

FINANCIAL PROBLEMS OF NUCLEAR PROGRAMMES

The experience of Argentina*

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1. FRAME OF REFERENCE

1.1. Integration of nuclear energy in the Argentine economic system

The Argentine economic system presents the characteristics of a developing country. This implies the need to increase and redistribute the national product on the basis of criteria of efficiency and social equity, to which end economic policies exerting an effect on the different variables of the economic system are designed and implemented.

The basic variables include, among other things, global growth rates of the economy, time limits for development plans, participation of the various sectors in the gross national product, basic energy inputs which are available and the forecast of their relative availability, price and investment schedules, and so forth.

The possibility of allocation of resources to nuclear programmes is justified if the specific investment module for the nuclear programme is consistent with that which, in general, is in effect for the developing economic system as a whole and, in particular, for the energy sector.

Deeper analysis of this concept requires that we determine what are the requirements in terms of factor input and what are the contributions to the desired increase in the national product.

Examination of the requirement of factor input leads directly to the problem of financial resources that are liable to be required in terms of existing national resources of those yet to be created

* Translated from Spanish.

and of non-national resources (foreign loans, financial assistance, investment capital).

The changing characteristics of the institutional framework and the variation in economic policies within a permanently inflationary context have given rise to erratic behaviour patterns in the economic and financial variables which have led to increased absorption of risks by long-term investment programmes, as is the case in the development of nuclear programmes.

Furthermore, to this negative effect deriving from general internal factors must be added some others which were prompted by questions originating in the external context and some which can be considered specific to the Argentine nuclear plan.

1.2. The inflationary context

Given the intensity and persistence of the phenomenon of inflation in Argentina and the need for progress in the matter of investment, the methods of evaluating projects must necessarily take inflation into account and in such a way as to achieve the most suitable utilization of resources.

The evaluation of a project consists in stimulating the economic interest of allocating liquid funds at the time of investment, in the expectation that the future flow of funds (which it is believed will be generated by the investment) may justify the opportunity cost involved in releasing funds for this purpose.

Theoretically, therefore, the most acceptable of the various criteria for evaluation are those which, in one way or another, take into account "the time value" of money, since the investments will generate funds which will be received at various times and consequently be of differing present or future values.

The evaluation of investment projects under inflationary conditions gives rise to a number of additional problems.

The first problem to be faced is the effect of the rate of inflation on the price of the various inputs or factors of production involved in the project as well as in the final product.

Depending on the duration of the project, it will be necessary to make periodic estimates of the variability and degree of uncertainty involved in each price under consideration. The estimation of these future prices entails forecasting supply and demand and the various liberalizations thereof during the life of the project.

A second difficulty is the degree of distortion which the inflationary process causes in the price of the final products. Moreover, it is probable that, the higher the inflationary level, the greater will be the changes in the relative prices, a situation which is aggravated if the process develops with government controls.

From this point of view, and with reference to earnings, the investments that will be favoured are those whose final products increase in price more rapidly than the average. On the other hand, if we consider costs, more profitable projects will be those which are intensive in the use of inputs whose prices increase less rapidly than the average.

For these reasons, investment plans, and especially those extending over several years, should take explicit account of the changes in relative prices, since their influence gives rise to genuine surprises, converting projects which were profitable under stable conditions into unprofitable ones, and vice versa.

Another aspect to be considered is the determination of the real rate of present-worth discount, the estimation of which is extremely difficult in periods of high inflation and even more so if this is subject to great variability. In principle, two considerations are applicable. One involves considering that if the discount rate in real terms (which is used for evaluating the different flows) shows a strong positive correlation with the inflationary level, the higher the rate of inflation, the fewer will be the number of profitable projects in the real sector of economy.

A second assumption emerges from the correlation between the level of the real rate and the rate of growth of the amount of money. If this correlation exists and is an inverse one, a restrictive monetary policy could give rise to illiquidity in the market and therefore, in the short term, to positive real rates on the high side. Consequently, the greater the monetary restriction, the higher will be the real rate of interest in the short term and the projects will therefore be less profitable.

In periods of uncertainty, planning becomes more indispensable than in periods of price stability. However, in our experience, developing an investment budget under inflationary conditions becomes more like the work of a "goldsmith" than of a scientist.

