks for a loan to them.

The creditors, observing the pollutant's *cash-flow* dynamics, will grant it even much less easily loans: the company, assuming it does not (seems to) have sufficient financial funds, more or less liquid, available for the paying back of loans, will have to face a downgraded financial *standing*, not only in the short term, in the form of a momentary lack of credit opportunities, but in the long term too, experiencing exactly the same symptoms, but, in this latter scenario, due to growing problems produced by adverse selection.

For the creditors which mobilize their capital over a long time span, with a non-indexed interest rate, the financial risk is as high as the due date is more remote, given the opportunities they face losing in that time frame – thus, financial risk can be described in terms of opportunity costs, the investors being in the situation in which they might confront with the decrease in the investment value as a result of apparition of new and better investment possibilities. Consequently, it is clear laying the base of a regenerative economy faces, among other threats, the drawback from behind adverse selection.

In a micro- and, due to aggregation of default, macro-economic perspective, adverse selection is felt through the difficulty encountered by the firm when it wants to carry out, at minimum-sized costs, or in another manner than by forcing itself to contract (at least potentially) risky credits, its pollutant activity, which, in any case, requires, in order to be fulfilled in satisfactory terms, bearing (terminal) costs whose dimension is of any size but small. Especially, deterioration of cash-flow backed up mechanisms forces the producer to function at anything but the minimum costs.

Growth of the market interest rate puts strain on the pollutant, preventing it not only to produce, but also to **sell** its output, and the more so as this problem is transmitted also through the ‘bank highway’ of information and (aggregate) demand of the real economy, which, assuming high values of market interest rate, puts already in difficulty, and not in the least of it, the company, put in the position to face the insolvency risk.

Output can be sold, in a market economy, and at least theoretically – no matter the value of the product –, with the use of consumer credits. But, from this point of view, growth of the market interest rate has an immediate effect, and moreover a harsh one, on the firm: consumer credit turns simultaneously *more expensive* and *riskier* (the latter perspective manifesting itself especially in times of economic crisis – or just of economic stagnation), by reason of which consumer investments, particularly in durable goods¹, are significantly less important. In these conditions, it is impossible, *starting from this*, the firm’s output – the firm it shouldn’t be forget it must also cope with the costs of its own pollution – should expand.

Firm’s **output**, assumed not realizable without polluting the surrounding area, on a more or less large scale, as it can be plainly seen, is affected by the very upward bias of market interest rate, through the *essential* influences illustrated in the following graph (where V_m = value of national currency, EN = net exports attributed to the firm² and C_c = the amplitude of consumer credits):

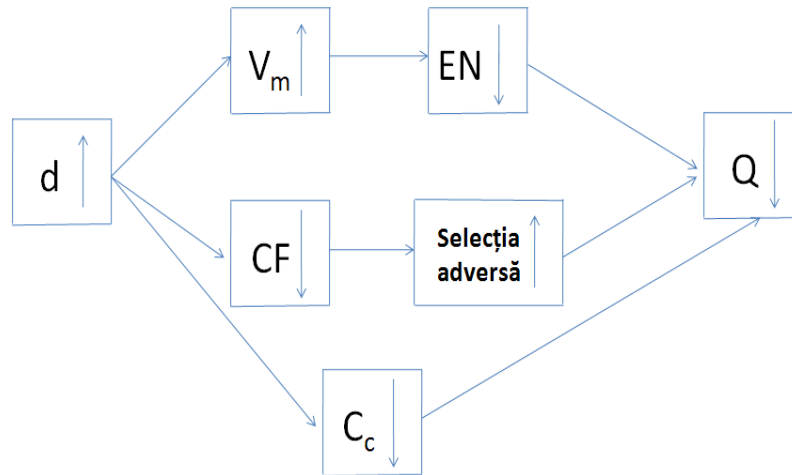


Figure 1: Firm’s output (assumed to be unrealizable without pollution)

On the background of output expansion – more probable, (slight) downfall –, in an economic and financial environment tending to consolidate the activity of a pollutant in the direction of promoting and consolidating environment protection, we undertake thereafter the task to outline the general economic

¹ Generally, in high value goods.

² The assumption is at least part of the output will be exported.

frame such a firm is placed in. Until now we characterized the main effects of increasing costs, managed by the firm, materialized as we have seen, and based on the growth of market interest rate. But, an equally important role is played by the increasing costs the firm deals with by changing its profile – ‘migrating’ from pollutant to the status of ‘green’ firm.

We refer to **production costs**, costs determined (only) by output size and cost per unit of output. From this point of view, a pollutant firm has not in the least financial reasons to *not* be disposed to change, not even in the short term, and less in the long term¹, its activity profile – regardless of the importance of the goal of reducing, or eliminating, terminal costs associated with this activity.

