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Institutional Safeguards for Cost Benefit Analysis: Lessons from the Chilean National Investment System

Andrés Gómez-Lobo

Abstract

This paper discusses some institutional and procedural designs that can strengthen CBA as a decision making tool within the public sector. Our discussion is based on Chile's National Public Investment System (SNI) the earliest and most consolidated investment appraisal system in Latin America. The objective of Chile's SNI is to provide a coherent framework for identifying, coordinating, evaluating and implementing public investments. Chile's SNI has several interesting institutional characteristics. For example, it standardizes project presentation formats, establishes explicit application and evaluation processes for public funds, provides general as well as sector specific methodological guidelines for CBA of projects and programs, and introduces a system of "checks and balances" by separating the institution that evaluates projects from the institutions promoting projects. Besides describing the system and highlighting the features we believe strengthen the use of project appraisal as a decision making tool. The paper also presents data on the number of projects appraised by sector, the overall results of appraisals and other administrative data, as well as a summary of ex-post studies for a sample of road, rural electricity, education and health projects. Unfortunately, the limited data available and the lack of a proper counterfactual scenario do not allow for strong conclusions to be made regarding the performance of the system. However, the data presented serves as an illustration of the Chilean system and it may be of value to researchers in this field as well as to policymakers in other countries wishing to improve their public investment systems.

KEYWORDS: project evaluation, infrastructure, cost-benefit analysis, institutional design

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1. Introduction

Cost benefit analysis (CBA) is potentially a very useful tool for decision making in the public sector.¹ However, given that it is generally applied in the pre-investment stage of projects, its results are dependent on a range of assumptions regarding demand, cost, social prices as well as other parameters which are difficult to ascertain objectively *ex ante*. Therefore, evaluations can be manipulated, either consciously or unconsciously (optimistic bias), to yield unrealistic results.

Consequently, there is a risk that public institutions may use this tool inappropriately, viewing it merely as a bureaucratic obstacle that has to be overcome prior to implementing a project that they want to promote or have already approved. In this case, CBA becomes useless as a decision-making tool, needlessly increases the time and cost of project development and no longer promotes the efficient use of public funds.

Researchers such as Flyvbjerg, Bruzelius and Rothengatter (2003) have shown the relevance of biases at the appraisal stage in large infrastructure projects. Although there are many causes for these biases, such as the lack of proper risk assessment or the changes in “scope and ambition”² of projects during its development stage, institutional aspects are also important. Flyvbjerg and COWI (2004) undertake a detailed analysis of underlying institutional causes for optimism bias in the British transport planning process and conclude that “political-institutional factors in the past have created a climate where only few actors have a direct interest in avoiding optimism bias”.

This paper follows this literature by discussing detailed institutional and procedural designs that can reduce the risk of conscious or unconscious optimistic bias from occurring and thereby strengthen project appraisal as a tool for resource allocation in the economy. Our discussion is based on Chile’s National Public Investment System (SNI for its Spanish acronym), the earliest and most consolidated investment appraisal system in Latin America.³ The objective of Chile’s SNI is to provide a coherent framework for identifying, coordinating, evaluating and implementing public investments. One of the main objectives of the system is to improve resource allocation through an appropriate social appraisal of publicly funded projects and programs.

¹ In this paper we use cost-benefit analysis (CBA), project appraisal and social evaluation of projects interchangeably. We also refer to cost-effectiveness analysis (CEA) within these general terms, although later in this paper we detail the projects where CEA is used instead of CBA in the Chilean public investment system.

² Flyvbjerg and COWI (2004), p. 7.

³ See Ortegón and Pacheco (2004, 2005) and Ortegón and Dorado (2006) for a description of other national investment systems in Latin America.

Chile's SNI has several interesting institutional characteristics. For example, it standardizes project presentation formats, establishes explicit application and evaluation processes for public funds, provides general as well as sector specific methodological guidelines for the appraisal of projects and programs, and introduces a system of "checks and balances" by separating the institution that reviews and approves the appraisal of projects from the institutions promoting projects. The objective of this paper is to describe these institutional characteristics and present data comparing *ex ante* to *ex post* appraisal results. Unfortunately, the limited data available and the lack of a proper counterfactual scenario do not allow for strong conclusions to be made regarding the performance of the system. However, the data presented serve as an illustration of the Chilean investment system and they may be of value to other researchers in this field, particularly those wishing to undertake a meta-analysis of results regarding project appraisal in different countries and agencies.

The following section outlines Chile's SNI. We then summarize the most interesting features of this system from the point of view of providing high quality information for decision making. We then present the limited information available regarding the quality of the *ex ante* CBA studies undertaken within the SNI system. To this end, we analyze a series of projects in the transport, electricity, education and health sectors where both *ex ante* as well as *ex post* studies are available. We believe that the description and analysis undertaken in this paper may be of interest to other countries wishing to redesign their public investment appraisal systems.

2. Chile's National Investment System

Although the origins of the Chilean SNI date back to the 1950s, it was not until the 1980s that the system adopted its present structure.⁴ In Chile, by law, all public bodies, be they ministries, regional governments, municipalities, publicly owned companies, or public services wishing to undertake an investment project or program, must apply to the National Public Investment System (SNI) for funding.⁵ Only initiatives that have been evaluated can be undertaken within the

⁴ See Fontaine (1997) for a historical recount of the development of the current SNI system. See also Fontaine (2006) for a complementary description of the system to the one presented here.

⁵ Article 19bis of Law 1.263 (Ley Orgánica de la Administración del Estado) states that "The pre-investment studies and investment projects must have a report from the national or regional planning body as internal documents of the Administration. This report must be based on a technical-economic appraisal of its returns" (translation by the author). In the case of investments carried out with funding from the National Regional Development Fund (FNDR), the regulation is stricter and not only requires an evaluation to be carried out but also that this evaluation must imply a positive social return from the project.

public sector.⁶ Depending on the type of project – as will be detailed further below – an evaluation consists of either a CBA or a cost-effectiveness analysis (CEA). As of early 2010, this procedure also applies to infrastructure concession projects where the private sector funds the investment.

The stages that each project must undergo in the SNI depend on its technical complexity and costs.⁷ For smaller projects, a positive evaluation at the identification or pre-feasibility stage may be sufficient for start-up; however, more complex or expensive projects require an evaluation at each sequential stage of the initiative (identification, pre-feasibility, feasibility and design).

The Planning Ministry (Mideplan) is the agency in charge of the *ex ante* and *ex post* appraisal of investment initiatives within the SNI. This institution is responsible for (i) regulating the procedures for preparing and appraising projects that apply for public funding, (ii) developing and managing an information system for all investment initiatives (the so-called Integrated Project Bank, BIP for its Spanish acronym), (iii) developing project preparation and appraisal methodologies, including the determination of social prices, and (iv) training public officials in project preparation and evaluation (Mideplan, 2009a). Some of these functions, particularly establishing SNI's regulations, instructions and procedures, are undertaken jointly with the Budget Office (DIPRES) of the Ministry of Finance.

2.1. Project Flow Within the System

Figure 1 presents the flow of a project within the SNI. Sometimes the institution that formulates a project is not the institution that formally funds it. This occurs, for example, in the case of projects developed by local governments (municipalities) that seek funding from the National Regional Development Fund (FNDR) administered by regional governments.