However, the maintenance of certain long-term policies over periods of time has made it possible to overcome the uncertainties resulting from the instability of economic variables, so that political persistence has acted as a supplementary guarantee of the instability of financial planning.

Obviously, this is at the price of assuming unprogrammed risks, as explained in sections 2 and 3 of this paper.

1.3. State participation in the electricity subsector

In Argentina the national State is for all practical purposes the main responsible authority in the management of the electricity sector.

The activity of the State in this area is guided by a certain political philosophy with regard to ownership of resources, responsibility for the provision of public services and rate policy as part of a particular fiscal policy.

There are no market mechanisms regulating supply and demand of electric power. In the case of supply, the operative considerations in the selection of sources, within the limits of the existing natural resources, are the criteria guiding State plans for the development of electricity; demand, in turn, is induced by a price policy which does not take into account the specific balance sheets

of each enterprise or facility - which cannot, therefore, adjust their operation to considerations of profitability. As will be pointed out below, this identifies one of the specific risks attaching to the Argentine nuclear energy programme.

The result has been the creation in the electricity subsection of a situation in which it is very difficult to reckon with interest in investing of the private sector. Accordingly, the financing of the major electricity projects is based on the use of resources derived from charges, contributions from special funds (taxes on the consumption of electric energy and fuel), the use of loans from suppliers, financial bodies and international agencies abroad. The borrowers are State bodies or enterprises - of various legal forms - or even the State itself.

The financing picture also includes the contributions of general revenue made by the State to take care of local expenditure and the unfinanced part of the goods and services provided from abroad.

For these reasons, we do not have in our country the alternative of being able to count on private investment capital for major nuclear projects although it has been possible to obtain contributions of capital from the private sector for some fuel-supply companies with State participation.

2. BRIEF SUMMARY OF ARGENTINA'S EXPERIENCE

In the particular matter of financing it has been possible to identify at least three groups of risk-generating factors involved in integrating nuclear energy in an economic system with characteristics like those of the Argentine Republic.

2.1. Use of factors which are scarce and therefore of relative higher price

- Domestic financial capital. (This has been limited to the contribution of the public sector, in accordance with what was stated in section 1.3.);

- Financial capital of foreign origin. (Effects of the floating rate and the increase in country risk);
- Highly trained manpower. This leads to investment in a nuclear education subsystem, by means of long-term training plans to overcome the limitations of the response capacity of the educational system;
- Technology. That which can be acquired abroad is very costly, requires the use of foreign exchange and has to overcome political difficulties. One's own developments imply large-scale investments and prolonged periods during which capital is immobilized. There are administrative inflexibilities which hinder the application of suitable technical concepts for the absorption of these costs by various projects;
- Industry. The specific industrial development implies accepting extra costs contained in prices as well as the additional cost of technological support.

2.2. Extended maturation time for large-scale projects

- Variations in cost over the long term, affected by the inflationary processes;
- Tendency to a deterioration in relative prices of long-term investments due to the increase in the real interest rate which pushes longer-term projects out of the profitability zone;
- Sensitivity of prices to restrictive monetary and exchange rate policies;
- Increase in interests taking place during construction. The floating rates tend to exceed the average profitability of the projects;
- Delays in the start of the investment recovery period.

2.3. The price of the final product does not cover all the variations in costs

- The cost of electric power is generally dealt with outside a strictly economic context. Rates and prices are applied which are strongly influenced by tax policy considerations;
- Since the service is for the benefit of the domestic market, the income does not directly generate foreign exchange; this income is affected, as far as its purchasing power is concerned, by the play in the ratio between local currency and foreign currency which is set for reasons of economic policy;
- The final price of the nuclear product (electric energy) increases less rapidly than the average of the inputs of the production process.

3. ANALYSIS OF THE RISK FACTORS

On the basis of the experience described in section 2 we may attempt a descriptive analysis of the risk factors to which implementation of nuclear programmes in developing countries is subject.

The scheme of presentation is as follows:

3.1. Factors deriving from the external context

1. Technological factor
2. Economic factor
3. Financial factor
4. Political factor

3.2. Factors deriving from the internal context

1. Political factor
2. Economic factor
3. Technological factor
4. Financial factor

The validity or relative applicability of the ideas set out will depend on the characteristics of the political and economic systems of each country and on the degree of technical and industrial development which determines the possibilities of national integration, organization of capital markets and existence of flows of funds of foreign origin in the forms of assistance, loans and investments.

