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Building Regional Infrastructure in Latin America

Vito Tanzi

Special Initiative on Trade and Integration

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This document is part of the first component of the Initiative.

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BUILDING REGIONAL INFRASTRUCTURE IN LATIN AMERICA

Vito Tanzi*

I. INTRODUCTION

Economic growth is often a kind of miracle because like most miracles, it is not easy to explain. Countries that have not grown for a century, at times begin to grow at a fast pace, while countries that were growing fast stop growing. From time to time economists have advanced particular theories that argue that some factors, such as investment, human capital, technological development, intangible capital, rule of law, good institutions, good policies, and so on, play a fundamental role in the growth process. The problem is that the number of these factors keeps growing.

Recently some economists as well as several political leaders have suggested that infrastructure would be one of these factors. One study has stated that "on average Latin American's infrastructure slowdown relative to East Asia, could account for as much as one-third of the widening income gap between both regions" (Easterly and Servén [2003]). The implicit assumption about the direction of the causation is from infrastructure to grow. These views have contributed to the belief that there is an enormous "infrastructure gap" to be filled in Latin America. Filling this gap would, of course, require huge amounts of financial capital. Some estimates have even been presented about how much Latin America should spend per year on the creation of infrastructure.

Without addressing, at this point, the validity of these claims, or the realism of the estimated "infrastructure gap" for Latin America, it may be useful to be reminded that the term infrastructure is relatively new in economics. Until recent decades, the term did not even exist. As Rémy Prud'homme has recently remarked, the term "does not appear in the 1952 Concise Oxford Dictionary, nor in the 1950 *Real Academia Española Diccionario*". Nor, does it appear in the works of the "Pioneers in Development" who were writing in the post-war period. The term is simply a recent addition to the growing list of factors that presumably promote or produce growth.

Infrastructure investment "...is a space-shrinker, it enlarges markets, and operates like the lowering of trade barriers". (Prud'homme [2004], p. 1). Thus, it can be economically important because:

(a) it increases welfare by saving time and facilitating contacts and movement; given that the economic value of time is directly related to the per capita income of those who use the infrastructures, this tends to make some infrastructure economically more valuable for richer countries than for poorer countries;

(b) somewhat related to the above point, infrastructure investment reduces trade costs by essentially shrinking the space in which individuals operate in terms of time and money;

(c) by reducing transport and communication costs, it enlarges the markets for labor and for goods and services. For example, Wal-Mart can recruit from a large area and the consumers at Wal-

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Mart can come from far away places because of the existence of infrastructure that facilitates mobility and reduces costs. Obviously, as Adam Smith taught us, larger markets allow greater specialization that promotes productivity. The existence of infrastructure is also likely to reduce subsistence activities because it facilitates and encourages exchange and exchanges promote growth;

(d) as implied by the Wal-Mart example, good infrastructure reduces the space (in terms of time and cost of transportation) between production centers and consumers; and

(e) because of the above, it allows units of production to be larger and to be placed in more convenient places, thus benefiting from economies of scale and from greater freedom on where to locate.

Unfortunately, the building of infrastructure tends to be very expensive and requires fixed costs that, once made, cannot be retrieved. These costs are, often, not associated with assets that, like buildings or planes, can be sold. Furthermore, unlike investments in the private sector, these assets produce a service that, for several kinds of infrastructure, cannot easily be sold because of high exclusion costs for non-payers, or because of high collection costs, or because of political obstacles to the imposition of realistic tolls.

Since there is no immediate market test for the services to be provided by the infrastructure investment, the best timing and the need for some infrastructure are not obvious. For example, the realization that there is no road between point A and point B is not a valid economic argument that a road is needed or should be built. Therefore, political decisions tend to prevail over economic decisions. For this reason mistakes are more frequent and more costly than for private investment decisions. There are many possibilities available to a country that contemplates the creation of a new infrastructure:[1]

First, is the traditional, pure public good option. The Government builds the infrastructure using ordinary (i.e. mostly tax) revenue and makes the infrastructure available to the public free. In the past most roads, bridges and canals have been built in this way. Of course the work of creating or maintaining the infrastructure can be assigned to private companies and these can be domestic or foreign. But the cost is borne by the taxpayers.

Second, is the pure public goods option but instead of using general tax revenue the government uses earmarked taxes. The use of earmarked taxes attempts to establish a link between users and costs. Or, looking at it from a different angle, it introduces a benefit-received criterion to the financing of the projects. For example, the U.S. system of highways was built mainly with money raised by gasoline taxes earmarked for this purpose. The assumptions are two. First, that those who use the roads should pay for them. Second, that the benefit from using the roads is linked to how much fuel a vehicle uses.[2] Other more complex possibilities might include the use of "betterment taxes". These are taxes levied on the increase in the value of properties, and especially land, that result from the building of particular infrastructures such as roads, airports, etc. In this alternative,

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[1] On this see also Prud'homme [2004].

[2] In some cases, the weight of the vehicle is also taken into consideration, because heavier vehicles impose more costs on the roads.

the government tries to capture some of the increases in property values that can be attributed to the infrastructure. Of course, both of these options can be used jointly. The use of fuel taxes is undoubtedly simpler, both politically and administratively, at least in case of roads.

Third, is the pure public good option with debt financing. It is the same as the first except that the government borrows all or part of the infrastructure cost. Thus, in some ways, it shifts the burden to future taxpayers. The borrowing can be domestic or foreign and the maturity of the loans may or may not reflect the time when the project will, hopefully, contribute to the growth of the economy and to the increase in tax revenue. This option exposes a country to greater future financial risks because the debt must be serviced and eventually repaid. The risk increases when the debt is foreign, the interest rate is high, and the maturity is short. If the infrastructure built in this way is productive, it will contribute to the generation of a higher future income. This will facilitate the servicing and repayment of the loan under the assumption that the higher income will result in higher tax revenue. Thus, the elasticity of the tax system is a relevant variable. Making the tax system more elastic will facilitate the servicing of the loan. This is the option favored by those who argue for the use of a "golden rule" in budgetary accounting.