In fact, as we will demonstrate here, there is a strong connection between financial constraints and *technological status-quo* of a given producer: its management may not find the required stimuli neither for modifying its ‘ecologic’ strategy, in the long term, nor for adopting a decision of renewed technology fitting – accomplished when less pollutant, or non-pollutant technologies are bought –, in the short term.

We have here the proof output and cost dynamics, as components of firm’s dynamics (from pollution to non-pollution), do not supply firm’s management only with a *purely financial motivation* for it to decide to renew its capital stock, and to use other technologies, so that the *purely financial* goal of reducing/eliminating the burden of terminal costs may be reached.

At least in the short term, the massive buyout of less pollutant, or even non-pollutant equipments/tools, assuming the firm continues to produce the same product(s) and a constant set of prices, ends in a profound change in the output process, on one side, and in a global rise in production costs, or in the costs added to production costs, on the other side.

The following results will be obtained:

- I) rise in the *average* total cost;
- II) rise in the marginal cost;
- III) decline of output size, **whose level is crucial for maximizing profits.**

Total output, thus, declines in dimension, as well as total (net – at least it tends to) profits, with the effect of a ‘costlier’ *translation* from pollutant status to ‘green’ status.

Financing environment protection by the *producers whose activities impose national level lining of environment protection activities* can be accomplished so that it might pay off for the state: pollutants may finance environment protection, without bearing terminal costs – in practical terms, they will be not directly, but indirectly bore, through extra taxation of that activity to the benefit of at least one of these two sides, and maybe even for the benefit of both.

¹ If an external pressure is not applied – whose possible impact is analyzed in this study.

That is, firstly the state benefits, through the tax policy, but the producer can also gain an advantage, first of all from the reduction of terminal costs' pressure, these being paid, fiscally, in several installments. However, in order for this tool of sustaining terminal costs to become real, several economic conditions must be fulfilled.

Indirect sustaining of terminal costs¹, by a pollutant, through taxation is capable to exist only given an almost state 'accounting' vision: it is demonstrated there is, on one side, a **marginal**² social return (MSR), and, on the other side, a marginal social cost (MSC). Balancing the efforts distributed between return collection and cost sustaining is all that the state is capable of doing and must do: in the end, there is no pollutant activity from which the state, in a given (relatively) ample time frame, cannot, inclusive financially, earn something.

The *net* fiscal return the state enjoys is directly proportional to the effect carried out by that tax on the *unfulfilled output surplus* (ΔQ): the producer, due to fiscal generated financial constraints, cannot produce, or cannot intend to produce, up to the amount of output it would have generated lest the tax wouldn't exist, so that, if in the absence of the tax the output would rise to Q_{fi} level, the existence of the tax makes that it will be only produced the amount of output Q_{ci} ($\Rightarrow \Delta Q = Q_{fi} - Q_{ci}$).

This *unfulfilled* amount – inclusive of the state efforts to dismantle pollution – is a financial contribution to specific activities focused on obtaining a regenerative economy with monetary means, in a framework specific for a market economy: in short, if that amount can be and will be **sold**. For this, a price is required.

The price with which the human society capitalizes on the (factual) decrease in pollutant's output is quantified using the terms named above, MSR and MSC, in the simple sense the price is **net marginal social return**, that is MSR-MSC. Fiscal policy is, in this case, a tool able, as this formula shows, to supply human society with an advantage emerged from the continuation of the pollutant economic activity, the tax being, compared to the decreasing pollutant activity, *the price* paid by the firm – over the price already paid by the pollutant, directly, so as to extinguish the effects of pollution, through coping with terminal costs.

In conclusion, financing the complex network resources-economy-environment requires, in advance, diagnosing and evaluating economic, financial and business risks, always close to all economic activities, whether pollutant or not: and this all the more so as, in general, a pollutant economic activity tends to be more **expensive** – first of all for the very pollutant producer – rather than a 'green' one.

¹ It is assumed only producer's activity pollutes, and not the consumption of its output by consumers.

² We consider the fact the economic activity of the producer generates pollution adds to the 'pool' of defaults for whom the producer is accountable (and the fact the algebra apparatus associated to these conclusions is neither immutable nor 'accurate', being only a necessary and useful tool).

Integration of diagnosis and evaluation of the risks implicit to the alternative strategies of financing the complex network resources-economy-environment in the conditions of an integrative-regenerative industrial economy requires the identification, by the management of the companies working in the field of environment protection, of the **financial strategies** which will be applied and of the main activity areas.

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