3.1. External context

3.1.1. The technological factor

In the period since the second world war up to the beginning of the seventies, the nuclear industry was the newcomer in the aggregate of major industrial processes; for this reason, it had to draw on the experience of its predecessors, especially in matters relating to environmental impact and protection of human health. In the latter connection, it also had to overcome the psychological effect of the initial military uses of nuclear artefacts.

As a consequence, the increase of costs deriving from safety regulations have become a constant in the development of nuclear technology.

The contracts for the construction of nuclear power plants customarily include clauses requiring the vendor to incorporate all technological advances made while the project is in progress. In many cases, it is the licensing bodies which require the modification of the facilities so that they can incorporate the elements resulting from new safety criteria.

3.1.2. The economic factor

Foreign companies which are purveyors of nuclear supplies and services have been affected by the disruption of the international markets caused by the oil revolution of the early 1970s.

Their reaction found expression in the fields of commerce and finance. The terms of contracts were stiffened. First, fixed prices disappeared, replaced by basic prices which were subject to

readjustment in accordance with variation in the prices of the cost factors of the supplier country or countries but which accepted a ceiling or limit up to which the buyer had to contribute; higher costs above this limit were absorbed by the supplier company. It was a formula which showed an attitude of willingness to share risks.

This attitude changed in the second half of the 1970s, with a rise in the limit (or ceiling) and then with its complete disappearance. In this way, the process of transferring to the buyer countries the commercial risk (with respect to the factors affecting variability of costs) was completed.

Shortly after the situation on the international markets had been successfully resolved for the vendor countries, they stated their inability to operate assuming economic and financial undertakings in the context of the inflationary Argentine economy and declined any responsibility in the administration of internal prices, while demanding the reimbursement of all the "real costs". The renegotiation resulting from this new transfer of risk to a nuclear Argentine body included the necessity for the latter to assume increasing risks in the performance of complex technical tasks and in the administration - at the managerial level - of large-scale projects. The response of the supplier was the introduction of contractual conditions minimizing or eliminating certain risks associated with this greater participation of the buyer in the implementation of the work.

It is worth pointing out that, at the time in question, the actions of the supplier companies affected not only the new contracts but also the existing ones; the latter were subject to renegotiations accepted by the buyer countries but had an undesired effect in that they weakened the administrative capacity of the buyer's public bodies in the eyes of the public which was permanently sensitized to the nuclear option.

3.1.3. The financial factor

The influence of this factor as a generator of risks to the implementation of nuclear energy plans in the developing countries can be described as the result of the "financial revolution" of the

1970s and it took the form of the application of the floating (interest) rate as a decisive element in the shaping of the capital market of the international financial system.

The economic development of the Argentine Republic since the middle of the past century was possible, among other things, because it was able to have access to an abundant capital market where the interest rate was fixed and low, i.e., it was below the average profitability rate of the Argentine economy, a situation that favoured the process of capital accumulation in addition to a steady flow of investment capital.

On the other hand, with the floating rate practically all new capital-intensive investment projects are displaced from the profitability zone and those which continue must absorb the risk of variation in rates (floating), which is transferred by the lenders to the debtors.

A thorough analysis of the mechanisms which generate floating leads us to the conclusion that the major costs transferred to the developing countries are not created in a genuine international market situation but that this reflects the results of the policies of financing the national deficits of developed countries that may play a decisive role in the shaping of the rate, avoiding the monetization of their own internal debts.

Our experience is clear in this respect: in the case of the first nuclear power plant, which was decided on in the mid-1960s, we obtained all the financing for foreign supplies at a fixed rate and with a 20-year repayment period, which began after the plant went into commercial operation. With the second nuclear power station, purchased early in the 1970s, prior to the oil revolution, the external financing no longer covered all the imported goods and services, and although the rates continued to be fixed, in the middle of the decade it was necessary to renegotiate contracts, which led to our accepting loans at a floating rate. For the third nuclear power plant, all the interest rates are of the floating type.

3.1.4. The political factor

The special connotations of nuclear activities, because of the possibility of military applications, have given rise to a complex system of safeguards. For the purposes of the present study, we shall attempt to identify those consequences of economic and financial nature that have taken the form of greater risk - and therefore costs - for the countries affected by these measures.