The institution promoting a project must gather all the required information and data relating to the project. This includes presenting a justification for the initiative, a social appraisal (either a CBA or a CEA depending on the type of project), verify that the SNI regulations are fulfilled,

⁶ The only exceptions are investment initiatives of the Armed Forces, which do not need to undergo this process; however, recently the Ministry of Defense has implemented a parallel evaluation system comparable to the SNI. There are also projects that in spite of being investments from an economic point of view are not formally so for the purposes of the SNI (e.g., human capital building projects or infrastructure maintenance expenses). Dipres (2007), employing a broad investment definition, estimates that between 60% and 68% of realized public investment between 2003 and 2006 was channeled through the SNI and therefore appraised.

⁷ Although Mideplan also needs to undertake *ex post* evaluations of a representative sample of studies, projects and programs funded by regional governments, the present discussion is mainly focused on the *ex ante* evaluation of investment projects

verify that the investment initiative is not duplicated within the SNI system and fill out the funding application form (IDI form) in the on-line informational system (BIP). With this information, the funding institution – that in many cases is the same as the promoting institution – presents the initiative to Mideplan for application to the SNI. Subsequently, Mideplan appoints a project investment analyst who has 5 working days to determine if the initiative is admissible or not. At this stage, the admissibility criteria are essentially that the information presented is complete and sufficient for the program or project to be evaluated, and some other administrative requirements (IDI form has been filled in correctly; the funding institution has the required funds in its budget to finance the initiative; and some other formal conditions).

Once the project has been declared admissible, it formally enters the SNI. Subsequently, an investment analyst from Mideplan reviews the information presented, particularly its social appraisal.⁸ Within 10 working days after admission into the SNI, Mideplan announces the “Technical-Economic Analysis Results” (RATE) of the project, which may be one of the following (Mideplan, 2009a):

- **RS (Socially Recommended):** the project complies with the requirements and regulations of the SNI, including being the best alternative for the problem in hand. If the appraisal is a cost-benefit analysis, the Internal Rate of Return (IRR) of the project must exceed the threshold set annually by Mideplan for RS status. However, as noted by Fontaine (2006), exceptions are made when the project has obvious intangible benefits or generates positive externalities which are not amendable to reasonable measurement. In the case of a cost-effectiveness analysis, the project must offer the lowest social cost among feasible alternatives.
- **FI (Incomplete Information):** technical, legal or other information required to evaluate the project is missing.
- **IN (Non-compliance with Regulation):** cases where funding has already been allocated to a project, or its implementation or construction has already commenced, without the required prior evaluation within the SNI.⁹ This also applies to projects that were originally approved but underwent subsequent changes in nature, scale, costs or timeframes without informing Mideplan.
- **OT (Technically Objected):** project is not socially profitable (according to

⁸ Project analysts are usually engineers or economists. However, the public employees preparing projects in the promoting institutions can have a wide array of professional backgrounds. Mideplan makes important efforts to train public employees in project preparation and appraisals.

⁹ In this case, the Controller General of the Republic is responsible for investigating the possible occurrence of irregularities in spending allocations or if projects have been implemented without first having had a technical-economic evaluation.

the threshold established annually by Mideplan), it is not technically viable or is poorly prepared, or does not comply with the strategic policies established for the sector, among others.

In the case of incomplete information (FI) or if the project is objected on technical grounds (OT), the financial institution and the promoting institution can provide additional information and present a revised version of the project to the SNI. In this case, Mideplan has once more 10 working days to issue a new RATE.¹⁰

Table 1 presents the number of initiatives applying for funding during the past 4 years by sector. It can be seen that between 1200 and 1500 initiatives are evaluated each year. The 2200 initiatives evaluated during the year 2011 are probably an exception due to the reconstruction efforts after the February 2010 earthquake that affected southern Chile. In order of importance, Education and Culture, Multisectoral, Justice, Agricultural and Forestry, and Transport were the sectors with most initiatives during the 2008 and 2010 period. Once again, the relatively high number of multisectoral projects in 2011 is probably due to the reconstruction efforts.

Table 2 presents the total amount of funding (in US\$ million) requested each year by sector. It can be seen that with the exception of 2011, the total amount of funding requested was between 2 and 2.2 billion dollars per year. The sectors that receive most funding applications coincide with the number of initiatives, except for Transport where investment per initiative is higher and thus increases the relative importance of this sector.

Tables 1 and 2 present the number and funding requests for all initiatives. Tables 3 and 4 present the same information but for initiatives that received "RS" status. A comparison of Table 1 and Table 3 reveals that between 54% and 67% of initiatives receive RS status each year, with 2011 probably being an exception (at 50%). However, when considering the amount of funding, the percentage increases from 69% to 77% between 2008 and 2010, with a low of 65% in 2011. According to Dipres (2007) nearly 214 full-time equivalent staff work on the technical-economic appraisal of projects, including staff from the central government offices of Mideplan and its regional offices (SERPLAC), and around US\$480 on average is spent by Mideplan in reviewing each initiative.¹¹

¹⁰ Dipres (2007) estimates that a project requires on average 4 to 5 of these iterations prior to obtaining a positive RATE.

¹¹ According to Dipres (2007), in 2006 \$226,000 Chilean pesos were spent per initiative, which corresponds to the figure indicated at an exchange rate of Ch\$470/US\$. This does not include the costs borne by project promoters in preparing an appraisal that is then submitted to the planning authority for review. Thus, the figure presented is a lower bound to the cost per project of the SNI system.

3. Institutional Characteristics of the Chilean SNI Worth Highlighting

After the brief description of the Chilean SNI presented above, this section highlights the institutional characteristics that in our view strengthen the quality of the social evaluations undertaken in Chile and that are potentially replicable in other countries.

3.1. Legal Requirement to Evaluate All Investment Initiatives

The first and possibly most important feature of the system is the legal requirement for all public sector investment projects and programs to be evaluated including (as of early 2010) infrastructure concessions funded by the private sector.¹² However, with the exception of projects funded by the FNDR, a positive RATE (RS) is not a strict legal requirement for implementing a project – only that an appraisal of the initiative is carried out – although the Ministry of Finance will usually not approve funding for projects that do not have RS status.

3.2. Institutional Separation between Promoter and Reviewer

Another key aspect of the system is the institutional separation between the public agency promoting (or funding) a project and the institution in charge of reviewing and qualifying the project's appraisal. In the case of Chile's SNI, the project promoter presents, at its own cost and responsibility, an appraisal to the SNI and Mideplan checks that the appropriate methodology was used, that it was applied correctly and that from this application a determined RATE is logically obtained and made official.

This separation reduces the scope for conflicts of interest. Generally, the main goal of a public spending institution (such as a Ministry) is to maximize the number and value of the projects undertaken. As such, there is a risk that if the promoting and reviewing roles are not separated then the rigorous appraisal of initiatives could be compromised to increase spending on projects. By creating a specialized evaluating agency the officials responsible for reviewing and qualifying projects are not subordinate to the authority promoting projects and as such have a higher degree of independence when it comes to reviewing proposals objectively.¹³

¹² As mentioned earlier, there is a gray area with respect to human capital formation projects and infrastructure maintenance projects. With respect to private concession projects, prior to the modification of the concession law in January 2010, an appraisal had to be submitted to the Ministry of Finance (not Mideplan). Mideplan issued reports on these projects only when specifically requested by the Ministry of Finance.