Fourth, is the public option with the use of tolls to cover all or part of the expenses. However, if tolls can cover the expenses, there is lesser justification for the involvement by the public sector. The private sector should be able to undertake this investment on its own or through a public-private partnership. The use of tolls changes the status of the service from a pure public to a private, or partly private, good. The tolls could cover the maintenance costs or cover also part of the capital costs. If the investment is made by the public sector, the funds used could come from ordinary revenue or from loans. They could even come from the securitization of the expected tolls.

Fifth, is the private option. A private operator is allowed to build, finance, and operate the project for a given number of years after which the asset will return to the public sector. In this case, the use of tolls or fees is essential to cover the costs. However, the concessionaire must anticipate the capital needed for the investment. The government and the concessionaire must enter in a contractual agreement that must make important assumptions about several relevant developments such as inflation, growth, exchange rates, and so on. Generally, the government will provide some guarantee against developments that are less favorable than assumed. Thus the government is exposed to some contingent liability.

Sixth, is the private option with "shadow tolls" paid by the government to the private operator? The private concessionaire who builds the infrastructure keeps track of the users who use the facilities. The government reimburses the concessionaire in line with the usage. In this case there are no costs associated with collecting tolls and no direct costs to the users. Hopefully, the higher economic activity generated by the project will raise the tax revenue that the government collects, so that the government finds it easier to pay the shadow tolls.

Seventh, is the private option but with use of tolls supplemented by public subsidies. The public subsidies can keep the tolls moderate so as to encourage a greater use of the facility with obvious economic benefits for the economy. Up to the point of congestion, and assuming that more use does not significantly raise the maintenance costs of the infrastructure, more use implies more benefits for the economy.

Eight, there is the less obvious, and often ignored, option of delaying the project until a time when economic and financial conditions are such as to provide better assurance that the project will be economically sound.

Ninth, there is the "do nothing option". For most projects, there are alternatives already available or some that may become more viable over time. Ferries may be alternatives to bridges over bodies of water. Planes may be alternative to roads, and so on. The economic viability of a specific project will often depend on the future developments of these alternatives. These alternatives may in time compete with the project and reduce its benefits. Or alternatively the new infrastructure may reduce the value of already available options.

The possibilities or options listed above should always be considered when deciding on an infrastructure. It is a mistake to assume that a given option (especially one determined through a political or even an engineering process) is the only valid one. Furthermore, when a decision to go ahead with a major project is clearly a political one, made to achieve a political and not necessarily an economic objective, then there is a strong presumption that the project must be covered by ordinary revenue and not by borrowed money. In these circumstances, infrastructure becomes similar to public monuments: they may be necessary to a country but not for economic reasons. Even a "golden rule" would not want to finance these projects with borrowed money.

The focus in this paper is on regional projects. That is, infrastructure that concerns or links at least two countries. Furthermore, much of the discussion is mostly relevant for transportation projects, which, in any case absorb often an overwhelming share of total infrastructure costs and are less likely to generate incomes that make them interesting for private sector’s investments. The discussion is much less relevant for projects related to the exploitation of material resources, including energy or for projects related to communication.

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II. THE ROLE OF MULTINATIONAL INFRASTRUCTURES

In the past, autarchic economic policies created conditions that forced markets to develop prevalently within national borders. For most products, services and activities, the market and the country were often the same thing. In fact, in many cases, because of poor national infrastructure, the markets for some products or services were smaller areas within countries. The infrastructure (roads, railroads, bridges, tunnels) that was created reflected existing policies and domestic activities. Often, and especially in some larger countries, this infrastructure was not even able to link physically and economically the various areas of the same country.

Cross-country rivalries or animosities and fear of invasion by neighboring countries discouraged the development of infrastructure that could link, rather than separate, different countries and could expand markets beyond national borders. Thus, little cross-country infrastructure was built. For this reason trade among Latin America countries developed much less than it could have developed and certainly less than trade between these countries and the rest of the world. The links with the rest of the world were mostly with Europe and the United States, rather than with other Latin American countries, and used sea routes or, more recently, planes.

With globalization and with the spreading of democracies conditions have changed. Democratic countries generally do not invade their neighbors. In a more open and democratic environment, especially when political leaders begin to share a common vision of regional economic integration, infrastructure that could link the Latin American countries and that could facilitate exchanges among them becomes more important. Regional infrastructure is, thus, receiving much more attention than in the past. In some ways, and of course with less urgency, several Latin American countries have started on a path that is reminiscent of the European countries in the early phase of the process that led to the creation of the European Union. This process has accelerated in recent years.

Within the European Union, given the goal of a single market, the European Commission has been pushing for the creation of infrastructure that will link more closely the member countries and that would facilitate movements of goods and people throughout the whole area. For example, the Helsinki Declaration of June 25, 1997, "Toward a European Wide Transport Policy" stated the objectives of this policy. The Commission’s "Growth Initiative of 2003" listed 56 projects: 31 in transport, 17 in energy, and 8 in high-speed communications networks, R&D and innovation. They are estimated to cost 62 billion euro. This money would be spent at the rate of about ten billion euro per year.

In these projects the European Community Budget together with national budgets would finance part of the costs using in part the "Structural Funds" while the European Investment Bank (EIB) would play a significant part in the total financing. The EIB borrows the money from the huge European capital market. The Commission has estimated a split of 60/40 between public and private financing for these projects. It is also considering setting up a guarantee instrument to encourage and facilitate the use of private funding for public-private partnerships for Transnational European Network (TEN) projects.

