



BULLETIN 378 /

FACILITATION OF TRANSPORT  
AND TRADE IN LATIN AMERICA  
AND THE CARIBBEAN

# The impact of “incomplete contracts” on long-term infrastructure concessions

## Introduction

Provision of infrastructure services is one of the development bottlenecks for Latin American and Caribbean countries. As the Infrastructure Services Unit team has found in its analysis and has warned for many years, policies in the region have been characterized by underinvestment, fragmentation,



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This article forms part of the reflections on infrastructure that have frequently appeared in the *FAL Bulletin* and other Economic Commission for Latin America and the Caribbean (ECLAC) documents.

This *FAL Bulletin* warns about potential risks in public-private partnerships (PPPs), based on experience in the region and economic theory, with a view to preventing concession agreements from being distorted owing to their incomplete nature.

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and a lack of resilience-related sustainability, to name but a few qualities. An integrated and sustainable logistics and mobility policy was proposed, with a regional perspective (Cipoletta, Pérez-Salas and Sánchez, 2010) to overcome institutional and regulatory flaws or obstacles in policy management and market organization. Such flaws and obstacles are the result of multiple unfocused public approaches to the different processes relating to economic infrastructure and services (conception, design, implementation and monitoring, supervision and evaluation). It is crucial for such policies to balance efficiency, resilience and sustainability, to ensure infrastructure contributes to development.

This issue of the bulletin addresses potential problems with long-term infrastructure concession agreements, drawing on theoretical developments regarding incomplete contracts (see Sánchez and Chauvet, 2019). It offers a preliminary examination of specific problems that could be remedied by applying economic theory, highlighting potential risks in public-private partnerships (PPPs) based on experience in the region and economic theory, with a view to preventing concession agreements from being distorted owing to their incomplete nature.

## I. Infrastructure investments, contracts and concessions

The structural problems that must be overcome to achieve the full development of Latin America and the Caribbean are related to areas such as investment and productivity. Gross fixed capital formation has trended upward in recent years (ECLAC, 2018), slightly narrowing the historical investment gap between the region and other economies. However, as an aggregate of GDP, investment remains insufficient and much lower than in other regions, especially the economies of Asia (excluding China), the Middle East and North Africa and the emerging countries of Europe. For several decades, measured in this way, investment was lower than in the most advanced economies.

Services in energy, transport, telecommunications, drinking water and sanitation network infrastructure form a link between the economic structure of territories and their markets, and at the same time serve as specific mechanisms to link national economies to the rest of the world. They enable cargo and passenger transport, and transactions, both within a given geographic and economic space, and between that space and the exterior. Indeed, economic infrastructure is a fundamental capital input for wealth creation, and is crucial to all stages of a country's development. Its impact can be transformative, promoting

productivity and competitiveness on international markets, and with them, growth and economic and social development. Infrastructure investments help to improve the coverage and quality of public services in areas such as health, education and leisure, reducing mobility and logistics costs, and improving access to various markets (such as those for goods and services, labour and finance). As a result, such investments create an enabling environment for greater public well-being.

Investment in economic infrastructure has been very limited in Latin America and the Caribbean, following a similar pattern to total investment. In the 1980s, investment in economic infrastructure averaged 3.6% of GDP for the main economies of Latin America (peaking at 4.15%). Over the years, this level gradually declined: to 2.2% in the 1990s, 1.9% in the 2000s (peaking at 2.35% in 2009 during the counter-cyclical push), and finally to 1.8% in the period from 2011 to 2016.

As a result, there is now a larger infrastructure gap—understood as the difference between investments made and those needed to sustain a certain level of growth or achieve certain service goals. The investment required to close the infrastructure gap in the region is enormous, indeed Perrotti and Sánchez (2011) put the figure at 5.2% of Latin America's annual GDP for the period from 2006 to 2020. Lardé and Sánchez (2014) updated this study for the period from 2012 to 2020 and estimated that, given the pattern in infrastructure investment in the period between the two studies, required investment had increased to 6.2% of the annual GDP of Latin America. Even more recently, a study by Sánchez and others (2017)—which includes a calculation of the infrastructure investment needed to respond to economic and population growth and achieve universal coverage of the basic services related to the infrastructure assets—estimated required investment equivalent to 7.4% of Latin America's annual GDP for the period from 2016 to 2030.

These figures show that the investment gap in infrastructure has not shrunk, at least between 2006 and 2016, a period that covers the starting years of the estimates in the above-mentioned studies. This gap is around 5% of GDP. A recent study on the main barriers to economic growth in 19 countries in Latin America and the Caribbean identified infrastructure as one of the main obstacles in 84% of cases (IDB, 2018).

From 1993 onward, public investment in infrastructure reached highs of around 1% of Latin America's GDP, with peaks in total investment of 2.25%. The rest of total investment in infrastructure was covered by the private sector. The road transport subsector (and to a lesser extent rail) has been the main recipient of this investment; it received just under 40% of total cumulative infrastructure investment in Latin America in the period from 2000 to 2015.

Private investment averaged 39.7% of the total for 1980 to 2015, with a low of 42.3% and a high of 59.8% for the five-year periods within this range. Private investment in transport infrastructure ranged from 33% to 45.5% for five-year periods.

Such investments are directly related to public-private partnerships (PPP), which in turn are linked to concession agreements. This is, in fact, one of the most important investments in the entire region, which has facilitated modest modernization of logistics and mobility services over the past 20 years.

However, as ECLAC has insisted, Latin America and the Caribbean not only needs to invest more, but must also invest more sustainably, not only in efficiency and effectiveness, but also so that infrastructure services are of quality, provide coverage, promote equality, reduce negative impacts and are in keeping with the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.

