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## CASE STUDY: COLOMBIA

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# Capital investment and education essential to economic development

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The Colombian economy has reached a critical branching point. While estimates vary of Colombia's total coal reserves, there is no question that these reserves are huge and that the country is now on the verge of becoming a major coal exporter. Nickel, copper and uranium will also soon add to Colombia's export earnings, 60 percent of which are now still based on coffee. This large increase in the near future in export earnings from coal and other mining products defines the single greatest challenge to the Colombian economy and to the Colombian nation in the decades between now and the turn of the century.

On the one hand, these earnings can be invested for rapid development of the domestic capital-goods sector and of necessary infrastructure, including expansion and qualitative improvement of the educational system. Based on such an investment policy, Colombia will well before the year 2000 be transformed into a modern, industrialized nation, principally exporting manufactured goods rather than simply raw materials. Only the fact that the country is relatively sparsely populated and that the population growth rate has slowed down significantly in recent years could become a negative factor and slow down development for lack of an adequate workforce.

On the other hand, foreign earnings can also be wasted on the further proliferation of consumer goods, domestic or foreign speculative investment, as for example, in real estate or the illegal drug trade, or short-sighted and useless attempts to combat unemployment and stave off social unrest by sinking capital into small-scale, labor-intensive industrial and agricultural projects. In this latter case, potentially beneficial export earnings will only become the source of runaway inflation and social and political instability, opening the country to a process of so-called Iranization, which is now in an advanced phase of being played out in Mexico.

It will be useful to briefly digress here and discuss the Mexican problem, because Mexico faced the same choices now confronting Colombia only a few years ago. For both internal and external political reasons the

correct economic policy decisions were not made, and quite lawfully the present severe economic and social crisis ensued.

### The Mexican problem

The large oil discoveries of the mid-1970s presented to Mexico the unique opportunity to accelerate the progress of heavy industry and infrastructure development initiated under President Echeverría. Nor can there be any question that important progress in this direction was made during the past several years. However, *there can be nothing arbitrary in the process of successful industrialization*. Rigorous requirements of financial and investment policy, project management and manpower development leave little latitude and define a very specific path to be followed.

Mexican political leadership was not found equal to the task. While oil revenues in part were reinvested in oil and petrochemical development, large projects in heavy industry and infrastructure (transport, energy) experienced ever-longer delays. Debilitating supply bottlenecks developed, adding a sizeable domestic component to the world inflation rate. Necessary food imports resulting from neglect of agricultural modernization in much of the country further fueled inflation, which reached a rate of 35 percent in 1981. At the same time, the light-industry consumer-goods sector, aided by a strongly foreign-controlled banking system, greatly profited from the oil bonanza, but did not reinvest profits domestically. Enjoying high protective tariffs, these industries found it unnecessary to make new investments at home and instead sent their profits abroad for speculative ventures. Further debasement of the Mexican currency was the inevitable consequence. When a combination of rapidly declining oil prices and high interest rates hit this already structurally unsound edifice, the entire weakness of a monoculture-plus-consumer-goods economy with no domestic capital-goods backup came to the fore.

## The Malthusian argument against development

To prevent any possible misunderstanding of this discussion of the Mexican situation, the difficulties experienced by the Mexican economy definitively do *not* prove that the oil boom or, more generally, "too rapid" economic growth, causes inflation and instability. Such arguments are put forward to obfuscate the distinction between sound nation-building economic policies and essentially neo-colonial and Malthusian *desarrollista* ("development") strategies. By claiming that all forms of rapid economic development must lead to disaster, the neo-Malthusians hope to discredit and prevent the historically unique type of economic development which has been proven successful, be it in Germany, the United States, Japan or more recently, Korea: the fastest possible *capital-intensive* industrialization, powered by the most *advanced technologies* available, backed up by *large-scale infrastructure projects* and the strongest emphasis on both *basic natural science* and *engineering education* of the kind exemplified by the 1790s and early-1800s Ecole Polytechnique of France.

That this is the uniquely successful model of economic development is a matter of historical record. However, beyond that we can categorically assert that it is the *only possible* successful model, because it alone represents a truly human form of economy. It is no accident that a country whose economy is based on the exploitation (cultivation) of one or two natural resources (crops) and an accompanying consumer-goods sector, has the educational structure and output to be found in Mexico or Colombia today, producing large numbers of administrators, lawyers and social scientists, moderate numbers of engineers, and virtually no physicists. An average industrial nation produces approximately five times as many natural scientists per capita as Colombia and Mexico.

It is the development of the capital-goods sector, the development of new technologies, the invention and production of machinery capable of producing consumer goods or of mining coal, which requires natural scientists and large numbers of engineers.

Judged from the standpoint of such necessary requirements, Colombia, as do most other developing sector countries, has a long way to go. However, in comparison to many other developing nations, the starting conditions for Colombia are considerably more favorable. Coal and other mining products convertible into foreign exchange for import of necessary capital goods have already been mentioned above. A second great advantage is the high degree of urbanization of the Colombian population, close to 65 percent of whom now live in sizeable cities. This is comparable to many advanced-sector countries, greatly aids the delivery of educational, health and other services, and makes un-

necessary very large initial investments to cope with the subsistence agricultural sector.

## Education and manpower development: the first challenge

Since the Colombian government, according to the recently published *National Energy Study (ENE)* and other sources, will be putting broad emphasis on coal and hydro-electric development in the coming years—about 50 percent of all public investment will flow in this direction—it will be useful to give a brief critical evaluation of this strategy from the standpoint of the proper framework for economic development we have put forward.

There is no question that undertaking large projects of the kind exemplified by the Cerrejon coal project (see box) is the right course to take. And initially, infrastructural development as well as capital-goods development should be geared toward guaranteeing the success of such projects. This must not, however, lead to the old colonial model of "a mine, a railroad to the nearest port, cheap labor—and the country itself will never see the benefits."

The big challenge is diversification, which requires both a well-balanced investment policy and, from the outset, full attention to the manpower problem. Ultimately it is not resources, but skilled manpower, that defines the wealth of a nation. Appropriate model institutions combining instruction and advanced research, must be newly founded or evolved out of existing colleges and universities. Primary and secondary curricula must at the same time be overhauled to satisfy the standards set by these leading institutions.

From this standpoint of necessary high-technology capital goods and quality science education development, it is a cardinal mistake when the *ENE* states that "at least until the year 2000, the operation of nuclear plants appears inconvenient."

Nuclear technology, because it represents the highest form of energy technology characterized by the greatest energy flux density, not only represents the cheapest and most versatile method of energy production. It simultaneously exemplifies all forms of high-technology development and provides indispensable experience not just in nuclear engineering, but in materials science, complicated guidance systems, advanced machine tools, etc. A modern industrialized nation without experience in nuclear technology is as unthinkable today as a nation trying to develop without steam power in the 19th century.

A development program prescribed in the spirit of the methodology laid out above is the indispensable cornerstone of Colombia's successful transition to the status of a modern, industrialized nation-state.