¹³ It is interesting to note that Flyvbjerg and COWI (2004) come to a similar conclusion regarding

In the case of Chile, Mideplan and the Ministry of Finance are keener in ensuring an efficient allocation of public funds compared to other agencies within the public sector. As such, they will be more interested in guaranteeing the quality of social evaluation of projects than promoting institutions. However, the independence of the reviewing institution is not absolute as the staff of Mideplan and other Ministries and public bodies answer to the changing political authorities of the government. But the institutional separation will at least reduce the political and hierarchical pressures that could otherwise affect the quality of evaluations when the promoter is the sole institution in charge of determining a project's social profitability.

Furthermore, an institution that specializes in reviewing projects can develop specific technical capacities in project appraisal. Procedures and methodologies can be standardized and the historical information of many projects and economic sectors can be centralized. This information can serve to improve cost and benefit estimates of subsequent *ex ante* evaluations, as will be discussed further below.

3.3. Multistage Evaluation with Various Filters and Supervisory Mechanisms

Another interesting feature of the Chilean SNI is multistage evaluations with various filters and supervisory mechanisms.

A large investment project – say a bridge, highway or other infrastructure project – is evaluated at several stages of the project cycle before start-up.¹⁴ At the identification stage several alternative solutions to a certain problem or social demand must be identified and appraised before funding can be approved for the pre-feasibility studies. Very simple estimates of cost and benefits of the alternatives are used, often taken from secondary data or from the experience of analogous projects. According to Mideplan (2011) the key element of the informational requirement at this stage is that the cost and benefit estimates should not require substantial human or financial resources to identify, measure and value. The objective at this stage is to make a preliminary judgment as to the technical and economic merits of undertaking the project idea. RS status at this stage allows the proponent to fund the pre-feasibility studies. To apply for this funding, the project information presented to the SNI must include the Terms of Reference for the pre-feasibility studies that would be undertaken should the project gain RS status.

the possible conflict of interest in their detailed analysis of the British Transport Planning Process and recommend independent appraisal of projects.

¹⁴ An official definition of each stage of the project cycle in the SNI can be found in Mideplan (2011).

At the pre-feasibility stage, the proposed alternatives are evaluated in more detail. Effort is devoted to providing more accurate investment, operational costs and benefit figures. Alternatives are ranked according to their social profitability and the most promising alternatives are selected for further study. Once the pre-feasibility studies are finished a more accurate and detailed project – reflecting the most profitable alternatives identified at this stage – is presented to the SNI to obtain funding for the feasibility studies. Similar to the previous stage, the proponent must present the Terms of Reference for these feasibility studies as part of the required information to be presented to the SNI.

At the feasibility stage, detailed analysis of the most promising alternative identified in the previous stage is undertaken, including optimizing its definition and design to maximize its social profitability. RS at this stage of the project cycle allows the proponent to fund the design studies.

The process continues with the design studies which include architectural and engineering specifications, among others. RS status at this latter stage allows the proponent to apply for funds in its budget to execute the planned investments.

In all of the above stages, the base case scenario must be an optimized version of the current state of affairs; that is, what would be expected if the project is not undertaken but some reasonable or inexpensive improvements are made to the current situation.

Not all projects have to undergo all stages of the project cycle. Table 5 explains the stages required for different types of projects. The stages a given project must complete in the SNI before start-up is sector-specific and is determined by Mideplan, most often in the specific methodological manuals for each sector.

The advantage of a multistage revision process is that modifications, errors or omissions to the original project can be evaluated or corrected in subsequent stages. In addition, any ongoing investment project with a cost overrun exceeding 10% of budgeted (private) cost must re-enter the system for re-evaluation.¹⁵

In addition to allowing appraisals to be continually updated as new information becomes available or the scope and characteristics of projects change, the multistage evaluation of projects has a more subtle benefit in terms of political economy. In the words of Fontaine (2006, p. 1), it allows “the appraisal of projects before they reach the feasibility stage—i.e., before they have too many

¹⁵ Given that part of an investment is already sunk, it is unlikely that the modified project will not be socially profitable. However, the re-evaluation process allows the authorities to analyze the source and justification of cost overruns. This adds an additional control to prevent project promoters from modifying projects at the investment stage without clear justifications. Oftentimes cost overruns are due to changes in input prices between the time a project was originally evaluated and approved and the time that actual investment begins.

clients and beneficiaries—so that projects may be reformulated, or abandoned, before they acquire a life of their own”.

The Chilean SNI also includes supervisory and quality control mechanisms. For example, within Mideplan there is a separation between the project analyst and the official responsible for determining its RATE. This allows projects to be reviewed by more than one expert, although in practice the second analyst only looks at the formal aspects of the project file to ensure its consistency. In the case of investment initiatives that are difficult to evaluate methodologically, Mideplan usually establishes a review committee.

Lastly, two or three times a year Mideplan undertakes a review process of a random sample of investment initiatives that were rated RS. According to Dipres (2007), in 2006 15% of the projects reviewed did not fulfill the technical criteria for a positive recommendation.¹⁶

3.4. Norms, Procedures and Methodological Guidelines and Thorough Training of Public Officials

The SNI has also developed norms, procedures and methodological guidelines for project appraisal. This allows for the standardization of criteria and formats for the information presented for each project or program, thereby aiding their comparison, at least within similar project categories.¹⁷ It also allows projects to be evaluated using techniques widely validated and accepted by the economics profession.

Mideplan has produced several methodological manuals.¹⁸ In addition to a General Methodology Manual for the Preparation and Appraisal of Projects (Mideplan, 2006), there are 38 specific guidelines for particular topics, project types or sectors. Table 6 presents the list of the available manuals, the year of the last revision and, when relevant, whether CEA or CBA is stipulated for the appraisals in each case.

¹⁶ According to the same source, in 2003 this proportion was 20%. According to Mideplan (interview with Nancy Whittle) this proportion had declined to 7% by 2009 and these discrepancies were generally due to differences in evaluation criteria between the original project analyst and supervisors. See the next section for an explanation of why these discrepancies might arise.

¹⁷ Usually projects from different sectors (roads and education, for example) do not compete directly for funding and thus standardization in general is not meant to allow comparison across categories of project types. In fact, the guidelines call for some project types to be appraised using CEA and others using CBA. But within each type of project category the methodological guidelines are meant to make results for different projects comparable.

¹⁸ All the manuals are available at the following website:
<http://sni.ministeriodesarrollosocial.gob.cl/>.

In general, the manuals provide instructions on (i) which method of appraisal should be used (CBA or CEA), (ii) the project development stages and how initiatives should be appraised at each stage, (iii) specific criteria for estimating costs in the respective sector, (iv) in the case of CBA some guidelines as to how demand and benefits should be projected into the future, and (v) the indicators that should be used to evaluate projects (e.g., Net Present Value or NPV from now on, IRR, or the different types of CEA indicators). In some manuals (airports, for example), there are instructions on how to classify different categories of projects (by size or type of traffic flow) and more specific infrastructure design criteria. The projects applying for SNI funding in each category must be presented and appraised according to the instructions provided in each corresponding manual.

It must be borne in mind that in spite of the methodological standardization efforts, proponents and analysts will always have some discretion over the details of a project's appraisal. For example, in the definition of the optimized base scenario or in demand projections, to name just two dimensions. Thus, there will still be room for discrepancy between project proponents, project analysts and supervisors of the latter with respect to the appraisal of a particular project. The norms and methodological guidelines aim to reduce discretion but can never pretend to eliminate it entirely. Proper CBA will always require some degree of judgment and cannot pretend to be just a mechanical application of a set of norms, standards and methodologies.