In this document, “concession agreement” and “PPP contract” are used interchangeably, since concession agreements are an inescapable part of PPPs.<sup>1</sup> Private participation

<sup>1</sup> A concession is one of the types of contract that are referred to as PPPs. There is no universally accepted definition, but there is some degree of consensus on key characteristics a contract must have to be considered a PPP: there must be a long-term contract, a significant transfer of risks and responsibilities from the public administration to the private sector, and remuneration that is linked to either performance or demand for the services provided through the infrastructure asset built.

in infrastructure development can take different forms, depending on factors such as participation by the public administration, risk allocation or transfer, investment and financing commitments, operating requirements, and incentives for operators. Privatization has been more frequent in the region in sectors such as electricity, gas and telecommunications, while concessions have been more common in transport (road, rail, ports and airports), water and sanitation and certain segments of the electricity sector, and to a lesser extent in management contracts. In Latin America, concession agreements became very important as a result of reforms begun around 40 years ago, including greater openness to trade, deregulation of the economy, and economic policies to attract more private capital to the infrastructure sector through privatization and concessions.

Experience has revealed certain problems with such contracts, including repeated renegotiation, ineffective management of breach of contract, and failure to meet targets. Several governance-related issues have come to light. Governance is key to ensuring that infrastructure—particularly when developed, operated or improved through PPP contracts—achieves the desired goals, from rendering a public service appropriately and sustainably to, ultimately, improving the well-being of society. In logistics and mobility, there are considerable flows of public and private investment into PPPs covering primarily roads, but also ports, airports, railways and pipelines. Within those flows, PPPs have been the main vehicle for investment in key transport infrastructure, and concessions have been the main tool used.

In practice, concession agreements can determine whether maximum well-being and productivity gains are obtained or not. Concessions for different economic infrastructure services, managed through contracts between the public administration as grantor and the—usually private—concessionaire (or concession-holder) are typically for long periods. Such conditions bring with them a difficulty: incomplete contracts (contractual incompleteness), as has been highlighted in the economic literature in recent years, especially since the Nobel Prize in Economic Sciences was awarded to Hart and Holmström in 2016.

Contracts are considered incomplete when the parties cannot set forth the contractual terms, in detail and in advance, for all eventualities. In these circumstances, the question is who has the right to decide on the part not provided for (or missing). In other words, who holds the residual control rights or decision rights? The party that does will be in a stronger position to achieve a better agreement in the future, as occurs, for example, in a renegotiation (Sánchez and Chauvet, 2019). One of the typical shortcomings of incomplete contracts, which has been identified in infrastructure services, is leaving room for opportunistic behaviour (such as the hold-up problem). When a contract has grey areas, is unclear, is missing details or is not precise—that is to say, when it is incomplete—the agent (or principal) may have considerably more bargaining power than the other party, leading to a renegotiated contract that benefits the agent, with no Pareto-efficient outcomes and a detrimental impact on societal well-being.

Incomplete contracts also have an adverse effect on competition. Competitive tension in the infrastructure services industry has often led to greater concentration, through both horizontal and vertical integration.

The effect on competition may take the form of collusive practices, less transparent management of public-private partnerships, regulatory capture, or a great variety of behaviours linked to hold-up. For these reasons, the design and allocation of concessions, the structure of contracts, and the protection of competition and regulation are crucial in channelling investments in infrastructure services to maximize their contribution to development.





A strong and clearly defined institutional framework is key to change and innovation, and to having efficient regulations and effective antitrust rules to ensure that the market, which is imperfect by nature, behaves in the best possible manner. In the early 1990s, ECLAC argued that the reforms taking shape in the framework of the new system of concessions in the region needed to be structured to give the State power to determine the type of private participation, decentralization and other characteristics of the process. Specifically, ECLAC insisted on the need for “an antimonopoly regime and a public sector agency which balances competing interests to ensure that no one group can utilize market mechanisms to obtain a monopoly position” (ECLAC, 1992). The goal was to ensure that greater private sector participation would benefit economies through more investment, more efficient management and greater productivity.

## II. Institutions, property rights, transaction costs and asymmetric information

Contracts shape institutions and are a constituent part of them, which is why it is important to examine the challenges presented by long-term infrastructure concessions with respect to contracts. Governance, which originates from institutions, may not be in a fit state to resolve some of the conflicting aspects that can arise from incomplete contracts, renegotiation, opportunistic behaviour or vertical integration, and which are of interest and concern to States in their pursuit of sustainable development.

Contract theory aims to explain these repercussions and to contribute to designing contractual relationships in which parties make mutually beneficial decisions. This is done by optimizing the design of incentive schemes (“contracts”) to encourage parties to behave more efficiently. Contract theory is closely related to mechanism design theory, but the former focuses on interactions between just a few parties (generally two), and the latter largely examines allocation mechanisms involving many parties. Contract theory deals with a fundamental problem of economic cooperation: two (or more) parties can jointly generate a surplus, in addition to what each can generate individually. The size of the surplus depends on the actions taken by each party. The problem is that each party has an incentive to behave opportunistically, to maximize its own reward rather than the joint surplus (Schmidt, 2017).

When contracts are complete, it is assumed that everything that can happen can be written into the contract so there are no unforeseen circumstances. Therefore, anything that can happen is provided for in the contract; but, within what is feasible, which is to say excluding unfeasible forms of agreements —both the impossibly complex and the

irremediably short-sighted—all contracts are incomplete. Hart (2017) explains this in other words and more pointedly: “Actual contracts are not like this [...]. They are poorly worded, ambiguous, and leave out important things. They are incomplete.”

It is for this reason that an economic viewpoint is required to analyse contracts, to complement the legal viewpoint. In this regard, economists will often refer to the considerations analysed in this document, while from a legal standpoint contracts do not contain all the elements required to function.