The starting point is the acceptance of the philosophy of safeguards, but a distinction has to be made between the situations which permit one to assume confusion with commercial interests, since a decisive brake is applied to the implementation of nuclear planning if the developing countries cannot complete a strategy which includes, in successive stages, the purchase of physical goods and services, the acquisition and development of own technologies for its own use, the ability to design and build nuclear power plants, to fabricate fuel elements, and lastly, to export goods and services.

Developing countries which are consumers or purchasers of nuclear equipment and technologies have encountered obstacles and difficulties in their purchases owing to the limitations and requirements imposed by the suppliers under the heading of "Non-proliferation".

This extreme defence of interests has had a harmful effect on countries which are becoming industrialized, requiring them to adopt somewhat over-ambitious nuclear policies, which in many cases meant absorbing risks of developments which drew on scarce resources and increased the costs of the programmes unduly.

In some cases, certain facts (e.g., India's exploding of a peaceful device in May 1974) led to a fundamental change in the policies of exporting nuclear materials, equipment, technology and services.

As a result, it was necessary to accept certain requirements which implied unilateral changes in contractual relationships in order to avoid disrupting the arrival in the country of components

considered critical to ensure the supply of fuel elements and, basically, not to endanger continuity of the work, and thereby to avoid rendering fruitless the part of the investment already carried out in Argentina postponing the expectation of a large-scale contribution to the country's electrical supply.

3.2. The internal context

3.2.1. The political factor

What is involved is an analysis of the conditions of the political system and its financial repercussions.

The instability of the Argentine political system has penalized the economic system because it led to an increase in the margin of risk or expectation of internal and foreign operators. This has been manifested in an increase in the costs of obtaining resources, especially those of foreign origin (country risk), thus bringing about an increase in the investment costs of nuclear programmes.

The acceptance by the political system of a nuclear plan, which must of necessity be long-term in character, introduces a stabilizing element and a guideline for decisions in the economic system in that it permits individual operators to decide on plans for investment, staff training and organizational and managerial structure within suitable planning bounds. An acceptable definition can be found for demands and inputs.

The organizations responsible for local planning can thus acquire distinctive characteristics within the political and economic system of a country which, generally speaking, is subject to tensions due to the sometimes violent change in variables. This permits the singling out of an institutionalization mechanism which has made possible an identification of the community with nuclear objectives, thereby facilitating the decision-making process in the allocation of resources.

One danger may be pointed out: the lack of adjustment to the general process, due to its cyclical fluctuations with regard to the continuity of a nuclear plan, can place these programmes in a

situation of conflict as it requires resources to the national economic system in a stage of development that can make continuity of the projects difficult.

3.2.2. The economic factor

More and more, the Argentine economy has been assuming the characteristics of a "closed" economy, i.e., the relative prices are not being shaped by the action of market mechanisms but are the result of a series of official decisions which act upon or regulate the flow of real goods and services and financial flows, both internal and external.

A key price, like that of foreign currency, goes up in relative terms, measures of the customs type are adopted increasing the cost of the imported article; the prices of goods and services of internal origin "become internationalized" and increase relatively more than the foreign ones.

As one of the aspects of the basic approach of the Argentine nuclear programme is to achieve maximum national participation, its cost structure tends to show increasing participation of national goods and services and consequently the increase in the cost of construction work and supplies is more than proportional to the increase in this participation.

As pointed out earlier, instability of economic policy introduces risks owing to the indefinite character of decisions relating to long-term programmes. Once these are under way, interruption of the national integration process gives rise to negative consequences in the incipient industrial structure being created which, in view of the uncertain prospects of the continuity of nuclear programmes, seeks to transfer its structural costs that, because of their specialization, are more inflexible when it comes to converting to other alternatives, thereby increasing the costs of development and construction, the rates of which preclude adequate utilization of the productive factors of the nuclear domain.

Since the matters giving rise to situations of conflict are generally described as "matters of the prince", the responsibility

is assigned to State bodies. Consequently, the agency carrying out nuclear plans has to bear a number of costs for risks of the type known as "higher costs not provided for contractually"; financial costs for delays in payments and not adjusted to inflationary changes, etc. The alternative is a standstill in the work.

3.2.3. The technological factor

3.2.3.1. The possibilities of national integration are determined by the conditions existing in the technical-industrial context.