One of the main activities of Mideplan in the context of the SNI has been the training of public officials in the preparation and appraisal of projects at all levels of government. As discussed in Fontaine (1997) this effort was aided through partnerships with academic institutions, in particular the CIAPEP program of the Catholic University of Chile.¹⁹ After more than 30 years of training efforts, it can be said that there is an 'appraisal culture' within the Chilean public sector, whereby most if not all public officials are aware of the importance of evaluating projects before they can be undertaken or at least are aware that an appraisal is required before they stand a chance of being funded.

3.5. Centralized Definition of Social Prices

Related to the above, Mideplan annually determines the social prices of the labor supply (skilled, semi-skilled and unskilled), the currency and discount rate, as well as other prices commonly used in CBA or CEA. For example, in the case of transport this includes defining the social prices of fuels, lubricants, tires, new vehicles, maintenance and the social value of travel time, all disaggregated by

¹⁹ CIAPEP is the acronym for 'Curso Interamericano en Preparación y Evaluación de Proyectos' (Interamerican course in the preparation and appraisal of projects).

type of vehicle. The social value of travel time is also classified by urban and intercity trips.²⁰

There are clear economies of scope in centrally defining social prices that apply simultaneously to several projects. Moreover, this procedure allows the analysts who propose and evaluate projects to concentrate on the appraisal itself and not spend time estimating social prices. There is also no risk of a discretionary modification of social prices by a project promoter. Also, determining social prices centrally ensures that all projects are evaluated using the same benchmark parameters in this respect.

3.6. *Ex post* Evaluations

The SNI also formally considers *ex post* evaluation of projects. These evaluations are useful for improving appraisal methodologies and refining the parameters and assumptions used in subsequent *ex ante* evaluations.²¹

There are two types of *ex post* analyses. One consists of reviewing the costs, implementation timeframes and compliance with the technical regulations, just after a project is built. The other is in-depth where in addition to the above variables the attainment of the benefits and expected costs are reviewed after the project has been in operation for a reasonable period of time.

Mideplan annually undertakes a simplified *ex post* evaluation of a representative sample of projects, programs and studies funded by the FNDR. However, this *ex post* evaluation activity only covers FNDR projects and not sectoral investments.²² As will be discussed below initiatives are currently underway to extend simplified *ex post* evaluations to the entire universe of public sector investments.

In-depth *ex post* evaluations are less common. To date, they have been undertaken in the health, energy, education and transport sectors. The results of available studies are presented further below.

3.7. Centralized and Transversal Project Information System

The BIP provides a unique information platform that raises the system's efficiency and transparency. The file for each project in the BIP contains information on the initiative and can be modified and updated by the project promoter. In addition, all observations or decisions made by Mideplan regarding a certain project – for

²⁰ The social prices for projects that applied for funding in 2011 may be found at: http://sni.mideplan.cl/postulacion_links/77_precios_sociales2011.pdf.

²¹ In the European context Florio and Sartori (2010) present further arguments for *ex post* evaluations.

²² FNDR investments represent around 15% of total public investment.

example, the assigned RATE – are made on-line which allows for a very fast and efficient communication between Mideplan and promoting institutions. The system also offers a limited access to the general public, allowing it to obtain information on the general features of investment projects.

This system could be the basis for a historical analysis of the costs and demands of various types of projects, thereby allowing for a better estimation of these variables for future evaluations.²³ The BIP information in Chile has not yet been used in this way and the ‘historical memory’ of projects is currently held informally by Mideplan staff. However, efforts are currently underway to cross the BIP information with the information from the Integrated Financial Management System (SIGFA) of the Ministry of Finance, which keeps the records of the funds effectively spent in each project. This way, it will be very easy in the future to compare the cost assumptions in the *ex ante* evaluations with the actual costs of each project.

4. The Operation of the SNI

Do the procedures and institutional designs described above help to improve project appraisal and optimize the allocation of public funds? Undertaking this evaluation is not simple as it would require measuring the productive impact of this system relative to a situation without a SNI. Unfortunately this is not feasible with current data availability. Therefore, this section has a less ambitious objective, which is to document procedural data relating to SNI as well as presenting the results of *ex post* studies that analyze the real versus *ex ante* profitability for a limited number of projects. In addition to illustrating the operation of the system, the information presented in this section may be of interest to researchers in this field, perhaps as an input for meta-analysis studies or other uses.²⁴

From a procedural point of view there are several relevant questions regarding the SNI system. For example, determining to what extent investment projects are appraised, what the results of these evaluations have been and whether these results determine public funding decisions. If projects are not evaluated or these appraisals are not decisive in funding decisions, then CBA will not be very relevant as a decision-making tool.

According to the Budget Office of the Ministry of Finance between 60%

²³ The European Union has undertaken efforts along similar lines, at least with respect to transport projects. See Chapter 3 of Ward and Wolleb (2010).

²⁴ As will be explained below, the lack of statistical representativeness of some of the procedural data and the small number of projects with *ex post* studies must be borne in mind when using the information presented in this section in future research.

and 68% of annual public investment between 2003 and 2006 passed through the SNI (Dipres, 2007). The remainder is explained by projects that due to their nature (human capital investment, maintenance or preservation of existing infrastructure, initiatives of the armed forces) do not formally require an evaluation.

Furthermore, according to the same source between 52% and 59% of the projects appraised between 2003 and 2005 obtained a positive RATE (RS). As shown in Tables 3 and 4, this proportion was slightly higher in 2008 and 2009 but about the same in 2010 and 2011. Maybe just as important is that a positive RATE seems to be a prerequisite for the execution of a project. According to Dipres (2007) between 2003 and 2005 on average only 11% of projects funded (around 5000 projects) did not have a positive recommendation from Mideplan. Therefore, in general, for the case of Chile it seems that the appraisal of projects and their results do influence public funding decisions.

There is also information on the quality of the evaluations. First, the control process implemented annually by Mideplan shows that 85% of projects with a positive RATE do subsequently upon review actually fulfill the technical conditions required for that rating (Dipres, 2007). However, ideally this control process should be undertaken by an external body and not internally by Mideplan as it is currently done.

Second, as already indicated, Mideplan must implement a simplified *ex post* evaluation of a representative group of projects funded by the FNDR. In 2009, 259 projects were reviewed, most of which were small with a budget below CLP300m (around US\$600,000).²⁵ In general, the *ex ante* cost estimates were precise. In half of the cases the actual *ex post* investment expenditure was lower than originally estimated and in the majority of projects with cost overruns the difference did not exceed 20% of the original budget. However, the same study concludes that the implementation timeframes considered in the *ex ante* evaluations were too optimistic.

Similar results as in 2009 were obtained in the 2010 review process (Mideplan, 2010). Out of 1095 initiatives, 215 were chosen for a simplified *ex post* evaluation that year. The results indicate that 27% of investment projects took longer to execute than planned at the *ex ante* stage and somewhat higher for programs and basic studies (35% and 44%, respectively). However, the time overrun was on average only 13% for investment projects (33% and 10% for programs and basic studies, respectively). In addition, the 2010 review indicates that all projects had costs lower than originally estimated.

Unfortunately, one cannot use the information on simplified *ex post* evaluations presented above to judge the quality of the demand projections or rate

²⁵ Unfortunately Mideplan (2009b) does not provide data by sector.

of return estimates of projects. It is also not clear that FNDR projects are representative of the whole portfolio of public investments.²⁶ It is likely that projects funded through the FNDR are smaller and simpler than sectoral investments. Therefore, the relatively favorable results of Mideplan (2009b, 2010) cannot be extended to all or most of the projects evaluated within the SNI system.