Consequently, under an incomplete contract, the agent (or principal) may find itself with strong bargaining power over the principal (or agent), resulting in opportunistic behaviour, which may lead to renegotiation of the contract to the benefit of the party that holds the power. This is called the hold-up problem. Although it would be difficult or even impossible to write a contract comprehensive enough to prevent hold-up, this does not mean that the parties cannot anticipate it: *ex post* renegotiation occurs when the *ex ante* investment has already been sunk and hold-up is therefore a possibility; in anticipation of this, the parties invest inefficiently.<sup>2</sup>

When contracts are incomplete, and especially if institutions are not strong enough, the main problem is the way decision rights are allocated to parties that are not included. In theoretical terms, when the third party (such as a court) is unable to verify the contractual terms the key question is who holds the residual control rights (Hart, 2017). The party that does will be in a stronger position to achieve a better agreement in the future, for example, in a renegotiation.

This definition of incomplete contracts and the possible outcomes of assigning residual control rights forms part of property rights theory, which is complemented by transaction cost theory.

With respect to property rights theory, according to Hart (1989), this approach has characteristics in common with other methods that develop the theory of the firm, namely: it is based on maximizing behaviour (like the neoclassical approach); it emphasizes incentive issues (like the principal-agent approach); it emphasizes contracting costs (like the transaction cost approach); it treats the firm as a “standard form” contract (like the nexus of contracts approach); and, it relies on the idea that a firm’s owner has the right to alter membership of the firm: the owner has the right to decide who uses the firm’s assets and who doesn’t. Under the property rights approach, “firm” is shorthand for a collection of assets; and “ownership” is shorthand for the possession of residual control rights over those assets. With regard to transaction cost theory, the theory of incomplete contracts in many ways builds on and formalizes the intuitions of transaction costs economics, (Salanié, 2005). Even for Williamson, the literature on incomplete contracting is a formalized version of some of the fundamental concepts of the transaction costs approach (Vahabi, 2002). Williamson (1989) states that economics of transaction costs is more self-conscious about its behavioural assumptions; introduces and develops the economic importance of asset specificity; relies more on comparative institutional analysis; regards the business firm as a governance structure rather than a production function; places greater weight on the *ex post* institutions of contract, with special emphasis on private ordering (as opposed to court ordering); and works out of a combined law, economics, and organization perspective.

In property rights theory, the non-verification scenario is caused by the parties to the contract having symmetrical information, while the information is asymmetrical (observable but not verifiable) between the parties to the contract and third parties (the court). What prevents parties with the same information from entering into a full contingent contract is the cost of processing and using this information so that the appropriate contingent clauses can be included and implemented. These transaction costs can also limit the complexity of contracts. In transaction costs economics, asset specificity introduces asymmetry of information between the party that has been granted the

<sup>2</sup> Williamson (1989) indicates that it was Golberg (1976) who called the opportunistic behaviour in which the parties may engage a hold-up problem, attempting to extract the surplus from the other party by threatening to dissolve the relationship unless there are price concessions.

contract and those that have not, also leading to a fundamental transformation in the contractual relationship as bilateral dependence increases. Under these conditions, **once the sunk cost of investment has been incurred, the fundamental transformation—leading to bilateral dependence or a lock-in effect—** and the lack of information (on opportunity costs) take on great significance.

### III. The theoretical effects of incomplete contracts

According to the different lines of theory examined, incompleteness of contracts leads to opportunistic behaviour that can result in suboptimal investment in specific assets, hold-up problems, renegotiation of contracts, related transaction costs, vertical integration and a risk of market foreclosure. Hence why policymakers must pay close attention to incompleteness of contracts if a transaction entails the rendering of infrastructure services under a long-term contract.

When there is opportunistic behaviour, the risk of corruption also increases. The critical confluence of renegotiation and risk of corruption is often at the selection stage, during the bidding process. It is then that an unlawful agreement may be reached between a public official and a bidder to submit an overly aggressive bid solely to ensure selection, with the aim of subsequently renegotiating the contract.

Opportunistic behaviour and the above-mentioned repercussions are encouraged by particular characteristics of the physical assets (infrastructure) through which the services are rendered, such as: long useful lives, substantial sunk costs, relatively indivisible assets, major positive externalities (owing to direct and indirect effects coming from infrastructure's role as a capital factor for other activities, and demand-side economies of scale), entry barriers (owing to economies of scale and scope), and their essential nature—as crucial facilities and related services (Sabbioni, 2018). The potentially damaging effects of incomplete contracts are more closely linked to consequences for the market, suppliers, goods or services, users and society, rather than to the contracts themselves. These effects can be summarized as vertical integration and risk of market foreclosure, impairment of quality, suboptimal investments and renegotiation.

- **Vertical integration and risk of market foreclosure:** In the event of vertical integration, there may be a risk of market foreclosure. Joskow (2006) explains that vertical integration (and long-term vertical contracts) can be used as a strategy to reduce competition in the short term, by increasing costs for competitors, or in the long term, by raising entry costs to exclude potential market entrants. Joskow distinguishes between a naïve vision of foreclosure sometimes associated with vertical integration, and the problems that arise as a result of strategic vertical integration to lessen competition by raising market prices upstream or downstream, or both. In the first case, when a firm is vertically integrated and supplies some of its own inputs, other potential suppliers are, so to speak, already “excluded” from supplying those inputs to the vertically integrated firm. According to this definition, all vertical integration excludes competition; this is not a useful or accurate notion of anti-competitive vertical foreclosure. The second case, however, is the classic situation of potentially anti-competitive vertical foreclosure when a firm has a monopoly over the supply of an essential input to which actual or potential competitors need access under comparable terms and conditions in order to compete downstream.