The interplay between the financing operations of the EIB and the Structural Funds is important. In Europe private financing of long-term projects is helped by the growing integration of the

European financial market and by the enormous financial resources (about 10 trillion euro) in the hands of pension funds, life insurance policies and similar investments. These are funds in search of good, long-term investments. A guarantee by the Commission would facilitate borrowing. The Structural Funds are financed by taxes on import and by a share of value added taxes that go directly to the European Community. For these reasons as Romano Prodi put it "...the obstacles (to be faced are) not only financial but also -and probably more importantly- political and regulatory". The Final Report by the Commission to the European Council indicates, "...the Commission will make proposals...to improve the administrative, regulatory and financial conditions for complex, cross-border investment projects".

In Latin America two major initiatives, strongly backed by political leaders, have been launched: the *Iniciativa para la Integración de la Infraestructura Regional Suramericana* (IIRSA), and the *Plan Puebla-Panama* (PPP). Both of these initiatives aim at increasing the still limited physical integration of the countries of the Latin American Continent. IIRSA is directed at the Southern part of the continent and concerns 12 countries and PPP at the Northern part. PPP concerns Mexico and the Central American countries. These initiatives are ambitious. They would create various "corridors" and "hubs" linking the markets of various countries and stimulating trade among these countries. The building of the entire infrastructure connected with these initiatives would require expenses running into many billions of U.S. dollars.

There are important differences between the European and the Latin American situations. It may be worthwhile to mention some of them.

First, is the level of per capita income that in Europe is several times the Latin American level. For example the total GDP of Latin America is broadly similar in size to that of Italy at the official exchange rates. This difference makes it more difficult for the Latin American countries to finance expensive projects.

Second, is the high saving rate of European countries that creates a huge pool of financial resources that can be tapped in the same currency for good projects.

Third, the geographical area of the Latin American continent is much larger than that of the European continent. Thus, it would be much more expensive to provide infrastructure similar to that of Europe.

Fourth, is the topography of the two regions. Natural obstacles such as mountain ranges, large rivers, huge forests, etc. increase the cost of these projects. These obstacles are much greater in Latin America than in Europe. The Euro tunnel project, under the British Channel, and the Lyon - Torino Route, under the Alps give some idea how expensive these projects can be when they encounter difficult topographic features. The first of these projects cost almost US$ 18 billion. The second is forecast to cost as much as US$ 15 billion.

Fifth, is the density of the population. The higher is the population density and its income level, the more profitable projects tend to be because there are more customers with more purchasing power per square mile. Population density and per capita incomes are, of course, much lower in Latin America than in Europe.

Sixth, is the lack of a developed Latin American financial market and the absence of a large pool of savings looking for long-term investments. There is a link between the development of pension systems and the availability of long-run investment funds. For this reason, the creation of infrastructure in Chile has benefited from the pension reform of the 1980s.

Seventh, so far, there is no equivalent in Latin America of the European Commission capable and ready to prepare projects and to finance a substantial share of the investments through European Union funds. This means that the potential role that an institution such as the IDB must play in the Latin America context is much broader. It must combine that of the European Commission and that of the European Investment Bank. If the IDB played such a role, it would need to rely on credit that originated outside Latin America, unlike the European Investment Bank. The risk that the IDB must bear especially, but not exclusively, with exchange rates fluctuations will inevitably be higher.

If carried out, IIRSA and PPP would create an infrastructure that would make it easier for people and goods to move between several Latin American countries and areas. The projects would create hubs that would stimulate the creation of regional, as compared with national, markets. Larger markets would lower costs and lead to more efficient locations for placing enterprises or wholesale centers and more efficient use of resources. The Latin American countries would become more economically, and possibly politically, integrated. The trade that would take place among the Latin American countries would increase. Presumably it might even rise compared with trade with the rest of the world although this is far from certain. The important political objective of regional integration would be promoted.

The rest of this paper outlines some of the issues that characterize, especially, multi-country infrastructure projects. It will deal, first, with general issues and then, more directly, with financing questions. Since the economic and political benefits that may be derived from better infrastructure have been stressed in various reports, this paper will focus on areas of concern and on problems that should be addressed when the decisions on whether to go ahead with an infrastructure project are being made. In this discussion it must be kept in mind that there are political and not only economic objectives that would be pursued by IIRSA and PPP. If these political objectives are important, countries should be willing to pay a price to achieve them.

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III. GENERAL ISSUES

It is, perhaps, useful to mention at the beginning that it is not the availability of infrastructure (roads, bridges, rails, ports, airports, canals, etc.) that promotes economic efficiency and growth but the use of that infrastructure. Under use reduces the contribution to economic efficiency of the available assets. Roads or harbors that few ever use do not contribute to economic development. Japan has learned this lesson the hard way in recent years. Furthermore, if they are financed through debt that must be serviced, they could be damaging to the growth of disposable per capita income because of the taxes necessary for servicing the public debt. Mutatis, mutandis, overuse of an infrastructure that results in serious congestion on bottlenecks reduces benefits and, implies that the capacity must be increased or, possibly, that the cost (tolls, fees) of using the infrastructure must be raised to discourage uses that have lower value. Too-low user costs at times lead to overuse and crowding and convey the impression that the capacity needs to be expanded. This is the justification for higher charges for the use of buses, subways or electricity, during peak load hours. Under use not explained by high tolls implies either that the project has been built too soon; or that, as in the case of "white elephants", it should not have been built at all. This infrastructure is contributing little to growth.