Mideplan has also undertaken in-depth *ex post* evaluations for road, rural electrification, schools and health projects.²⁷ Table 7 presents the results of the *ex post* studies available for seven transport projects.²⁸ Most of these projects were implemented during the 1990s or early 2000.

Table 7 shows that, with the exception of one project, the actual investment expenditure falls within a reasonable range (below 20%) with respect to the original estimates.²⁹ In the case of “Avenida Las Golondrinas”, where the investment exceeded the *ex ante* estimates by 60%, the *ex post* returns of the project (24%) were higher than originally calculated (18.6%). This occurred because the underestimation of benefits more than compensated for the increased investment costs.

The volatility of demand estimates (for projects where this information is available) is surprisingly high. In some cases, the specific traffic flows were underestimated by 50% to 70%, whereas in others they were overestimated by around 50%. This may well be due to the difficulties associated with the estimation of traffic growth – which span decades – compared to the near term estimation of investment costs of a road project. However, at least with respect to these transport projects we do not find evidence of a systematic bias. Although not shown in Table 7, the *ex post* studies also indicate that in general the *ex ante* evaluations overvalued the number of passengers per vehicle but underestimated their speeds; the implementation timeframes have also generally been overoptimistic in the *ex ante* evaluations.

Finally, in four of the seven studies, the *ex post* social rate of return (IRR) are below the original estimates. Nevertheless, in all cases the projects continued to have returns above the social discount rate defined by Mideplan.

Table 8 presents analogous information for two rural electrification projects where in-depth *ex post* studies are available. It can be seen that in both projects *ex post* investment was higher than originally planned but so was demand. In one case, the *ex post* IRR was lower than the rate estimated *ex ante*,

²⁶ As indicated above, FNDR investments represent around 15% of public sector investment.

²⁷ Fortunately, the number of projects with in-depth *ex post* studies is small and thus a more sophisticated analysis of *ex ante* and *ex post* rates of return – as in Del Bo and Florio (2010) – could not be undertaken.

²⁸ The reports are available at: <http://sni.mideplan.cl>.

²⁹ Ward and Wolleb (2010) report an average cost overrun of 21% for transport and infrastructure projects in the European Union and an average delay of 26% over planned completion time.

but in the other case it was higher. In this second case, the increased social profitability was due to the higher *ex post* number of beneficiaries as well as to a higher per family consumption projected for the future of the project and based on the consumption figures for the last years prior to the reappraisal. In both cases, the *ex post* IRR is above the social rate of discount.

Table 9 presents information for the *ex post* studies available for the health sector.³⁰ In this case, projects are appraised using a cost-effectiveness approach and an equivalent cost per beneficiary or per medical attention is estimated for the most recent projects.

It can be seen from Table 9 that, in general, construction and equipment costs were overestimated at the *ex ante* stage, whereas operating costs were underestimated. However, it is not clear from Mideplan documents whether these are private or social costs. Table 9 also presents some demand measures (discharges or total number of medical attentions) to gauge the accuracy of demand estimates. In all cases where some information is available, demand was underestimated or slightly overestimated. The only exception is the Health Center in Talcahuano where demand was 66% below estimated levels. This was due to an overestimation of the beneficiary population in the area.

Table 10 presents information for educational projects. It can be seen that for most of the schools built, demand, investment and operational costs were underestimated.³¹ However, for the case of nursery schools estimates were very accurate, perhaps because these projects are simpler and less prone to modifications due to policy changes.

In summary, the available evidence indicates that the *ex ante* evaluations have an acceptable precision level at least for the roads and rural electrification projects. This, together with the fulfillment of the strictly procedural aspects of the evaluation system, would tend to support the hypothesis that the SNI has been successful at guaranteeing high quality *ex ante* social evaluations of projects and thereby ensuring a good allocation of public funds. However, the scarcity of *ex post* studies, both simplified and in-depth, does not allow for a definitive conclusion. Nevertheless, Contreras, Cartes and Pacheco (2010, p. 32) state that: "In our opinion, there is a broad consensus that the system has made (notwithstanding all its possible failings) a real contribution to improving resource allocation."³²

³⁰ The documents published by Mideplan present much more information than that contained in Table 9, including a breakdown of costs, beneficiaries, construction schedules and medical attentions, as well as an in-depth analysis of the causes for departures between *ex ante* and *ex post* figures for this sector.

³¹ Similar to health projects, it is not clear from the available information whether these are private or social costs.

³² These authors also present a list of problems and issues to be improved in the Chilean SNI. These include Mideplan's possible conflict of interest given that it is both an evaluating agency

5. Conclusions

Based on the experience of Chile, this paper attempts to describe the institutional safeguards that can be implemented to improve the effectiveness of the social evaluation of projects. Noteworthy among these are the separation between the proponents of projects and the institution in charge of reviewing and qualifying the social appraisals of these initiatives, a strong normative foundation that includes the development of methodological guidelines and procedures, quality control and supervision mechanisms, and a permanent commitment to *ex post* evaluations to provide feedback to the system.

Other Latin American countries have also developed public investment systems with some characteristics similar to the SNI, particularly Mexico and Colombia.³³ However, the Chilean system is the most advanced and institutionalized in the region. This does not imply that the system is not perfectible or that it has nothing to learn from other experiences. For instance, in the Chilean SNI it would be recommendable to delegate the quality control of appraisals to an external committee or supervisory commission, rather than having Mideplan undertake this activity in-house. In this respect, the Mexican case is interesting because the evaluating body in that country is advised by an external academic institution and the evaluation of large projects must have an independent expert opinion (Ramírez, 2010). There is also considerable room in the Chilean system to improve and strengthen the feedback from the *ex post* evaluations to the *ex ante* evaluations.

However, the available evidence for the Chilean investment system indicates that institutional safeguards can be applied to guarantee the social evaluation of projects and thus improve resource allocation in the economy. In particular, the system seems to provide precise *ex ante* cost estimates of projects and programs across a wide range of sectors. However, demand or benefits are much more difficult to estimate with precision, particularly in the transport sector. Perhaps this is not so surprising given that demand estimates cover a long-time horizon making precise estimates particularly challenging and data demanding. Operational costs were also not estimated precisely in the case of health and some educational projects, possibly due to the difficulties in projecting labor costs in highly labor intensive industries.

The above conclusion does not imply that the system is bulletproof. For example, some investments undertaken during the past decade in the rail sector

and a Ministry that determines certain social expenditures. These authors also warn of the political pressure to give positive evaluations irrespective of merit faced by the analysts, particularly in the regions outside of the capital area.

³³ For a brief description of the Mexican case see Ramírez (2010) and SCHP (2008). For the case of Colombia, see DNP (2006).

were probably inadequately evaluated *ex ante*. However, in a democratic regime it is impossible to shield all public investments from political considerations and pressures that may result, in some cases, in bad investment decisions from a resource allocation point of view. The question is whether a system such as the SNI helps to improve resource allocation on average compared to a situation where such a system is absent. Unfortunately, the limited data available for the SNI in Chile do not allow for a rigorous answer to this question.