Thus, if the supplier of an input, for example, is vertically integrated with a customer (producer), there is a potential risk of market foreclosure, upstream or downstream. Firstly, if the supplier of the input is a monopolist or has significant market power, non-integrated customers may find it difficult to access the input, and thus risk being excluded from the downstream market. Secondly, if the customer is a monopsonist or has significant buying power, non-integrated input suppliers could find it difficult to access the customer, and thus eventually be excluded from the upstream market (Sabbioni, 2018).

In the case examined, that of infrastructure services, a potentially problematic situation arises when a concessionaire integrates vertically with one or more users of the service delivered via the asset under concession. This would be the case of an airport operator that integrates with an air company, or a port terminal operator integrating with a shipping company (or even with a land distribution and transport company). Here there could be a risk of downstream foreclosure, since shipping companies not integrated with the port operator or airlines not integrated with the airport operator could be at a disadvantage in terms of access to essential facilities and services. Within the literature on property and residual control rights, Hart (1989) developed a theoretical model that shows how vertical integration changes the nature of competition in upstream and downstream markets. The model also identifies the conditions under which risk of foreclosure is a consequence or a goal of such integration, or both. On this basis, he suggests that competition authorities should be suspicious of vertical integrations that significantly harm rivals. Therefore, an integration of an upstream company and downstream companies that have had substantial business dealings with companies outside the intended integration is potentially more damaging than an integration of companies that have traded mainly with each other and where the effect of foreclosure will be more limited.

- **Costs versus quality:** Various authors (Hart, 2017; Hart, Shleifer and Vishny 1997), find that provision of public services (the assets) under private ownership leads to an overly strong incentive for cost reduction and incentives to improve quality that are moderate, but still too weak. Based on the assumption that contracts are incomplete, residual control rights are important, as they determine bargaining power and incentives to act, and a supplier can exploit them to save resources, to the detriment of service quality or efficiency. Also, in the language of agency theory, as a principal, the public administration is concerned with production efficiency and service quality. If service quality is difficult to specify in a contract, the agent will have an incentive to operate at the lowest possible cost, likely lowering quality even if the letter of the contract is not breached.
- **Suboptimal investments and renegotiation:** When quality-cost trade-offs are ambiguous, there is a latent risk of hold-up through vertical integration (with risk of market foreclosure) or renegotiation (or capture of the regulator<sup>3</sup> or of the public administration), if the allocation of residual control rights and compensation mechanisms negotiated ex ante or renegotiated ex post the original contract do not satisfy the parties when the state of the world is disclosed. All this leads to suboptimal levels of infrastructure investment, either because of disincentives from incomplete contracts, or because of the generally excessive rigidity of investment plans linked to concession agreements.

## IV. Infrastructure concession agreements in Latin America and the Caribbean

PPPs multiplied in developing economies in the 1990s. By 2016, more than 7,000 projects had been implemented as PPPs worldwide (Guasch, 2017), with a great heterogeneity. In Latin America and the Caribbean the level and quality of infrastructure both improved; nonetheless, they are still not high enough (Bitrán, Nieto-Parra and Robledo, 2013; Crus and Marques, 2013; Guasch, 2004; Guasch and others, 2014; Guasch, Laffont and Straub, 2006; Rozas, Bonifaz and García-Guerra, 2012; Vassallo, 2015, among others). In short, the different authors find that the main advantages of PPPs are lower costs in relative terms, better compliance with deadlines, and higher infrastructure quality. The weaknesses of PPPs include their vulnerability to renegotiation —potentially even threatening the very credibility of the format— ineffectiveness in managing breach of contract, and, in some cases, failure to meet targets.

<sup>3</sup> In other words, the regulator is not impartial during supervision; the regulator can be captured by user groups or even by the public administration or political parties (Guasch, 2004; Crus and Marques, 2013).

Globally, three geographic areas have accounted for nearly 90% of all PPP projects in transport over the past thirty years: Latin America and the Caribbean (mainly Brazil), South Asia (India) and East Asia and the Pacific (China). However, according to ECLAC studies, average total investment in infrastructure in Latin America and the Caribbean barely surpassed 2% of regional GDP, substantially less than in other economies during the same period (China 8.5%, Japan 5%, India 4.7% and the European Union and United States 2.6%).

Table 1 shows the number of PPP infrastructure contracts awarded between 1980 and 2017 in Latin America and the Caribbean: 2,078 PPP projects in 20 countries; this is a clear reflection of the importance of this form of agreement in infrastructure. Of these contracts, 40.3% were for energy, 25.5% for transport, 21.2% for telecommunications and 13% for water and sanitation. To give a better idea of the standing of concession agreements in the economies of the region, a sample of 1,000 PPP projects in infrastructure from between 2006 and 2015, mostly in the energy and transport sectors, add up to investment of US\$ 361 billion, mostly in Brazil, Mexico and Colombia (IDB, 2017).

**Table 1**

Latin America and the Caribbean (20 countries): PPP contracts (concessions) in infrastructure by country and sector, 1980–2017  
(In number of contracts and percentage of total)