A relevant characteristic of the tasks which have to be faced by the local private sector of developing countries when participating as suppliers of nuclear goods and services (i.e., levels of quality, tolerances, yields etc.) is the relatively indeterminate nature of certain technical aspects derived from the applications of new or little known technologies.

This gives rise to problems in at least three areas:

- Quality assurance: in developing countries the contractor's estimates have to cover the costs expected to result from having to meet unconventional quality levels with respect to which he does not have sufficient experience.
- Indeterminate nature of technical aspects: the necessary specifications are not available for agreeing to a fixed price or one which can be adjusted on the basis of some price index, for which reason contracts of the "at cost" type or per unit of service provision (rates) are proposed.
- Timetables: the requirement is for deadlines with more than approximate coverage and with entitlement to recognition of acceptance of delays without penalty. Thus the costs of the delays have to be borne by the body which contracted for the work.

The consequences for the public body bearing the responsibility for the work are an increase in its costs, both direct ones, as a result of the higher price that has to be paid for the absorption of risks deriving from the above-mentioned uncertainties, and indirect ones, due to the increases in financial costs owing to extension of the performance deadlines.

3.2.3.2. In the relationship with the foreign company acting as supplier for the construction work, situations develop which give rise to further risk absorption.

We shall mention just two aspects:

- The charges set by companies which quote prices for the performance of construction work in a foreign country, especially in developing countries, in order to insulate themselves from the economic and financial risks associated with local expenditure.
- The elimination of any economic and financial risk in cases where the purchaser bodies seek greater participation in the performance of the work as part of a policy of know-how transfer.

None of these risks assumed by the public body can be transferred to or even shared with local private companies, for the reasons given in the previous section.

In short, the public body carrying out nuclear construction work in a developing country must itself assume - with little or no possibility of transferring them - certain risks of the nature indicated, as a result both of the action of the external supplier company and the resistance of local companies.

3.2.3.3. A consequence of the two transfers of risk explained above is the creation of another source of the increased costs: the gradual imposition of contracts of

the "at cost" or "by rates" types instead of the traditional one with fixed adjustment requires the implementation of a control infrastructure with a response capability on the same level of technological, technical, administrative and financial training as that of the private sector.

This requires a substantial change in the professional requirements for the officials of public bodies since the problem cannot be solved by a simple accommodation of persons and functions. A serious problem of recruitment and training is created in a context of work restrictions resulting from the scarce supply of specialized manpower and from the levels of compensation in the public sector, a situation which limits the negotiating power of the State to some degree.

3.2.3.4. Another way of describing this situation is to say that, through the process described, the private sector succeeds in eliminating or reducing the area of uncertainty within which it has to take its decisions but thereby increasing the area of uncertainty of the public sector.

Modification of the uncertainty situation implies alteration of the margin of risk inherent in the decision referring to an action (contract), as a result of which it is necessary to re-examine the "quantum" of this component in calculating the profitability of the investment agreed on.

3.2.4. The financial factor

The inflationary context, the exclusive participation of the National State in the management of nuclear activities and the inflexibilities of monetary, exchange and tax policy have created a situation difficult for the Argentine Republic's executive body for nuclear policy to manage.

In situations of high inflation companies try to improve their profitability through proper management of their liquidity, seeking to reduce the unfavourable effect of exposure of their monetary

assets to inflation. This objective is partly achieved by suitable administration of inventory policy, which can be used as an adjustment variable for avoiding inflationary losses or for counteracting negative effects of interest rate policy.

This resource cannot be used by the Argentine public body responsible for the operation of nuclear power plants as the characteristics of its product do not permit the formation of stock; thus, the level of production or the level of income are directly affected. Decreases in production for reasons beyond its control - as a result of which nuclear power plants do not always serve as base power stations - increase the share of structural costs (which are always proportionally high in the case of nuclear plants) in the total costs.

Because of their technical characteristics and their cost structure, nuclear power plants require stability in prices and in demand.

On the other hand, as the Argentine State has adopted a particular strategy of financing for the CNEA (Argentine National Atomic Energy Commission), and this is a function of tax policy and not of the most suitable financing structure from the entrepreneurial point of view (since there is an undervalued rate and compensation via contributions from the Treasury), the financial capacity of the body is seriously impaired, because it cannot manage its flow of funds in accordance with its cash requirements, thereby creating undesired financial costs and worsening its profit-making potential.