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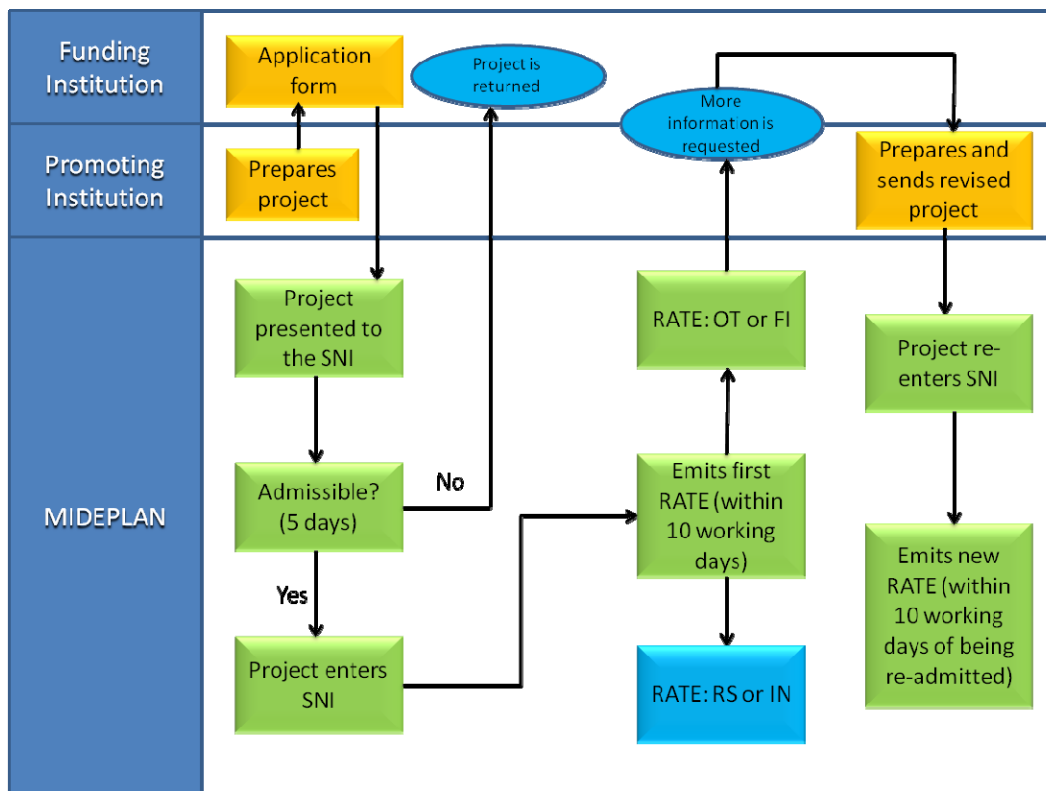
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Figure 1 – Project Flow Within the SNI.



Source: Mideplan (2009a).

Table 1 – Number of Initiatives Applying for Funding by Fiscal Year and Sector.

Sector	2008	2009	2010	2011
Water supply and Sewerage	15	14	10	18
Communications	2	3	2	2
Defense and security	143	100	103	181
Sports	49	39	47	154
Education and Culture	446	376	374	394
Energy	1	4	3	10
Industry, Commerce, Finance and Tourism	83	45	34	69
Justice	175	131	96	112
Mining	7	2	1	3
Multisectoral	223	241	285	762
Fishing	30	29	48	46
Health	26	33	79	146
Agricultural and Forestry	146	117	65	72
Transport	98	85	102	186
Housing	40	41	23	16
Total	1484	1260	1272	2171

Source: BIP, Mideplan.

Note: includes projects, programs and basic studies. Over 93% of initiatives are projects. Each initiative is classified according to the fiscal year it is applying for funding, so they are usually appraised the year before.

Table 2 – Investment Amount of Initiatives Applying for Funding by Fiscal Year and Sector (US\$ million).

Sector	2008	2009	2010	2011
Water supply and Sewerage	25.6	36.9	38.8	28.7
Communications	1.4	12.6	10.1	2.0
Defense and Security	71.1	84.6	83.7	186.1
Sports	22.0	54.3	84.1	167.2
Education and Culture	836.2	804.4	676.7	617.8
Energy	0.1	1.1	0.8	1.6
Industry, Commerce, Finance and Tourism	40.6	24.8	26.1	55.4
Justice	164.2	142.7	106.7	132.4
Mining	1.6	1.2	0.7	2.1
Multisectoral	237.8	210.9	428.0	733.3
Fishing	12.7	11.0	53.8	77.4
Health	114.9	204.5	211.5	217.9
Agricultural and Forestry	58.7	245.6	73.3	51.5
Transport	293.7	282.5	368.7	638.2
Housing	98.5	107.2	41.1	24.8
Total	1979.0	2224.4	2204.1	2936.4

Source: BIP, Mideplan.

Note: includes projects, programs and basic studies. Over 93% of initiatives are projects. Each initiative is classified according to the fiscal year it is applying for funding, so they are usually appraised the year before. An exchange rate of Ch\$470/US\$ was used to convert the figures in Chilean pesos to dollars.

Table 3 – Number of Initiatives with RS Status by Fiscal Year and Sector.

Sector	2008	2009	2010	2011
Water supply and Sewerage	7	11	6	7
Communications	1	3	0	0
Defense and Security	108	70	55	75
Sports	28	16	11	83
Education and Culture	353	302	247	223
Energy	0	1	1	3
Industry, Commerce, Finance and Tourism	44	30	22	16
Justice	124	111	83	90
Mining	5	2	1	0
Multisectoral	122	105	111	379
Fishing	18	14	17	20
Health	10	18	38	90
Agricultural and Forestry	90	65	41	25
Transport	60	51	45	83
Housing	28	21	13	5
Total	998	820	691	1099
Percentage of total initiatives	67.3%	65.1%	54.3%	50.6%

Source: BIP, Mideplan.

Note: includes projects, programs and basic studies. Over 93% of initiatives are projects. Each initiative is classified according to the fiscal year it is applying for funding, so they are usually appraised the year before.

Table 4 – Investment Amount of Initiatives with RS Status by Fiscal Year and Sector (US\$ million).

Sector	2008	2009	2010	2011
Water supply and Sewerage	24.5	35.3	13.9	11.8
Communications	1.2	12.6	–	–
Defense and Security	45.8	70.4	63.6	96.0
Sports	7.7	42.9	11.8	38.3
Education and Culture	734.0	705.1	582.2	426.8
Energy	–	0.6	0.7	0.2
Industry, Commerce, Finance and Tourism	27.3	20.4	14.3	19.0
Justice	136.9	125.0	94.7	111.8
Mining	1.3	1.2	0.7	–
Multisectoral	150.8	140.4	256.6	466.7
Fishing	5.8	5.0	36.2	58.3
Health	95.7	196.3	201.8	205.7
Agricultural and Forestry	38.2	29.4	36.9	16.1
Transport	164.9	199.3	182.0	462.1
Housing	85.6	74.9	22.1	7.0
Total	1519.5	1658.7	1517.5	1919.8
Percentage of total initiatives	76.8%	74.6%	68.8%	65.4%

Source: BIP, Mideplan.

Note: includes projects, programs and basic studies. Over 93% of initiatives are projects. Each initiative is classified according to the fiscal year it is applying for funding, so they are usually appraised the year before. An exchange rate of Ch\$470/US\$ was used to convert the figures in Chilean pesos to dollars.

Table 5 – Project Cycle Stages in the SNI.

Application in the SNI		
From stage	To stage	Observations
Identification	Start-up	For non-complex projects with pre-approved prototypes
Identification	Design	For projects of medium complexity that require specific designs
Design	Start-up	
Identification	Pre-feasibility	For large and costly projects that must undergo all five stages of the project cycle
Pre-feasibility	Feasibility	
Feasibility	Design	
Design	Start-up	

Source: Mideplan (2011), p. 30.