Country	1980-2000						2001-2017						1980-2017	
	T	E	Tr	W&S	Total	Percentage of the total	T <sup>a</sup>	E	Tr	W&S	Total	Percentage of the total	Total	Percentage of the total
Argentina	17	31	40	14	102	10.8		21	8	1	30	2.6	132	6.4
Belize					0	0.0		1	0	0	1	0.1	1	0.0
Bolivia (Plurinational State of)	0	17	5	2	24	2.5	4	3	0	0	7	0.6	31	1.5
Brazil	87	7	50	50	194	20.6	21	283	50	69	423	37.2	617	29.7
Colombia	0	0	44	7	51	5.4	8	8	53	21	90	7.9	141	6.8
Chile	12	81	27	3	123	13.1		58	36	12	106	9.3	229	11.0
Costa Rica	0	31	1	0	32	3.4	8	5	4	0	17	1.5	49	2.4
Dominican Republic	1	10	3	0	14	1.5		9	5	0	14	1.2	28	1.3
Ecuador	0	2	0	0	2	0.2	12	8	5	0	25	2.2	27	1.3
El Salvador					0	0.0	9	5	0	0	14	1.2	14	0.7
Guatemala	1	0	2	0	3	0.3					0	0.0	3	0.1
Haiti					0	0.0	7	2	1	0	10	0.9	10	0.5
Honduras	1	8	0	1	10	1.1	15	18	5	2	40	3.5	50	2.4
Jamaica	2	0	0	0	2	0.2	17	5	4	0	26	2.3	28	1.3
Mexico	63	51	91	58	263	27.9	45	22	39	20	126	11.1	389	18.7
Nicaragua					0	0.0	9	9	0	0	18	1.6	18	0.9
Panama	0	0	5	0	5	0.5	11	14	2	0	27	2.4	32	1.5
Peru	85	17	5	0	107	11.4	2	64	33	8	107	9.4	214	10.3
Trinidad and Tobago	1	1	0	1	3	0.3					0	0.0	3	0.1
Uruguay	0	0	2	1	3	0.3		47	8		55	4.8	58	2.8
<b>Total</b>	<b>273</b>	<b>256</b>	<b>276</b>	<b>137</b>	<b>942</b>	<b>100.0</b>	<b>168</b>	<b>582</b>	<b>253</b>	<b>133</b>	<b>1136</b>	<b>100.0</b>	<b>2 078</b>	<b>100.0</b>

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC) on the basis of information from the World Bank; and J. Guasch, "Granting and Renegotiating Infrastructure Concessions: doing it Right", *WBI Development Studies*, No. 28816, World Bank, Washington, D.C., 2004.

**Note:** T: telecommunications; E: energy; Tr: transport; W&S: water and sanitation; only brownfield and greenfield projects are included, both active and completed.

<sup>a</sup> In 2016, the World Bank made a change to its Private Participation in Infrastructure (PPI) Project database, whereby telecommunications includes only the portion of that sector that involves fibre optic cables and in which the government is actively involved.

For the period from 1980 to 2017, Brazil accounted for 29.7% of the total for concessions in the region. In second place was Mexico, with 18.7% of the total, followed by Chile, Peru, Colombia and Argentina, with shares of 11%, 10.3%, 6.8% and 6.4%, respectively.

The share of contracts by sector is different between the two periods analysed. Between 1980 and 2000<sup>4</sup> the transport sector represented 29.2% of contracts, followed by telecommunications at 29.0%, energy at 27.5% and water and sanitation at 14.5%. Between 2001 and 2017 51.2% of contracts were concentrated in the energy sector, 22.3% in transport, 14.8% in telecommunications and 11.7% in water and sanitation.

## A. Port concessions

Over time, the port industry has undergone substantial changes, affecting both its economic dynamics and its relationships with the rest of the supply chain and with the public administration in general. As a result, the sector is in a very different situation today than it was more than 25 years ago, when a new operating, economic and financial model of PPPs was consolidated (Sánchez and Chauvet, 2019). The growing adoption of innovative technologies and practices in organizations' functional processes and areas has also been seen in ports. The changes required by this new, more competitive context include cultural change, contact between businesses and the economy's needs, and establishment of the governance needed to adapt to the new times, with new forms of public-private, social, labour and environmental relations.

The various agents in this sector reflect two types of contracts. On one hand there are contracts that are predominantly private, when they link suppliers and customers in transport and distribution. On the other hand, there are public contracts in the terminals covered by concessions. Behaviour has led to greater market concentration through horizontal integration at the level of both port terminal companies and container shipping companies (in certain areas and for certain routes) and vertical integration of the two segments by global or international operators (Sánchez and Chauvet, 2019).

To analyse the situation for ports, a sample of concessions was examined. For this purpose, a concession was taken to mean any contract containing rights and obligations for both parties covering a specific period of time, without distinguishing between contracts according to how they were awarded (that is to say, through a bidding process or granted directly). The sample covers 10 countries in the region with a total of 161 maritime terminals under concession, which move more than 100,000 twenty-foot equivalent units (TEU) per year, or 1,000,000 metric tons a year each. All the terminals are also particularly important in terms of port movements in their country or for the region. The 10 countries included in the sample are Argentina, Brazil, Chile, Colombia, Costa Rica, Jamaica, Mexico, Panama, Peru and Uruguay. The sample covers 49 container terminals, 2 gas terminals, 5 container and passenger terminals, 11 bulk liquid terminals, 9 bulk liquid oil and distillates terminals, 29 specialized in solid bulk, 16 in solid agricultural bulk, 15 in solid mineral bulk, 8 that are both multipurpose and container terminals, 6 passenger terminals and 3 vehicle terminals.

To demonstrate the suitability of the sample, it was compared to the survey of container terminals performed by ECLAC, covering 118 ports or container port areas in 25 countries, which moved a total of 53.8 million TEU in 2018. The sample contains 49 of the 118 container ports in the ECLAC report, representing 41.5% of ports, but 76.6% of total port movements in 2018. Even in countries with fewer ports in the sample, the representativeness of the sample is high, for example, it reflects 85% of TEU moved in Argentina, and 95% in Brazil. The representativeness of the sample is 93% for Chile, 95% for Colombia, 98% for in Mexico, over 98% for Panama and 98% for Peru, always in relation to total movements in 2018. In short, the sample is highly representative and considers 161 active port concessions, with contracts that have been signed since the 1990s.