In some cases the State has distorted this financing structure by imposing the taking of short-term loans on the foreign market in order to deal with contingencies but thereby creating an intolerable pressure in respect of future activity. This has led to the refinancing of the debt in question, a procedure which is being carried out in 1985.

4. SUMMING UP AND PROSPECTS

4.1 Results achieved

In the frame of reference described, the activities in the nuclear area, as a result of the maintaining of certain policies followed continuously over the years, enable the country to show the following results, which have been achieved in spite of the adverse factors referred to:

1. Two nuclear power plants in operation (1000 MW), which contribute 15% of the power generated in the national grid;
2. The availability of fuel for the nuclear programme, in the category of reasonably assured resources;
3. Control over the fuel cycle, which enables us to fabricate fuel elements within the country in a plant with a potential capacity for supplying the country's first three nuclear power plants;
4. Availability of the technology for fabricating Zircaloy cladding and semi-finished products through operation of a pilot plant which is in the process of becoming an industrial-scale plant;
5. Availability of the technology for producing zirconium of nuclear-grade purity on pilot-plant scale;
6. Development of the know-how for the reprocessing and production of mixed-oxide fuel elements;
7. Being on the threshold of local production of heavy water by an industrial plant and developing our own technology for production on pilot-plant scale;
8. The country has acquired the technological capacity to enrich uranium by the gaseous diffusion method without any outside assistance;

9. Ability to develop the design capacity, project direction, engineering, supply, supervision of construction, assembly and commissioning of nuclear power plants through the agency of a mixed-capital engineering company and Argentine private consortiums;
10. Development in the country of a nuclear industry which supplies many electromechanical components at the quality level required, with its multiplier effect in other areas thanks to the reliability of its products;
11. Initiation in the country of the construction of large-scale components by national industry, through obtaining the fabrication license and know-how involved;
12. Having a sufficient staff of highly-trained workers in the various disciplines required by a nuclear programme;
13. Ability to transfer nuclear technology of an increasing degree of sophistication to other countries.

The management, co-ordination and administration of the risks associated with nuclear power projects requires exceptional measures of operational flexibility. This is a result of the technological complexities involved, the prolonged construction periods, the many different sectors involved and the large-scale investments at stake. This requirement is even greater, if we may say so, in the countries which are making their first efforts along these lines, since it implies that many of the sectors involved do not have sufficient accumulated experience, with the resulting effects on aspects of the project, both those of a technical nature and those having to do with its economic consequences.

In order to deal with the problems of administering risks and with a view to achieving the highest levels of efficiency possible, which in turn requires a certain capacity for management, the CNEA has organized a specific entrepreneurial structure which has enabled it to apportion responsibilities in a more balanced manner.

Since the execution of nuclear policy is concentrated in the National Atomic Energy Commission, this objective is being realized through the creation, gradually and where appropriate, of separate undertakings whose decision-making power lies within CNEA even though it does not hold a majority of shares in the unit's capital formation. As an example we may cite ENACE, which is the engineering undertaking which has the responsibility of acting as industrial architect for the construction of future nuclear power plants; CONUAR, which operates the fuel element fabrication plant; INVAP, which makes use of the Commission's human and material infrastructure, assigning it to the development of various projects, such as uranium enrichment, the pilot plant for producing nuclear-grade zirconium sponge, the construction of a training reactor, the production of detectors, etc.; and NUCLEAR MENDOZA, which carries out projects corresponding to different stages of the fuel cycle.

4.2. New institutional situation

The economic content of a political institutional system has to be oriented in the long term towards the sustained generation of financial flows which correspond to the actual flows of goods and services.

In this scheme, the effort should be on ensuring that the rate of development of the nuclear programme is consistent with the progress determined by general economic policy, the explicit objective of which should be an increase in the goods and services available to the community, which is the only means of obtaining genuine resources assuring the continuity of these programmes.

Nuclear programmes cannot consider as variables of adjustment in the short term in the context of a reformulation of general economic policy. It is unquestionable that, owing to the relative magnitude of the national resources involved, inflexibilities are introduced in the environment of political decisions, as a result of which conflict institutional situations have to be faced.