Table 6 – List of Methodological Guidelines in the SNI.

Name	Year of last revision	Type of appraisal
<i>General</i>		
General Methodology for the Presentation and Appraisal of Projects	2006	–
<i>Sector-specific Guidelines</i>		
Methodology for the Preparation and Appraisal of Airport Projects	2009	CBA
Methodology for the Preparation and Appraisal of Potable Water Projects	2008	CEA
Methodology for the Formulation and Socioeconomic Appraisal of Projects for the Replacement of Street Lighting	2011	CEA
Methodology for the Preparation, Appraisal and Prioritization of Primary Health Care Projects	2007	CEA
Methodology for the Preparation and Appraisal of Fishing Cove Projects	2010	CBA
Methodology for the Economic Appraisal of Low Standard Roads	1996	CBA
Methodology for the Formulation and Appraisal of Bicycle Path Master Plans	2011	CBA
Methodology for the Preparation and Appraisal of Fluvial Defenses Projects	1992	CBA
Methodology for the Preparation and Appraisal of Sports Facilities Projects	2007	CEA
Methodology for the Preparation and Appraisal of Public Building Projects	2011	CBA
Methodology for the Preparation and Appraisal of Educational Projects	2009	CEA
Methodology for the Formulation and Appraisal of Rural Electrification Projects	2007	CBA
Methodology for the Preparation and Appraisal of Multipurpose Dam Projects and Related Hydraulic Works	2011	CBA
Methodology for the Preparation and Appraisal of Juvenile Housing and Detention Centers	2009	CEA
	2007	CBA or

Gómez-Lobo: Institutional Safeguards for CBA

Name	Year of last revision	Type of appraisal
Methodology for the Preparation and Appraisal of Rain Water Drainage Projects		CEA
Methodology for the Preparation and Appraisal of Police Infrastructure and Equipment Projects	2002	CEA
Memo of Methodological Agreements for the Appraisal of Traffic Management Projects	2011	CBA
Methodology for Estimating the Benefits of Ancillary Investments related to Road Projects	2011	CBA
Methodological Guidelines for the Preparation and Appraisal of Territorial Development Master Plans	2010	CEA
Methodology for the Preparation and Appraisal of Small Airfield Projects	2002	CBA
Methodology for the Socioeconomic Appraisal of Sustainable Reconstruction Plans	2011	CEA
Methodology for the Preparation and Appraisal of Jail Projects	2009	CEA
Methodology for the Preparation and Appraisal of Equipment Replacement Projects	2005	CBA
Methodology for the Preparation and Appraisal of Residential Waste Management and Related Projects	2009	CBA or CEA
Simplified Methodology for Estimating the Socioeconomic Benefits of Putting Cables Underground and the Joint Appraisal with Urban Infrastructure Projects	2011	CBA
Methodology for the Preparation and Evaluation of IT projects	2002	CEA
Methodology for the Evaluation of the National Network of Community Telecenters Projects	n.a.	CBA
Methodology for the Preparation and Evaluation of Rural Telephony Projects	n.a.	CBA
Methodology for the Preparation and Appraisal of Interurban Transport Projects	2006	CBA
Methodology for the Preparation and Appraisal of Intermediate Road Projects	2006	CBA
Methodology for the Preparation and Appraisal of Urban Road Projects	2006	CBA
Methodology for the Preparation and Appraisal of Police Surveillance Projects	2007	CEA
<i>Other Methodological Guidelines</i>		
Estimating the Value of Life through the Human Capital Approach	2011	–
Simple Methodology for the Estimation of the Social Benefits of Accident Reductions in Interurban Road Projects	2011	–
Simplified Methodology for the Estimation of Benefits of Joint Urban Roads and Rain Water Infrastructure Projects	2011	–
Simplified Methodology for Estimating the Social Benefits due to Bus Fleet Reductions in Urban Transport Dedicated Bus Lane Projects	2011	–
Methodology for the Valuation of Dams and Hydraulic Works Currently in Use	2011	–
General Methodology for Staff, Infrastructure and Optimal Location	2011	–

Name	Year of last revision	Type of appraisal
for the National Detective Agency Methodological Proposal for the Pricing and Focalized Subsidies in Dam Projects and Ancillary Hydraulic Works	2011	–

Source: Mideplan.

Note: the guideline names were translated by the author.

Table 7 – Comparison of *Ex ante* and *Ex post* Evaluations of Transport Sector Projects.

Project	<i>Ex ante</i>	<i>Ex post</i>	Difference
Upgrade Motorway M-40, VII Region (starting date 2000)			
Investment Cost (CLPm 31/12/1995)	1,108.0	1,154.5	4.2%
Traffic Flow 2005 (TMDA)	1,065	494	–53.6%
IRR	27.5%	14.3%	–48.0%
Construction of Access road and Costanera Norte Hornitos sector, II region (starting date 2002)			
Investment cost (CLPm 31/12/2001) ^a	779.3	674.2	–13.5%
Traffic Flow 2005 (TMDA)	296.1	296.1	0.0%
IRR	373	204	–45.3%
IRR	18.5%	12.3%	–33.5%
Construction of Access road to Iquique, I region (starting date 1999)			
Investment cost (CLPm 31/12/2000)	5,062	5,732	13.2%
Flow 2004 (Flow/hr both directions)	1,155	1,788	54.8%
IRR	32.0%	74.0%	131.2%
Upgrade Avenida Las Golondrinas, Talcahuano, VIII region (starting date 2002) ^b			
Investment cost (CLPm 31/12/2000)	7,847	12,555	60.0%
IRR	18.6%	24.0%	29.0%
Upgrade Road S-11-R, Stage III, IX region (starting date 1995)			
Investment cost (CLPm 7/1995)	2,322.7	2,348.1	1.1%
VAN (CLPm 7/1995)	696.5	1,704	144.7%
IRR	19.23%	–	
Upgrade Road D-485, IV region (starting date 1995)			
Investment cost (CLPm 31/12/1993)	1,274.1	1,438.0	12.9%
Traffic flow 2000 (TMDA) ^c	1,115	1,862	70.0%
IRR	14.5%	13.0%	–10.3%
Upgrade Valdivia bypass, eje Picarte, X región IRR	22.4%	17.1% ^d	–23.4%

Source: own elaboration based on information published on Mideplan's webpage.

Note: ^a the first figure corresponds to Stage I of the project and the second to Stage II. For the flows and IRR, the figures correspond to Stage II of the project. ^b The figures shown include the

link road added onto the original project. In addition, the figures correspond to the last re-evaluation (year 1999) and not to the original evaluation (1993). ^c Considers the sum of the flows of Sectors 1 and 2 of the project. ^d It does not include the rainwater drainage project.