<sup>4</sup> The contracts awarded through competitive tenders (78%) were distributed by sector as follows: telecommunications 35.2%, transport 33.2%, water and sanitation 18% and energy 13.6%. For direct agreements (22%) the distribution was as follows: energy 71.9%, transport 18.6%, telecommunications 7.5% and water and sanitation 2% (Guasch, 2004).

The following considerations relate to the sample of concessions and not to the universe of concessions. In the 1990s, the process of reform in the maritime-port industry consolidated in the region. During that period, 68 contracts were signed, accounting for 42% of currently active concessions. Around 30% (46 contracts) were agreed between 1991 and 1996. In the 2000s, 36 new concessions were awarded (22.36%) and 23 more (14.22%) from 2010 to 2016, which is the last year studied.

Table 2 summarizes the end dates of the initial port sector agreements in the sample, by country. As shown, of the concessions are ongoing at the time of this study, 45 are close to expiring (28%), providing a great opportunity to apply the governance and institutional improvements described in this report. These improvements minimize the main disadvantages identified, which relate to incomplete contracts, the principal-agent problem, opportunistic behaviour and vertical integration.

**Table 2**

Latin America and the Caribbean (selected countries): port terminal concession agreements, by country and end date

	Brazil	Mexico	Argentina	Chile	Colombia	Costa Rica	Jamaica	Panama	Peru	Uruguay	Total
2020	3			2							5
2021	1										1
2022	5	2	1					2			10
2023	5			1	1						7
2024	1	2	1	1							5
2025	1	1	1								3
2026	2			1	1	2					6
2027	3										3
2028								1			1
2029									1		1
2030		1		1	1						3
2031	1	1		1					2	2	8
2033				1							1
2035	3				1						4
2036		1	1						1		3
2037					1						1
2038	2		2		1						5
2039	6								1		7
2040+	15	8	7	2	1	1	1			2	37
<b>Total</b>	<b>48</b>	<b>16</b>	<b>13</b>	<b>10</b>	<b>7</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>112</b>

**Source:** Prepared by the authors on the basis of R. J. Sánchez and P. Chauvet, “Contratos de concesión de infraestructura: incompletitud, obstáculos y efectos sobre la competencia”, *International Trade series*, No. 150 (LC/TS.2019/104), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2019.

## V. Discussion

In addition to risk of market foreclosure, incomplete contracts theory and property rights theory have also helped to explain issues such as vertical integration’s social motivations and costs, disputes over State and private property, quality-cost trade-offs when public administrations must provide an asset or public service, and whether it is preferable to enter into traditional contracts, public-private partnerships, or concession agreements to render such services.

This section addresses the theoretical risks of incomplete contracts, based on regional experience in port concessions: vertical integration, risk of market foreclosure, cost-quality trade-offs, suboptimal investments, and renegotiation.

Maintaining the theoretical approach applied in this study, within the analysed sample of infrastructure concessions in Latin America and the Caribbean there has been a

notable problem of renegotiation, in relation to the risks of integration, concentration of market power and a resulting risk of market foreclosure. Given that markets are imperfect in terms of provision of infrastructure (assets and related services), and in view of the consequences of incomplete contracts described in economic theory, there is a possibility that integration processes will intensify. Sánchez and Chauvet (2019) explain how the inherent characteristics and dynamics of the maritime and port industry have led agents to behave in such a way as to increase market concentration, mainly since the period of devolution and the deployment of the landlord port model, and as a result of factors such as globalization of trade and internal and external technological changes. In the port areas that are fed by the routes in question, this integration has been both horizontal, for port terminals in certain geographical areas and maritime transport of containers on certain routes, and vertical between ports and maritime transport by global or international operators.

A growing process of vertical integration has taken place in recent years in the maritime and port industry, whereby shipping companies have been acquiring stakes in terminals, either directly or through their container terminal operator subsidiaries. Larger companies have their own terminal operators. Some details are provided in box 1.

#### Box 1

##### Cases of vertical integration between terminals and shipping companies, 2019

**Argentina:** the integrated terminals within the Buenos Aires metropolitan area (two out of a total of four) accounted for 67.7% of the containers moved in 2019. If full integration were to take place, their control would rise to 81%.

**Brazil:** 48.6% of container movements occur in vertically integrated terminals. Looking at just the ports of Santos, Rio, Paranagua, Itapoá and Itajaí, the percentage is 67%. There is also a growing participation by inland logistics companies with stakes in container terminals.<sup>a</sup>

**The Caribbean:** the terminals that had a shareholding agreement with shipping companies in Bahamas, Costa Rica, Colombia, Jamaica and Panama accounted for 35% of all container trans-shipment activity.

**United States:** recently, the movement of cargo from two large shipping lines integrated horizontally to their vertically integrated terminal resulted in a court case owing to the terminal's claim that it lost 60% of the cargo it handled.

**Peru:** in the port of Callao (which moves 86.4% of all containers in the country), vertically integrated businesses control 41.2% of the total moved.

**Mexico and Colombia:** vertically integrated terminals account for 15.1% and 10.3% of total movements, respectively.

**Source:** Prepared by the authors.

<sup>a</sup> If this happens in a particular port, it means that all three parts of the supply chain are vertically integrated, with anti-competitive implications that must be foreseen and addressed, in particular when at least one of the links in the chain may be at risk of foreclosure.

With respect to the cost-quality trade-off, the port industry may not experience the problem as described in theory, possibly owing to fierce inter-port competition in several subregions of Latin America and the Caribbean. Where there have been user complaints about service quality in relation to price, it seems this has been more attributable to regulatory difficulties or incentive design problems, which are not analysed in this study.