A survey of experiences from many countries indicates that there has been a tendency in infrastructure projects to make forecasts that have proved to be much too optimistic. This has happened even under the best of conditions. For example SNCF, the French-owned railway, had predicted that 16.8 million rail passengers would use the Euro tunnel (that links France with the UK under the English Channel) in its first year. The actual number was only four million. In 2003 actual revenue from the tolls was a third of what had been predicted while the construction costs had been much higher. This happened in a density-populated area connecting two of the richest cities in the world (London and Paris) and two G-7 countries! The same happened in the Vienna-Budapest Motorways. When it was completed, actual traffic was only 50% of the predicted level. "Toll roads in Mexico, Argentina, and Brazil have all suffered from this problem" (Strong, Guasch and Benavides [2004], p. 12).

These forecasting errors are not random but systematic. As Prud'homme has put it, "errors of 50% or more seem to be the rule rather that the exception" (p. 2). They are made not because of technical incompetence on the part of those who make the forecasts, but because there are strong incentives, on the part of those who make the basic decisions to build the infrastructure, to exaggerate the benefits, and hide some of the costs. Over-optimistic forecasts inevitably lead to poor financial decisions. In these decisions politics often plays a bigger role than economics. For this reason it is important to create effective filters so that only "good" projects pass the acceptance test. These filters should aim at removing the systematic bias in forecasts recognizing that there will remain the possibility of random errors. A careful application of good techniques for project selection must be an essential part of the decision process, as it seems to be in Chile. This should always be the case but the filter must be particularly tight when the projects are financed by foreign debt and when the interest rates are high.

Unfortunately, as the report of March 4, 2002 prepared by the Policy and Evaluation Committee of the IDB (RE-260) explains, because "the calculations [for cost-benefit analysis] were complex, subject to differences of opinion, and highly sensitive to assumptions" and because "the (IDB) ...

was encouraged to move into areas in which it was exceptionally difficult to predict future benefit flows", the IDB shifted away from this analysis even though "the logic of the exercise did focus on likely future results" (p. 24). The move away from objective project evaluation has, of course, not been limited to the IDB but has affected other lending agencies including the World Bank and the European Investment Bank, as well as the governments themselves. Universities have drastically cut the offering of these courses because there have been few applicants in recent years. Lack of demand for specialists in cost-benefit analysis has reduced the supply.

The current situation in Latin America seems to be that, with some exceptions, e.g. Chile, which has retained a tradition of objective and rigorous project evaluation, the filters that had existed in the 1970s to screen projects are no longer there. Therefore, the probability of making mistakes has risen and these tend to be costly mistakes. This implies that the rate of return to public investment has probably fallen. If the countries had, themselves, taken over this evaluation function from the lending agencies, the negative consequences would have been limited. Unfortunately, this did not happen. The role of the Ministry of Finance in exercising discipline in these decisions has been limited. Decisions on public projects are often made by spending ministries that have less concern about the efficiency and the financial implications of these projects. Perhaps, the move away from tax financed to debt financed projects, may have reduced the power of the Finance Ministry. The reason is that the spending ministries often negotiate directly with the lenders and the Finance Ministry has limited political power to prevent spending that is externally financed.

It would be difficult to overemphasize the need to filter projects more carefully especially when political objectives tend to overwhelm economic considerations and thus provide a political cover for economically questionable projects. This problem may be accentuated by talks of "infrastructure gaps" and by the belief held by many that public investment automatically contributes to growth so that it should always be encouraged. This belief is behind the pressure to introduce a "golden rule" for estimating the fiscal deficit of a country. The combination of political objectives and debt finance creates situations that reduce the rigor needed in these decisions.

Careful project selection must be a fundamental part of decisions related to IIRSA and to PPP. In their initial conceptions, these were largely engineering plans that could be stretched to accommodate many questionable projects or compressed to include only the economically efficient ones. These important regional programs should not become Christmas trees for hanging unproductive projects promoted by special interest groups. Informal conversations suggest that there has been a welcome process of pruning of poor projects from IIRSA, which has substantially reduced the potential cost of the initiative. Presumably the same is happening to PPP. Furthermore, much pruning will inevitably be forced by the limitation of financial resources. The important objective is to continue with this process but to guarantee that the projects that survive are truly the most useful or productive ones and not those with powerful sponsors. Surely there must be many projects that merit to be supported and carried forward.

The importance of IIRSA and PPP is that, for the first time, infrastructure projects will no longer be thought only in strictly national but in regional terms. In a more open and globalizing environment, where markets are no longer limited to or identified with national areas, thinking in terms of regional hubs and in terms of infrastructure that would facilitate economic operations within these multinational hubs, can be an important step toward the integration of the Latin American

economies. These projects could make it possible to better exploit natural resources or to make resources available to where they would bring the greatest economic benefits regardless of borders.

As long as people think in national terms, they will have no or little incentive to learn about economic opportunities that may exist on the other side of the frontier. The existence of this kind of asymmetric information and national bias that frontiers foster obviously discourages thinking in terms of regional hubs. It also means that, at this point in time, most "traffic" stops at the frontiers and, thus, tends to be national. Therefore, regional projects are less likely to be economically profitable except for particular commodities or services such as electricity, gas and similar which can connect the supplies in one country with the consumers in another country. It will take a long time to change these attitudes and the current situation.

In most cases, even in advanced, industrial countries, much of the use of (or the traffic on) existing infrastructure tends to be internal to the countries. Citing a study by Canadian economist John McCallun, Dani Rodrik has pointed out that trade between a Canadian province and a U.S. state (that is, international trade) is typically on average 20 times smaller than trade between two Canadian provinces (intra-national trade) (Rodrik [1997]). In most situations, only a small proportion of total traffic is cross-border or transnational, because most traffic and most exchanges tend to be local. This is true even in the two mostly integrated countries, the United States and Canada. This has major implications for the profitability of regional infrastructure.