Table 8 – Comparison of *Ex ante* and *Ex post* Evaluations of Rural Electrification Projects

Project	<i>Ex ante</i>	<i>Ex post</i>	Difference
Pailahueque, Victoria (originally appraised in 1995, built in 1997 and re-appraised in 2005)			
Investment cost (UFa)	7,906	9,736	23.1%
Number of beneficiaries (families)	118	121 (at start-up), 142 (at re-appraisal)	2.5%/20.3%
Average consumption (kwh/month)	40	33.7	-15.8%
NPV (private; UF)b	-5,209	-6,725	29.1%
NPV (Social; UF)	19,942	14,675	-26.4%
IRR (Private)	0.55%	-2.1%	-281.8%
IRR (Social)	38.2%	26.3%	-31.2%
Puralaco, Chanquin, Puerto Esperanza, Toltén (originally appraised in 1994, 1995 and 1996, built in 1997 and re-appraised in 2005)			
Investment cost (UF ^a)	9941	11,118	11.8%
Number of beneficiaries (families)	131	161 (at start up), 181 (at re-appraisal)	22.9%/38.2%
Average consumption (kwh/month)	35.65	33.26	-6.7%
NPV (private; UF) ^b	-6,868	-7,665	11.6%
NPV (Social; UF)	13,749	24,432	77.7%
IRR (Private)	-1.6%	-2.2%	37.5%
IRR (Social)	27.81%	33.4%	20.1%

Source: own elaboration based on information published on Mideplan's webpage.

Note: ^a UF is a monetary unit that changes value according to last month's inflation. At the date of writing (June, 2011) one UF corresponds to around 47 US\$. ^b These projects received subsidies to compensate for the negative private net present value.

Table 9 – Comparison of *Ex ante* and *Ex post* Evaluations for Health Projects.

Project	<i>Ex ante</i>	<i>Ex post</i>	Difference
Rural Health Clinic, Roa, VIII Region (appraised 1999, built 2001, reappraised 2004)			
Construction and equipment costs (thousand CLP of 2004)	62,818	54,637	-13.0%
Annual operational costs (thousand CLP of 2004)	6,191	9,392 ^a	51.7%

Construction (square meters)	149.5	167.8 ^b	12.2%
Equivalent cost per beneficiary (thousand CLP of 2004)	24.11	33.74	39.9%
Health Center “Los Cerros”, Talcahuano, VIII Región (appraised 1993 and 1996, built 1997–1998, reappraised 2001)			
Construction and equipment costs (thousand CLP of march 1999)	600,929	575,282	–4.3%
Annual operational costs (thousand CLP of march 2000)	346,474	420,239	21.3%
Number of attentions	140,567	46,505	–66.9% ^c
Equivalent cost per beneficiary (thousand CLP of march 2000)	3111	10,860	249.0%
Health Center “Lo Hermida”, Peñalolen, Santiago (appraised several times between 1993 and 2000, built 1999–2000, re-appraised 2004)			
Construction and equipment costs (thousand CLP of 2004)	1,010,899	763,387	–24.5%
Annual operational costs (thousand CLP of 2004)	414,329	647,978	56.4%
Number of attentions	104,418 (first year of operation, 1997)	165,692 (2003)	–
	160,605 (10th year of operation, 2007)		
Equivalent cost per attention (thousand CLP of 2004)	7.1	4.6	–36.0%
Standardization and enlargement of Hospital, Valdivia, XIV Region (appraised 1991, built 1992–1996, reappraised 2004)			
Construction costs and equipment costs (thousand CLP of 2000)	17,270,553	20,295,248	17.5%
Annual operational costs (thousand CLP of 2000)	–	–	44.9%/48.7%
Number of discharges (year 2000)	22,382	23,587	5.4%
Replacement of Hospital, Iquique, I Region (built 1992–1997, reappraised 2006)			
Construction and equipment costs (million CLP of 2000)	16,480.4	13,969.7	–15.2%
New and remodeled area (square meters)	24,060	22,454 ^d	–6.7%

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Number of discharges (year 2000)	16,911	18,858	11.5%
Health Center, Curicó, VII Región (built 2001–2002, reappraised 2006)			
Construction and equipment costs (UF ^c)	202,413	180,842	–10.7%
Annual operational costs (thousand CLP of 2004)	1,690,253	2,210,093	30.8%
New and remodeled area (square meters)	5502	5502	0.0%
Number of attentions ^f (year 2004)	240,703	231,580	–3.8%

Source: own elaboration based on information published on Mideplan's webpage.

Notes: ^a year 2003. ^b Part of this increase is explained by the need to construct a ramp and a bathroom for disabled patients that was not considered in the original project but was required by regulations. ^c This reduction was due mainly to an overestimation of the beneficiary population near the clinic. ^d Most of this reduction was in the area remodeled not in the newly constructed area. ^e UF is a monetary unit that changes value according to last month's inflation. At the date of writing (June, 2011) one UF corresponds to around 47 US\$. ^f Includes minor surgeries.

Table 10 – Comparison of *Ex ante* and *Ex post* Evaluations for Educational Projects.

Project	<i>Ex ante</i>	<i>Ex post</i>	Diff.
Public School, Copiapó (originally appraised 1994, built 1995–1996, re-appraised 2000)			
Construction cost per square meter (CLP)	207,068	276,113	33.3%
Investment per student (CLP)	1,109,380	2,908,184	162.1%
Operational costs per student (CLP)	161,771	363,841	149.1%
Construction per student (square meters)	4.40	7.83	78.0%
Padre Hurtado Public School, Puente Alto, Santiago			
Investment per staff (CLP thousands)	7,855	9,145	16.4%
Students enrolled	1,560	1,479	–5.2%
Operation costs (CLP thousands per year)	148,045	275,118	85.8%
Remodeling Palestine School, La Reina, Santiago (appraised 1998, built 2000–2001, re-appraised 2002)			
Investment per student (CLP thousands)	248	276	11.3%
Students per capacity	75%	95%	26.7%
Operation costs (CLP thousands per year)	165,743	296,312	78.8%
Nursery School, Yerbos Buenas, Linares, VII Region (originally appraised 1997, built 1998–2002, re-appraised 2002)			
Investment per student (CLP thousands)	1,564	1,392	–11.0%
Enrollment	136	141	3.7%
Operation costs (CLP thousands per year)	65,795	67,107.5	2.0%
Elementary School “Los Toros”, Puente Alto, Santiago (appraised 1996, re-appraised 2002)			
Investment per student (CLP thousands)	269	410	52.4%
Enrollment	1,620	1,628	0.5%
Operation costs (CLP thousands per year)	159,683	317,660	98.9%
Nursery School “Los Cachorritos”, San Vicente, VI Region			

(appraised 2001, built 2003–2004, re-appraised 2005)			
Investment	–	–	–3.0%
Enrollment	24	40	66.6%
Operation costs	–	–	–6.0%
Nursery School “General Oscar Bonilla”, Machali, VI Region (appraised 2003, built 2004, re-appraised 2005)			
Investment	–	–	13.0%
Enrollment	21	252	1100%
Operation costs	–	–	4.0%
Nursery School F-488 “Laurita Vicuña”, San Francisco de Mostazal, VI Region (appraised 2003, built 2004, re-appraised 2005)			
Investment	–	–	–23.0%
Enrollment	167	192	15.0%
Operation costs	–	–	2.0%
School “Villa Francia”, Puerto Montt, X Region (appraised 1999, built 2000–2001, re-appraised 2005)			
Investment	–	–	0%
Enrollment	124	134	8.1%
Operation costs	–	–	–2.0%
Nursery School “Estrellitas del Sur”, Puerto Montt, X Region (appraised 1996, built 1999–2000, re-appraised 2005)			
Investment	–	–	0%
Enrollment	230	239	3.9%
Operation costs	–	–	–2.0%
School “La Paloma”, Puerto Montt, X Región (appraised 1998, built 1999–2000, re-appraised 2005)			
Investment	–	–	6.0%
Enrollment	–	132	–
Operation costs	–	–	–

Source: own elaboration based on information published on Mideplan’s webpage.