Moreover, as explained by incomplete contracts theory and as reflected by early and recurrent renegotiation of concession agreements, the maritime-port industry also faces the hold-up problem and other opportunistic behaviour between carriers and terminal operators. The relationship between the two segments is determined in their contracts and can lead to successive monopolies and oligopolies (with a risk of double markups). In unforeseen circumstances, bargaining power may be very imbalanced between the two parties, depending on the market; in this regard, governance and regulation are fundamental.

Furthermore, the hold-up problem may also occur between a port authority (grantor) and a terminal operator (concessionaire), resulting in a suboptimal ex ante investment or ex post opportunistic behaviour by the government. Also, depending on the market conditions and the specificity of the investment (asset), the enormous market power held by an integrated operator (such as a container shipping company operating the port terminal) can lead to renegotiation in its favour, which is detrimental to other actors (risk of market foreclosure), thus reducing the well-being of society as a whole.

As described in the section on theory, the effects of incomplete contracts are closely linked to renegotiations, which can become systematic. As explained by several of the authors already mentioned (Sanchez and others, 2000; Guasch, 2004; Crus and Marques, 2013), renegotiations are not per se a problem, and can even be positive and efficient instruments. They can be a solution if they address the inherent incomplete nature of PPP contracts or concession agreements, in view of factors such as their long duration, the probability of unforeseen events with severe economic or financial impacts, and the likelihood of changes in the priorities of the grantor (the public administration). Such contracts are long-term and involve assets whose investment, financing, depreciation and recovery horizons are also long-term, exposing them to external factors and to factors originating from the contracts themselves. Adjusting or adapting the contract to new conditions revealed over time can therefore increase the well-being of both the contracting parties and third parties, such as users and the public administration, **provided that opportunistic behaviour is prevented**. Assuming that a tender is well-designed, provides adequate incentives for competitive bids and that the most efficient candidate is the successful bidder, it can be said to have advantages. The problem lies in when the advantages of a tender disappear in renegotiations, which are bilateral, rather than a bidding process. See box 2 for the numbers of renegotiations in the world and in Latin America.

#### Box 2

##### Contract renegotiations

In the world, for more than 7,000 contracts awarded, renegotiation is surprisingly prevalent, occurring in 40% to 75% of cases. In Latin America and the Caribbean, for a sample of more than 1,000 infrastructure concessions, more than 30% of contracts were renegotiated. The sectors with the highest renegotiation rate were water and sanitation (74.4%) and transport (54.7%). Moreover, most of the concessions that were renegotiated underwent this process very soon after being awarded, with an average of only 2.2 years between award and renegotiation. This average was 3.1 years for transport concessions.

In Latin American and Caribbean port concessions, of the 161 cases examined, 58 had been renegotiated by 2018, equivalent to 36%. By country, the ratios of contracts with changes to total contracts were: Brazil (27/71), Argentina (4/17), Chile (6/13),<sup>a</sup> Colombia (8/13), Mexico (9/26) and Panama (4/8). There are 24 contracts left that finish before 2026, which could still be renegotiated.

**Source:** Prepared by the authors.

<sup>a</sup> In several of these cases these situations were provided for in the original concession agreements.

Incomplete contracts also often result in suboptimal investments. In the case of high transaction costs and incomplete contracts, ex post residual control rights are critical because, through their influence on asset use, they will affect ex post bargaining power and the sharing of surplus ex post. This sharing will, in turn, affect the parties' incentives to invest in that relationship. There has also been excessive adherence to strict investment plans in the region, which often become invalid soon after the contract enters into force. However, the incompleteness of contracts and their related inflexibility prevent investments from being decided upon according to broad criteria and can drive up the risk of hold-up.

Theory proposes various solutions to the renegotiation of concession agreements, including pre-designed renegotiation mechanisms, penalties, flexible options and contracts, and

investment structures and dynamics. While there are some positive cases in the region in this regard, experience is generally limited. Hence, in the next generation of concession agreements, these solutions must be examined and used from the outset.

Public regulation also needs to be re-evaluated. Regulation itself is not a solution to efficiency problems in the provision of infrastructure services; it is a public policy instrument that can be either applied well, tolerably or poorly by the State. Markets without constraints (intervention to prevent negative externalities or to pursue social ends) fail, but so do regulations that are not effective in aligning social and private costs and benefits, and thus perverse incentives. While no regulatory system is perfect, economies with well-designed regulations can outperform those with inadequate regulations. Regulations can improve and correct markets and protect those who might otherwise suffer in unregulated markets (Stiglitz, 2009).

## VI. Conclusions

Although supply remains scarce, in general, the quality of infrastructure in Latin America and the Caribbean has improved over the last couple of decades. Over the period, private investment has taken on greater relative importance in concession agreements. However, the process has not been smooth, and problems such as inefficiencies and failures have arisen from the design of contracts.

This bulletin has reviewed the theory on incomplete contracts, which lead to failures that can be seen in concessions. In particular it has examined vertical integration, risk of market foreclosure, suboptimal investments and repeated renegotiation, as well as —to a lesser extent— the cost-quality trade-off. However, two issues must be clarified. Firstly, not all infrastructure concession agreements necessarily have negative effects that originate from their incomplete nature. This is because there are suitable mechanisms that can prevent such negative consequences. Secondly, the harmful repercussions of incomplete contracts affect markets (good or service provided, users and society), more than they affect the contract itself.

The starting point for this bulletin is that infrastructure concession agreements are actually habitually “incomplete”, and that under certain circumstances this may lead to opportunistic behaviour that results in several of the problems analysed. As a result, their benefits and costs ultimately have suboptimal and inefficient outcomes. This reflection is valid for the design stage of the tenders, the awarding stage and the post-lock-in control stages.