IIRSA or PPP are not likely to change that reality. Thus, the traffic that could be created by the new regional infrastructure proposed by these initiatives should not be expected to increase dramatically the trade or the exchanges among Latin American countries. But since most new infrastructure will be physically placed within the borders of single countries, it will also increase, in many cases, intra-national traffic. This implies that if bottlenecks already exist or develop, they are, or will be, created by much domestic traffic competing with little regional traffic for use of the same infrastructure. Improving national networks would lead to improvements in regional traffic where it already exists. However, if there is no cross-country infrastructure, no improvement in national networks can create regional economic hubs.

It could be argued that Say’s Law, which states that the supply creates its own demand, might work for infrastructure. Various documents argue that once the infrastructure that connects distant places -that may now be separated by natural obstacles, such as the Andes or the Amazon River- is in place, traffic will increase rapidly. In other words, the supply of regional infrastructure will create its own demand. In this context it is important to keep in mind, first, what was already said: that under the best of circumstances (U.S. vs. Canada) traffic and exchanges are mostly national; and, second, that forecasts of usage have been often wrong in one direction especially for the earlier years after an infrastructure becomes available. It is not comforting to argue that at some future time the traffic will materialize. Delayed usage can create big financial problems for infrastructure financed through borrowing rather than through ordinary revenue.

If an infrastructure is likely to become profitable, or even socially productive, only with a significant delay, it will require a financing with a very low rate of interest. The reason is that discounting distant future benefits with a high rate of discount makes their present value very low. Borrowed money is rarely cheap. Thus, the argument that, in time, infrastructure tends to be used more fully and to become economically useful is no consolation for projects financed through

debt. For these projects the servicing of the debt cannot wait for the time when the project will be in full use. However, once again, if political considerations are important enough to make a government or governments willing to go ahead with such investments, they ought to be financed through ordinary revenue and not through loans.

Once they become operative, infrastructure projects for transportation facilitate the physical movement of goods and persons across national frontiers. By doing so they remove physical obstacles to trade and exchanges. However, they eliminate only obstacles placed by nature. By themselves, infrastructure projects do not eliminate man-made obstacles that always exist and that can be very constraining. Man-made obstacles are those created by regulations, procedures, controls, laws or even illegal activities such as corruption and banditry that tend to be different between countries. These obstacles may neutralize or reduce the savings, in time or money, generated by infrastructure projects. Thus, they may reduce the potential benefits derived from the projects. If a truck saves some hours in travel time, because of a new bridge or tunnel across a frontier, but ends us wasting days to clear the bureaucratic obstacles at the frontier, the benefit from the multinational infrastructure is much reduced.

There is a great need to harmonize, as much as possible, these man-made obstacles before the new infrastructure becomes operational. But harmonization is not enough if the common denominator is an inefficient model or practice. Harmonization must achieve a significant simplification of rules and procedures. In other words it must take place around best practices. This argument is similar to the one that concerns tax systems. It is not a good policy to harmonize tax systems using a poor reference model.

The current discussion of the necessity to create better regional infrastructure in Latin America could generate major dividends if it stimulates discussion and action on the need to simplify rules and to eliminate procedures and processes that are inherently inefficient. There was a time when the official role of frontier personnel was largely to impede traffic. In an integrated Latin America it must be to facilitate traffic and trade without, of course, losing sight of the need to control for illegal activities such as drug smuggling and terrorism. In Europe the process of harmonizing rules and regulation is the responsibility of the European Commission. In Latin America there is no such authority to promote such a process. For this reason the role of the IDB could be particularly significant.

Man-made obstacles reduce the benefit that may be derived from the use of regional infrastructure once the infrastructure is in place. However, these obstacles may also play a negative role in the process of creating the infrastructure. Bureaucratic, legal, and administrative obstacles may be important issues for the providers of the infrastructure who may or may not be public institutions. Especially when infrastructure will be financed and built through public-private partnerships, the role of non-harmonized rules may be particularly important.

How should the framework for multinational infrastructures be harmonized? Should an optimum (or, better, a best practice) approach be developed? What can be learned from the successful Chilean experience? Is this experience easily reproducible in other countries? It may be recalled that Chile has a "unitary" form of government. In other words, national economic decisions are taken by a powerful central government. This "unitary" model is different from the decentralized models that exist in Brazil, Argentina, Colombia, and some other Latin American countries.

Significant obstacles to the use of a Chilean model might originate from the existence of a federal structure and multilayered governments. Also different environmental laws, or even sensitivities, are likely to play a role. Even attitudes to the role of foreign operators may differ in different countries having been shaped by past experiences.

Experience indicates that, at times, agreements among a country's main actors as to whether and how an infrastructure project should be built are as important as agreement between the governments of different countries. Sub-national governments (states, provinces, etc.) tend to play large roles in these decisions. As Strong [2001] p. 17 has put it: "The difficulties of federal/state relations in infrastructure projects also can serve as lessons for transnational projects. Disagreement between states and the federal government about priorities, contributions, and the level of support can doom projects even before their transnational aspects are brought into account". Increasingly ethnic regional groups have also been playing a role.

IIRSA and PPP will face problems of sequencing. Serious backing, on the part of the countries' authorities, to these projects should be expressed in firm commitments and in concrete actions toward the elimination, or the substantial reduction, of man-made obstacles to the movement, across frontiers, of goods, persons, and services. The impression that one gets, and it may be a wrong impression, is that at this stage there is too much talk on the part of the countries' authorities about how to finance, still not precisely defined, projects and not enough about the preliminary work necessary to create an institutional infrastructure that would make the regional infrastructure useful and productive.

An occasional costly mistake is to build infrastructure too soon. It is costly to have expensive assets that are not adequately used for lengthy periods of time. While this delay before the infrastructure is in full use is a problem for any investment, it becomes a macroeconomic and not just an allocation problem when the assets have been financed by debt, which carries high interest rates. During these periods of under use, interest must be paid and maintenance costs must be covered. For this reason, half a century ago Albert Hirshman had argued that bottlenecks caused by excessive use of assets are often the best signals that an investment is needed; see Hirschman [1958], especially pp. 86-97. Of course, they can also mean that the user fee is too low when such fees can be applied.

Before concluding this section it may be worthwhile to cite from the report on the so-called Growth Initiative of the European Commission. It indicates that the problems discussed above have also characterized the European experience. "In relation to networks, delays have accumulated for large-scale cross-border transport projects as a result of complex administrative procedures, low priority by member states, uncertainties associated with the choice of routes and the planning process and the complexity of coordinating projects with a cross-border dimension. This has been compounded by the difficulty of structuring supranational businesses to run such operation". In addition, the absorptive capacity of the administrations and the level of support and political commitment have been also problems (Commission of the European Communities [2003], p. 6).

IV. FINANCING ISSUES FOR MULTINATIONAL INFRASTRUCTURE

The recent discussion of public infrastructure in Latin America has been dominated by financing issues. Many observers, including political leaders, have accepted the conclusions that:

(a) there is a huge "infrastructure gap" in Latin America;

(b) this gap is a major obstacle to faster rates of growth;

(c) therefore, the main problem is finding the financial resources to reduce the gap.

Once the resources are found, infrastructure can be created and growth will be promoted quickly.

These conclusions are behind the recent debate on whether fiscal rules that set limits to the size of the allowed fiscal deficit, including limits imposed by Fund-supported financial programs, should be made more flexible. A "golden rule" that netted out public investment from total public spending, thus reducing the measured fiscal deficit, would allow countries to borrow and spend more on public infrastructure. The assumptions are that there are lines of credit to be tapped and productive projects ready to be undertaken. The only constraint is the rule. While this may be true for specific national projects, it is unlikely to be the case for regional projects. Citing once again the European Commission:

"Cross-border segments constitute the fragile links in the construction of fully integrated internal market in an enlarged Union and are often subject to long delays both because they may deliver a lower return on investment and are inherently more complex to coordinate" (Commission of the European Communities [2003], p. 14).

In this section the focus will be on regional, rather than national, projects. Although many issues are the same for both kinds of projects, some are specific to cross-border or regional projects. Since the main focus of this paper is on regional integration, the emphasis will be on various transportation projects. These projects (a) are more relevant for economic integration; (b) absorb an overwhelming share of total infrastructure spending; and (c) are less likely to attract the interest of the private sector.

If infrastructure is to be built, someone must cover the costs. Over the life of a project the costs can be covered either by the public sector, using ordinary (i.e. tax) revenue or loans, or by those who use directly the infrastructure when tolls can be and are used. Of course much infrastructure does not lend itself to the use of tolls. If an infrastructure is built and operated through the use of a public-private partnership, the private individuals who put up the funds may end up bearing some of the costs when the investments do not prove to be profitable and they have not benefited from explicit or implicit public guarantees against these risks.

When tolls are used, it may be possible for those who pay them (say trucks) to shift the burden of these tolls on others, such as the consumers who buy the transported products. Thus, as with taxes, there is a question of legal versus effective incidence of the burden of the tolls. Those who finally bear the cost may be different from those who pay the tolls. Thus, surveys that attempt to

establish the final burden of these tolls on different categories of users must pay attention to this problem of toll shifting.

Until the Great Depression much of the infrastructure for which the use could be restricted (toll roads, subways, canals, electricity, telephone) had been developed by private interests. The Great Depression and the increased role of the state that followed it made nationalization fashionable and brought about a change in attitude so that the public sector came to play a larger role in infrastructure projects. Over the next several decades, especially in Latin American countries, the government built most of the infrastructure. In various parts of the world, including Latin America, the culture that developed was that the use of many of these assets should be provided free to the public, or at least, that it should be highly subsidized. This attitude, combined with the fiscal difficulties that many countries were undergoing, reduced the countries' capacity to finance new public projects or even to maintain existing ones. It, thus, contributed to the "infrastructure gap".

Over the decade of the 1980s attitudes started changing and a larger role in economic activities on the part of the private sector came to be accepted (Tanzi [2000], chapter 2). The so-called Washington Consensus was the most transparent manifestation of this new attitude. This new attitude extended to the possible management by the private sector of public enterprises that had been public in earlier years. Many public enterprises were privatized and the governments started entering into public-private partnerships for the creation and the management of new infrastructure projects. Because of continuing fiscal difficulties in many countries and because the privatization of public enterprises often produced large revenue to the governments, many governments welcomed these changes. Also the citizens of some countries became better disposed to pay fees on tolls for the use of facilities especially when they provided better services at still attractive prices.

In recent years, some Latin American countries, including Mexico and Chile, have relied on these public-private partnerships to expand their stock of infrastructure. This allowed them to reduce the use of public revenue and to benefit from technical and management skills that could be provided by private investors. So far the experience has been mixed. Some of these partnerships have been successful, others much less. Problems have developed in some countries leading to (a) renegotiations of many agreements; (b) occasional substantial losses to those who had invested the money; and (c) exposure of the public sector to potentially large contingent liabilities. It is fair to conclude that the enthusiasm of the early 1990s for these arrangements seems to have been reduced.

In Latin America, Chile has been the most successful with these arrangements. The availability and use of new technologies that have reduced the cost, in time and money, of collecting tolls (for example, electronic sensors for motor vehicles) and the Chilean capacity to develop transparent and effective legal and regulatory frameworks explain this success. The greater availability of domestic financial resources for longer-term investments has also helped. However, a final or definitive judgment on the Chilean experience will have to wait some years because some of the new infrastructure projects are not yet operational. This, for example, is the case with the network of toll roads in Santiago that is expected to revolutionize urban transportation in that city and that will be completed in 2005. In any case it would be nice to be able to duplicate the Chilean experience in other countries.

While interesting and significant for some national projects, for some of the reasons mentioned earlier, public-private partnerships are not likely to play an important role in transnational or

regional transportation projects. Demand driven projects, which are the ones most likely to interest private investors, are almost always strictly national, except for those related to energy and communication. As with the Santiago highway network, these partnerships are often for projects in densely populated or in economically developed areas.

The experience with regional transportation projects is still limited and comes mostly from Europe. So far this experience has been somewhat disappointing. The TEN, the European Commission's proposal aimed at linking the various areas of Europe, has not got very far in spite of the money available from the European Union and the role that the European Investment Bank could play. The difficulties faced by transnational projects are several.

First, as stated earlier, in spite of growing economic integration among neighboring countries, much of the traffic on the existing infrastructure remains national. This means that, from an economic or demand-driven point of view, it makes more sense in general for investors or for a country to develop national rather than regional infrastructure.

Second, even when new regional infrastructure could create additional, cross-country traffic, it could take many years before the cross-country or frontier traffic increased enough to generate a reasonable economic return for a private investor or even for the economy. However, an infrastructure that has been built with borrowed money requires the servicing of the debt from the time the money is used. Debt servicing cannot wait until the infrastructure becomes productive or profitable.

Third, when a regional infrastructure is built to benefit two or more countries, so that the costs must be allocated among them, "free rider problems" are likely to arise. These problems arise because of "geographical asymmetries". These derive from the facts that only rarely will the countries benefit equally from a cross-border infrastructure. Furthermore, each country will have the incentive to downplay the benefits that it will derive from the project and overplay the benefits to the other parties. Each party will try to shift the financial burden on the others. A strong, impartial and respected arbiter would be needed to apportion costs in an objective and equitable way.

Finally, when "corridors" or "hubs" are created that cross particular countries there will be inevitable attempts to place strictly national projects under the umbrella of the regional infrastructure. This will be particularly so when convenient financing is obtained for regional programs.

These and other problems not discussed here characterize regional projects and make the creation of regional infrastructure more difficult than that of national infrastructure. They also have a major bearing on the financing of these projects.

In an optimal world (a) the Latin American countries would have the capacity to raise tax money to finance, annually, a program that would aim at integrating the countries in a physical sense; (b) a regional authority would design the program, keeping in mind the objective of regional integration, and would decide the pace at which it would be implemented; (c) this authority would allocate the costs to each country taking account of geographical asymmetries and thus preventing free rider's problems from arising; (d) the authority would promote a program aimed at harmonizing, around well designed best practices, the regulations, processes, and norms that affect both the building of the infrastructure and its use. This harmonization would reduce the problems that are encountered in border crossing.

Unfortunately, the world is not optimal and there is no Latin American authority capable of performing the above functions. Therefore, future developments must take place within the context of existing institutions, relationships, and availability of resources. Because of the prominence that it has assumed in the public debate, we should refer first to the ongoing discussion on whether fiscal rules should be amended to allow more public investment. The impression that is at times given is that these rules are the main obstacles to the building of infrastructure. In this context it should be understood that the relaxation of fiscal rules to accommodate more public investment per se does not make more resources available to the countries. It only allows countries to use more credit, if that credit is available. The change in the fiscal rules does not reduce the cost of borrowing and it says nothing of whether it is a good policy for the countries to add to their public debt by increasing their borrowing. Countries that have already debt problems should be careful in pursuing this road.

Of course, if the extra resources borrowed would go for a mature public investment project that in a short period of time could produce a rate of return higher than the interest rate on the borrowed money and if macroeconomic conditions (inflation, balance of payment, etc.) did not discourage this extra spending, then the relaxation of the fiscal rule for this specific investment would be justified. However, the assumptions implicit in this change of policy should be kept in mind. For the reasons mentioned earlier, it is not likely that many regional projects would satisfy the above conditions. Although there could be exceptions.

A preferred option could be the use of earmarked taxes. These are taxes collected for a specific use. If an argument could be made that, directly or broadly, these taxes are paid by individuals who benefit from the services provided by the activities financed by these resources, then these earmarked taxes can be justified by the so-called benefit received principle. This is a principle of taxation that justifies particular taxes on the argument that those who pay these taxes benefit from the government activity financed by them. In a way these taxes become almost prices for the services.

A benefit-received argument could be made for the imposition of particular taxes on citizens who directly or, more often, indirectly will benefit from the provision of regional infrastructure. This infrastructure will reduce transportation costs but will also increase the value of some land by increasing access to it. Thus both fuel taxes and taxes on the increase in the value of land (so called "betterment taxes") could be considered as candidates for earmarking to finance regional infrastructure. Obviously the same argument can be made for financing national infrastructure. There are precedents in the use of these taxes. These precedents could be studied to assess the difficulties (administrative and political) of using them. The U.S. Federal Government was able to finance the U.S. Federal highway network with earmarked taxes on gasoline. This network included "frontier" roads such as the very lightly traveled roads in Nevada and in other Western states that are largely cross-border states that connect more developed and inhabited parts of the United States. These "frontier" roads could have never been provided by private resources.

The use of "betterment taxes" on land, earmarked to finance not only roads but also other kinds of infrastructure such as airports, ports, and canals, are less well known and could be studied. The justification for these taxes is that infrastructure raises the value of land and properties in the areas where the infrastructure is provided. Thus the owners of this land benefit directly from the infrastructure so that they should bear part of the costs. There is a clear theoretical justification for these taxes even though politically and administratively there would be difficulties in their use.

Earmarking is a controversial policy that has been often opposed by public finance economists, including the author of this paper. It creates extra budgetary and protected areas of public spending which may be subjected to less public or political scrutiny than other spending. Earmarking often leads to inefficient uses of public money. In an ideal world there might not be any place for it. However, earmarked taxes, justified by a benefit-received principle and used to protect some needed capital spending (e.g. roads) from fiscal retrenchment, have received more support.

In Latin America earmarking would face an additional problem. On several occasions, and some recent ones, governments in need of resources have ignored the established rules of earmarking and have raided the resources accumulated in earmarked accounts. Thus, in Latin America there would be the concern that, at least in some countries, governments might raid resources that had been accumulated to finance infrastructure. For this reason earmarked resources aimed at creating regional infrastructure could be put under the control of a multi-country institution, a *Fondo de Infraestructura*, rather than the national governments. This *Fondo* could also receive capital transfers from the member countries and within strict limits even borrow from official institutions.

If multi-country institutions, *Fondos de Infraestructura*, were created to promote and supervise activities toward the establishment of infrastructure programs associated with IIRSA or PPP, they could become the manager of the earmarked funds. In some way, this approach would be similar to the one followed in Europe where the revenue from the common external tariff and a part of the value added tax revenue are earmarked for specific purposes, including the financing of regional infrastructure, and are under the control of the European Union. The rates at which these taxes would be applied would probably have to be the same among the countries that would be parties of each grouping. They would have to be negotiated among the countries.

The regional institutions representing the IIRSA and PPP countries would use the revenue to promote regional transportation infrastructure within agreed guidelines. This infrastructure would be considered a kind of regional public good. Being financed by tax revenue, and bearing limited frontier traffic, it would dispense in most cases from the use of tolls in order to stimulate regional trade and movement of people. This approach would recognize that, for several or even many years, the infrastructure created could not generate a financial rate of return to attract the interest of the private sector in financing it. It would also recognize that it would not be wise to finance this economically unproductive but politically important infrastructure with costly debt.

Naturally, if there were any infrastructure project with the capacity to generate significant potential income within a short period, the multicountry institution should encourage the intervention of private investors and enter in public-private partnerships that could even use some of the earmarked money in support of the infrastructure projects. However, in these cases care would be taken not to guarantee the private debts or the returns on private investments. Thus, contingent liabilities for the governments should be avoided or kept to a minimum.

The IIRSA and PPP supernational agencies would be created by the members' countries and would be charged with the responsibility of pursuing the joint or common interests of the countries. They would be guided by the principle that their goal is a regional goal and not the goals of specific countries. This of course points to the difficulties in determining how the interests of particular countries would be dealt with and how the representation of the countries would be determined. There are difficult political issues that are made more complicated by the great differences in the

size of the countries and in their per capita incomes. Should representation reflect the size of the countries or should each country have the same weight in decision making? Should decisions require unanimity or just some majority? How would the heads of the agencies be chosen?

These agencies would have the power to use the earmarked revenue and other potential revenue sources to finance directly the building of some infrastructure and, in exceptional cases also to provide risk insurance for regional public-private partnership projects if some such projects are identified.

Various proposals have been made to create conditions that would make possible for the *Fondos de Infraestructura* or equivalent institutions to carry on their functions. These proposals are based on the assumption that there are mature and potentially highly profitable projects ready to be exploited. Such projects could generate revenues from tolls or fees that would make them attractive to private investors as long as some risk is born by public institutions such as governments or the IDB. If such projects existed, the users could be made to pay tolls and the tolls that were forecast could be securitized to generate resources for the capital expenditure connected with the building of the infrastructures.

In the energy sector there may be projects that might satisfy those conditions especially when the resources that exist in one country, say Bolivia or Paraguay, can be used in larger and more developed countries, such as Brazil and Argentina. In the transportation projects related to regional traffic, it is more likely that such projects will be rare. Thus, financial engineering could not perform the miracle of producing substantial financial resources, not protected by someone against future risks, for projects that are essentially public goods. Realism suggests prudence. Prudence suggests that if the public goods are politically important they should be financed, to the extent possible, by ordinary revenue.

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V. SUMMARY AND CONCLUSIONS

Economic development depends on many factors among which there is the availability of infrastructure. Infrastructure is important for national development as well as for regional development. The development of economic and trade relations among sovereign countries belonging to a particular region can become an important political objective for the relevant countries. Thus infrastructure that facilitates trade and exchanges among these countries (cross-border or regional infrastructure) acquires a political significance.

Infrastructure is expensive to build. Countries that have problems in raising tax revenue or that are burdened by high debts or face large fiscal deficits can find it particularly burdensome to spend large public resources on these public projects. In recent years partnerships with private investors have provided for some governments an alternative for selected demand-driven projects. However, because forecasts of future use have often been too optimistic and other developments have occurred to reduce their rentability, some of these partnerships have resulted in renegotiation of contracts and have often increased the liability that has fallen on the government. As the title of a recent World Bank book indicates, governments have been at risk when they have entered in these partnerships and when they have guaranteed particular rates of return to the private investors (Polackova Brixi and Schick [2002]).

With some important exceptions, especially with the energy sector, cross-country infrastructure is not demand-driven. The traffic is likely to be low and to remain low for years after it has been built. Thus, it is not likely to attract much interest on the part of private investors unless governments provide guarantees to them. The paper has argued that it could be damaging to the countries' economies to build this infrastructure with loans because for a long time the implicit rate of return from it is likely to be significantly lower than the interest rate on the loans. However, if the infrastructure is politically important, because regional integration is a political objective, the governments should do their best to build potentially useful infrastructure with ordinary revenue. The paper suggests that earmarking might be a possibility to consider.

The paper has emphasized that physical obstacles are only part of the costs of crossing frontiers. There are many man-made obstacles that impede or retard the crossing of frontiers. These obstacles should be sharply reduced before agreements among countries to build cross-border infrastructure are reached. The removal of these obstacles is likely to raise the rate of return from the regional infrastructure.

Finally, it ought to be kept in mind that difficulties in reaching multicountry agreements may be intensified when, for particular countries, local interests differ from national interests.

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