In the new institutional framework of our country it is obvious that the community is calling for a change in the allocation of resources. The political authority must take satisfactory care of pressing and urgent needs which to a great extent are depleting available national resources. One consequence is a sharp decrease in investment, including the postponement of long-term construction work.

It is here that the role of international solidarity and realism in business should enter the picture, especially those which must be demonstrated by the suppliers and credit institutions associated with the provision of nuclear goods and services. A proper response would consist of an effort to:

- Consider the renegotiation of existent loan contracts, extending the instalment periods and postponing the start of the repayment periods, on the basis of updated timetables for the construction projects which have been subject to considerable delays in meeting deadlines.
- Accept the possibility of increasing assistance in the form of credit to meet increased costs due to difficulties in the implementation of projects in developing countries, in order also to encourage those countries which hope for investment in programmes of this type and so that they do not find themselves limited by a lack of financial assistance which does not permit them to defend the investment made.
- Create a favourable environment as regards the reliability of the financial system in dealing with long-term programmes, demonstrating its ability to adapt itself to the unfavourable contingencies of the developing countries, especially in cases where, as in our country, we have demonstrated a vocation and capacity for defending the collective interest, including the adoption of rigorous programmes for repairing the economy.

4.3. International relations. Determining factors */

The situation described in the preceding section should therefore be fitted into the broader field of international relations. For a better understanding of this scenario, reference should be made to the new characteristics and dimensions of economic interactions, as well as to the need to seek a consensus in order to arrive at the political foundations which constitute the framework of the international system.

The present trend of these economic interactions is in the direction of a "world economy" (in the words of Bressand), i.e., an integrated system of worldwide scope with a logic of its own and in which two contradictory tendencies exist side by side:

- One in the direction of greater integration (especially in relation to agreements on a technological basis and the development of telecommunications);
- One in which this integration occurs within a restricted area, which tends to exclude a large number of countries and undertakings.

This means that the process of spreading economic growth which has been under way since the end of the second World War is threatened, implying an economic isolation with severe consequences for those protagonists who are on its margins. In this connection, two broad areas of change in the 1980s need to be analysed, technology and finance. It will be observed that in both areas, according to their present state of development, there are important factors which can accelerate that fragmentation.

Technological innovations play a fundamental role in the world economy, leading to a profound transformation of productive processes, to the fusion of hitherto differentiated activities and to the emergence of new telecommunication infrastructures (keys in

*/ (This chapter was developed by Mr. Gabriel E. Terigi, Licentiate in International Relations, on the basis of the ideas of Mr. Albert Bressand (INTAL No. 99-March/95)).

the functioning of world markets), and, above all, modifying the nature and distribution of the comparative advantages. With respect to this point, the trend is not favourable to the developing countries, owing to the consequences of a central fact: the comparative advantages will increasingly be created by man. The development of industrial relations (alongside "traditional" commercial relations) takes place in the framework of this technological change, by means of agreements at the government and the enterprise levels. And, once again, the risk of the isolation of vast sectors becomes evident.

At present, financial relations have become the centre of the international political debate, especially as a result of the problem of indebtedness (on the part of the developing countries).

The increase in the price of money creates problems for the "consumer" nations, i.e., the developing countries with average income. The financial packages which are proposed for dealing with this crisis should be considered a transition towards a more structural approach which can go to the heart of the problem.

The changes on the behaviour of the financial markets point to a disappearance of the "mild" financial circumstances of the 1970s.

In the 1980s we are encountering "world markets" where the risks inherent in the fluctuations of interest rates end up being transferred entirely to the debtor.

There seems to be a correlation between the short-term outlook with which the financial markets operate and the shorter duration of production cycles and the acceleration of technological changes. The danger lies in the fact that as a result of a short-term conception of the principle of world economy efficiency, only part of the world economy will be taken care of financially; in reality, such a principle should be subordinated to preserving and increasing the efficiency of the international economic system as a whole.

The challenge consists in preventing the financial markets from contributing to the fragmentation of the world economy, so that they

may serve the integration of the countries less favoured by the above-mentioned tendencies in the world system which is in the process of becoming consolidated.

It is therefore necessary to recognize the worldwide nature of the political context in which we must operate. In so far as it is understood that an international system can only be based on certain game rules, institutions and political legitimacy, it will be possible to establish the bases for co-operation that permits all the actors of the international scene to be integrated in such a system.