In Latin America, and also in some Caribbean countries, numerous port terminal concession agreements end in the next few years, necessitating renegotiation, reversion or reconcession processes. In this regard, attention must be paid to the global consolidation and concentration of industry, through horizontal and vertical integration. Integration where one of the parties is a concessionaire that provides a strategic service to the economy could have consequences for development of supply chains and, ultimately, for the well-being of society. This is a potential anti-competitive threat, and one that the antitrust regulations of some countries appear unable to address.

Potentially anti-competitive vertical foreclosure occurs when a firm has a monopoly over the supply of an essential input to which competitors need access under comparable terms and conditions in order to compete downstream. Therefore, if the supplier of an input is vertically integrated with a customer, there is a risk of foreclosure, either upstream or downstream: if the supplier of the input has some market dominance, non-integrated customers could find it difficult to access that input (and thus **risk foreclosure from the downstream market**); if the customer is a monopsonist or has significant buying power, non-integrated input suppliers could find it difficult to access the customer, and thus eventually be excluded from the upstream market. The risk of downstream foreclosure through vertical integration of airports and ports comes from shipping companies that are not integrated with the concessionaire having inferior access to inputs (essential facilities and services).

For all these reasons, the current governance structure of ports must be reviewed with a comprehensive and forward-looking vision, so that the resulting laws, regulations and institutions effectively and efficiently solve the challenges faced.

Regarding the region's infrastructure, another problem can be seen in renegotiations resulting from incompleteness of concession agreements, which could not be examined in this bulletin, but which it will be important to research in the future. It is an effect that goes unnoticed because it accumulates over successive individual renegotiations: **incompleteness, far from being reduced through renegotiation, may become even more complex** and create new problems that restrict investment, create an unlevel playing field for competitors, the eternally unresolved problem of the tail end of the concession, and other disincentives that can affect the key goals of infrastructure PPPs.

The problems with the tail end of concessions have not yet been solved in a convincing manner. In fact, they represent one of the main shortcomings that make contracts incomplete. The dizzying pace of technological change and the consequences of the rapidly shifting world in logistics services, including port services, mark a contrast with the original concession agreements of the early days of infrastructure PPPs. In other words, as ever faster change takes place, the conditions under which a market functions lead to transformation of the way concessions operate and shorter life cycles for investments. Investments must therefore be highly adaptable to the changing environment. This is to say that the tail end of concessions and technological change must be priorities in the design of a new generation of agreements for the next wave of port concessions.

The volume of concession agreements that are set to expire over the next 6 years creates an opportunity for deep reflection on the lessons learned from the wealth of experience of PPPs for port and terminal operations accumulated over the past 25 years. It is also a chance to consider the problems addressed in this study, to maximize the positive effects of infrastructure concessions. Among other challenges, at the end of a contract in the port sector, there are almost no precedents in the world for reversion, re-tendering, awarding, and transition between concessionaires that have ensured uninterrupted service and provided legal guarantees for all parties, including workers, contractors, logistics operators, and public bodies.

While it is not impossible to write a contingent contract without gaps or ambiguities for any contingency, the cost could be prohibitive. Asymmetric information and transaction costs determine the design of contracts and subsequent renegotiations. The frequency of renegotiations is one of the main problems affecting concession agreements and one of the weakest points of PPP contracts because of the potential consequences: the competitive effect of bidding is eliminated, thus distorting government tenders, since the most likely winner is not the most efficient operator but the one that is most expert or qualified to bid and then renegotiate. However, renegotiations in themselves (including extensions of concession periods) are not necessarily a problem, provided that the process of adjusting the contract to the new conditions can increase the well-being of the parties and that opportunism is prevented. The success of the concession model is intrinsically linked to the ability of the parties to address the inevitability of amending contracts. For the model to succeed value for money must be maintained and the importance of the primary goals of the original contract must be respected.

The solution to the effects of incomplete contracts does not lie in formulating more "complete", extensive and complex contracts, but in shaping a new generation of contracts that offer better safeguards, based on institutional frameworks and governance. This new generation must include appropriate mechanisms for dispute resolution, interpretation, pre-negotiation design, penalties and options. Fundamentally, contracts must be more flexible, with investment structures and patterns that are more closely tied to performance and quality than to obsolete investment plans covering 20 years or more.

Despite all these problems, on average it is estimated that contracts have been quite effective in achieving the desired advantages and reducing the infrastructure gap faced

by most countries. Nevertheless, while the benefits have been quite significant, they would have been even greater if programmes (and projects) had been better designed and implemented, and if the negative effects of some concessions had been prevented; all of this relates to proper design of incentives in contracts.

To solve the problems with concession agreements —whether analysed in this document or not— there must be a shift towards a suitable and coherent PPP model, with policy, regulatory and legal frameworks, robust processes and institutions, public financial management, and broad governance. These critical components will ensure that the many benefits of PPPs are actually obtained. To achieve this, within the PPP system, preparations must be made for a new generation of concession agreements.

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## VIII. Publications of interest



*Serie Comercio Internacional No. 150*

### Contratos de concesión de infraestructura: obstáculos y efectos sobre la competencia

Ricardo J. Sánchez  
Pablo Chauvet

This report is closely linked to certain structural problems relating to development. In particular, it examines investment in infrastructure and how productivity is affected by the level of such investment. Other key issues addressed in the document include governance, infrastructure concession agreements, the main features of public-private partnerships, and antitrust measures.

Available in:



*Fal Bulletin No. 369*

### Logistics for production, distribution and trade

Gabriel Pérez  
Ricardo Sánchez

This document analyses the role of logistics in production, distribution and trade in Latin America and the Caribbean. This is in connection with the incorporation of the Infrastructure Services Unit into the Trade, Infrastructure and Integration Division of the Economic Commission for Latin America and the Caribbean (ECLAC).

Available in: