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Original article

Using contingent valuation and cost-benefit analysis to design a policy for restoring cultural heritage

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ABSTRACT

Historical heritage is proving an ideal field to apply contingent valuation for estimating individual as well as collective preferences as goods tend to be non-market and publicly owned. Yet despite this, findings are seldom used to draw up cultural policies or assess cultural heritage related projects. The current paper thus posits an approach which merges contingent valuation and cost-benefit analysis to design a cultural policy aimed at restoring the urban cultural heritage of the city of Valdivia (Chile). Contingent valuation is used to estimate the expected benefits from heritage for both local residents and tourists visiting Valdivia. We then apply cost-benefit analysis to the findings to evaluate a project to restore the historical ensemble through a non-profit foundation. The originality of the proposal lies in its merging the two approaches and may prove appealing to developing countries in which much of the heritage has been neglected and left to deteriorate, and where few or no resources have been devoted and a lack of effective institutional schemes to address the situation is evident.

1. Research aims

Heritage economics has established itself as an area of analysis in its own right within the field of Cultural Economics, due to the particular nature of the elements it deals with, namely goods which are in general unique, cannot be reproduced and are maintained over time [1]. Moreover, many of these elements are deemed public assets providing a series of intangible values linked to their aesthetic or symbolic content, such that the market and pricing are not the most suitable vehicles for reflecting their value. This does not mean that there is a lack of appreciation on the part of residents, reflected in a desire to restore and preserve these elements [2], nor that cultural heritage, perceived as a capital asset, does not imply a flow of expenses and employment linked mainly to the demands of tourism, contributing to the economic development of cities endowed with cultural heritage [3]. It is thus important to establish techniques and conduct empirical analyses aimed at valuing historical and cultural heritage, as these are able not only to provide us with an idea of individual as well as collective preferences with regard to these items, but also to offer key input for assessing cultural policy and the viability of projects linked mainly to urban cultural heritage, and therefore to a city's cultural capital seen as an asset.

This line of research is particularly important in developing countries, where studies exploring the valuation of the social benefits derived from cultural heritage remain scarce [4], and which may be justified by the need to provide funding for the preservation thereof, or to set up reliable institutional figures to manage such a task. Cultural heritage in these countries may also be exposed to certain dangers and risks arising from neglect or lack of resources devoted to preservation, due to the uncontrolled exploitation for tourist purposes in certain areas, or indeed the pressure exerted by those wishing to find an alternative use of a speculative nature and which may lead to the very destruction of cultural heritage.

Our research centres on the economic valuation and assessment of the cultural heritage of the city of Valdivia in Chile, an emblematic historic ensemble and one of the country's leading cultural areas. Specifically, our work pursues two basic goals: firstly, to estimate both tourists' as well as local residents' willingness to pay for cultural heritage, as a means to gain an insight into the economic value which may be attached to the city's historic ensemble; and, secondly, to explore and assess the viability of a plan to restore and create value for urban heritage through the setting up of a hypothetical non-profit foundation devoted to this task. To achieve the first goal we employ the contingent valuation approach and in the second cost-benefit analysis.

The originality of the proposal lies in the fact that contingent valuation is not applied as just another academic exercise. We use the findings to draw up a specific cultural policy, namely the restoration of urban historical heritage [5]. The institutional formula chosen to execute the scheme arises from Chile's need for additional bodies

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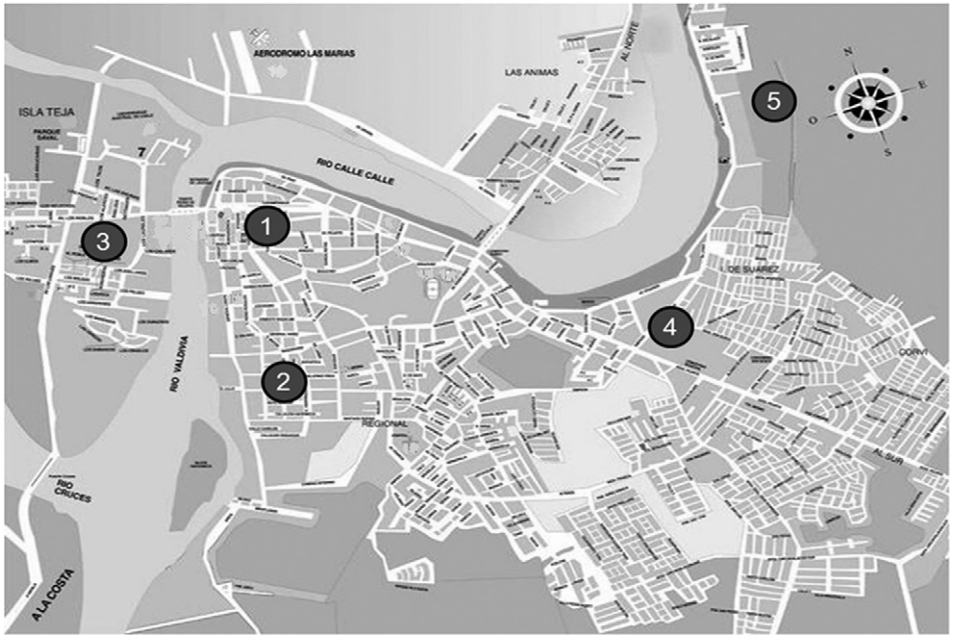

Fig. 1. Distribution by sector of historic buildings preserved in the city of Valdivia.

able to channel more resources and tackle the challenge of restoring heritage more efficiently than existing public organisms. The proposal we put forward also ties in with the idea of civil involvement in maintaining cultural heritage and observes the principle of consumer sovereignty.

The structure of the paper reflects this two-fold purpose. Section two describes the case study together with the approach adopted, which merges contingent valuation techniques and cost-benefit analysis. Section three presents the initial findings, the estimation of the economic value of Valdivia's cultural heritage, while Section four assesses the social viability of a restoration plan for the historic ensemble. Finally, Section five summarises the main conclusions to emerge from the research.

2. Case study

The city of Valdivia is an urban enclave located in the southern part of Chile, away from the country's main urban centres. It has quite a small population (134,500 inhabitants in the last census conducted in 2002). It is currently the capital of the Region of Los Ríos and was founded in 1552 by the Spanish conquistador Pedro de Valdivia, who chose its strategic location amongst the navigable rivers close to a coastal port. Valdivia's cultural heritage comprises a series of disperse elements, the most notable features of which are their Spanish origin, the fortifications dating from the Spanish Empire, and 19th century German colonization, which clearly marked much of the urban layout and the collective urban identity of what is the city today [6].

Amongst its most outstanding cultural heritage, Valdivia boasts 55 buildings listed as "Buildings and Areas of Historical Preservation" which are afforded protection and included in a territorial conservation plan drawn up by the city's authorities and Ministry of Housing and City Planning. This list of elements is grouped into five major sectors in the city centre (Fig. 1 and Table 1), although the majority, and certainly the most important and striking, are to be found in the city centre, and streets of General Lagos and Isla Teja. These areas are home to some of the Spanish fortifications and beautiful German houses, which have been declared Historical Monuments or Typical Areas and which are therefore protected under Chile's National Monument Law.

Valuing this historic ensemble constitutes an attractive case study, both in terms of the methodological challenge it poses, due to the non-bounded and disperse nature of the assets being analysed, as well as to the potential use of the findings when gauging the viability of tourist projects, or assessing cultural heritage restoration policy. This is particularly relevant in the case of Chile and other developing countries, since cultural heritage conservation policies tend to be bereft of any financial or tax benefits for owners of historic buildings, with the result that many such buildings are in rapid decay, either because of a lack of resources available for their restoration or because the alternative land value acts as an incentive to neglect them with a view to pursuing other aims, usually land and building development.

We thus propose merging two methodological approaches in our research: contingent valuation for value allocation, and cost-benefit analysis to assess the chosen policy. In the initial stage, the contingent valuation technique provides the estimations of individuals' Willingness To Pay (WTP) for the cultural heritage of Valdivia through two approximations: firstly in the shape of the direct use value given by tourists visiting Valdivia and, secondly, through passive value use, as indicated by the city's inhabitants. Both findings will be used as input to determine cost-benefit analysis (CBA), specifically an estimation of the social benefits afforded by the city's cultural heritage. By comparing these benefits to the costs involved in setting up a foundation devoted to restoring and promoting the urban cultural heritage, we may determine whether the project is socially viable or not, through the various viability indicators. This task also implies a previous

Table 1
Distribution by areas of cultural heritage currently protected.

Sector	Name	Number of buildings	Percentage
1	Centro	22	40.0
2	General Lagos	25	45.5
3	Isla Teja	1	1.8
4	Sector Picarte – Estación	6	11.0
5	Barrio Collico	1	1.8
	Total	55	100.0

Source: own based on information provided by the Ministry of Housing and City Planning (MINVU, 2006).

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effort in terms of drawing up the institutional cultural policy in question, in addition to the sensitivity analysis of the findings vis-à-vis various hypothetical situations arising from specific critical variables.

3. Contingent valuation of the urban cultural heritage in the city of Valdivia (Chile)

3.1. Specification of the model

The contingent valuation method is a method for directly estimating declared preferences for a good which are not traded on the market [7]. Individuals are asked for their willingness to pay (WTP) for the benefits received from a change in the supply of this good or alternatively for their willingness to accept (WTA) compensation due to possible losses in to what extent it may be used. In theoretical terms, the contingent valuation method is based on the economy of welfare, since it assumes that WTP values are directly linked to the function of individual preferences.

Thus, the basic theoretical framework of contingent valuation analysis considers an individual's utility function, u, dependent upon market goods, x, and on a level of supply of a public good, q. Individuals minimise expenses px subject to a given value of a utility function $u = u^*(x,q)$, such that the expense function is expressed as $e = e(p, q_0, u^*)$, where q_0 is the current value of the public good. From here, WTP of individuals who express a change from q_0 to q_1 is defined as:

$$WTP(q) = e(p, q_0, u^*) - e(p, q_1, u^*) \quad (1)$$

WTP may be obtained in a variety of ways, ranging from simple open questions [8], to more or less complicated bidding games [9], all of which seek to pinpoint the true WTP, which only the respondent but not the researcher knows for certain. Once the declared values have been obtained, and after minimising any biases, which are bound to arise in a survey of this nature, WTP may be estimated by using econometric tools. Parametric regression models have been widely used for this purpose [10] on the assumption that WTP is closely linked to individuals' demographic and socioeconomic traits, as well as prior experiences in the consumption of the good in question and the availability of alternatives.

However, over restrictiveness in specific functional forms when attempting to account for consumer behaviour has led to the introduction of WTP estimation using non-parametric methods [11]. The basic idea is that there is no evidence a priori to suggest that consumer preferences should follow any particular distribution, and that non-parametric estimations may maximise flexibility and minimise, whilst not removing, cases required to estimate the survival function.

Non-parametric models applied in contingent valuation resemble those which involve estimating the survival function, in applications in which we wish to ascertain the likelihood that the time a phenomenon will occur will be at least t. The method involves estimating the likelihood that initial payments will be accepted through an algorithm or iterative procedure enabling the optimum and convergent solution to be found. The time variable used in other applications is replaced by the subjective maximum willingness to pay expressed by the individual, and the event to be predicted corresponds to a favourable response to the valuation scenario posited.

For WTP surveys involving single-bounded dichotomous choice questions, the Ayer et al. algorithm is used [12], and for double-bounded, Turnbull's self-consistent algorithm [13]. In our research we use the algorithm proposed by An and Ayala [14], which is an improved version of the Turnbull method, since it allows handling of randomly grouped data, a common feature of public asset valuation.

Generally speaking, the contingent valuation method has for quite some time been the target of much criticism, mainly due to insensitivity problems when dealing with the type and scope of goods being evaluated, temporal instability of valuations or biases within the valuation method itself [15]. By contrast, other authors have constructively defended the method [16], attempting to overcome its anomalies and striving to enhance the procedure so as to obtain more robust and comparable findings.

In the area of cultural asset valuation, diverse opinions are also to be found [17], ranging from those who perceive these applications as a lesser evil, and one acceptable for the moment as a monetary expression of individuals' preferences, and those who are concerned that these techniques will never be able to reflect the cultural value of certain goods and works of art, since the asset at hand is multi-faceted and one which may not be expressed in purely monetary terms. Whilst accepting this criticism, we must, nevertheless, recognise the enormous prestige currently enjoyed by contingent valuation exercises in the field of public good evaluation, and in particular, for items of historical heritage. The robustness of the technique and the usefulness of the findings it provides depend to a great extent on the thoroughness of the procedure, although they should at least provide an idea of individual as well as social preferences if funding is based on voluntary contributions for public assets [18]. From this standpoint, contingent valuation may prove an extremely useful tool for those publicly charged with the care of cultural heritage, since the findings may serve as a reliable guideline for the allocation of funding or for assessing the application of legislation.

These are the grounds on which the methodological approach used in our research are based, using, as we have pointed out, findings from contingent valuation estimations of the cultural heritage of Valdivia, as input for the cost-benefit analysis of an urban restoration project. In the valuation exercise, we have posited a two-fold application: on the one hand estimating the value attributed by tourists visiting Valdivia who are keen to understand and enjoy its historical heritage; and on the other, the residents of Valdivia itself, concerned with restoring and preserving these goods, which are a symbol of their collective identity and even a wealth factor[1]. We now look at the application of the two techniques and the findings to emerge.

3.2. Value of the urban cultural heritage given by tourists

The target population for the first valuation study comprises tourists aged over 18 who visited Valdivia during the summer of 2004. The sample size offered a 4% error with 95% confidence. A total of 615 were visitors were systematically randomly interviewed, with a proportional spread of national and foreign tourists, based on flow data of visitors provided by Valdivia's National Tourism Service. Surveys were conducted personally by a small group of previously trained interviewers. After filtering for a positive willingness to participate in the hypothetical market posited, a total of 485 valid responses were obtained.

The questionnaire was split into three parts, the first of which dealt with the activities undertaken by the tourist interviewed (nationality, means of transport, where they were staying, number of accompanying persons, approximate expenditure, and so on.).

[1] Despite the existence of several valuation methods (travel cost, choice experiment, etc.), we prefer to apply the same approach for the two empirical exercises, the contingent valuation method, with two vehicles of payment close to the bids made in a market: one price for tourists, and a donation from residents. The questionnaires used in the research are available from the authors upon request.

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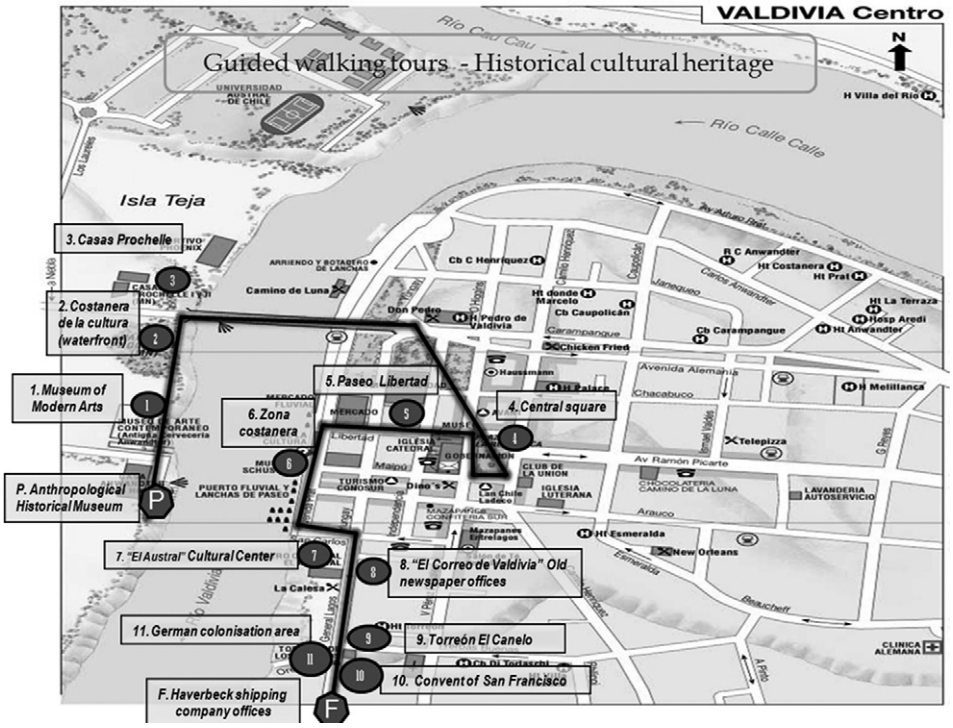

Fig. 2. Valdivia's cultural heritage: proposal for a guided walking tour.

Table 2
Price vector in Chilean pesos (Euros) offered to the respondents for the double-bounded format.

First bid	2,000 (2.7)	3,000 (4.0)	4,000 (5.7)	5,700 (7.6)	7,500 (10.0)	9,500 (12.7)	12,000 (16.0)	15,000 (20.0)
Second bid/Yes to the first bid	2,500 (3.3)	3,500 (4.7)	5,000 (6.7)	6,500 (8.7)	8,500 (11.3)	10,500 (14.0)	13,500 (18.0)	20,000 (26.7)
Second bid/No to the first bid	1,500 (2.0)	2,500 (3.3)	3,500 (4.7)	5,000 (6.7)	6,500 (8.7)	8,500 (11.3)	10,500 (14.0)	13,500 (18.0)

Source: own.

The second part focused on the monetary valuation of the case study, by giving the contingent valuation question and the vehicle of payment. Finally, the third part was aimed at gathering the socioeconomic characteristics of the respondent including sex, age, academic qualifications and income, etc.

Since the goal was to ascertain the direct value use allocated by tourists to Valdivia's historical heritage, the main difficulty faced when attempting to limit the case study was the fact that the city's heritage goods are spread over a wide area, and not bound by any fortified wall or contained within a historical centre, as is normally the case in European countries. To overcome this hurdle, we adopted a strategy which consisted of offering a "guided walking tour", such that the goods to be valued are clearly defined and are as real as possible. In the tour of the city, this was specifically detailed in the survey as "Historical heritage of the city of Valdivia" and covered the city's main cultural and heritage landmarks (Fig. 2), providing a tour which would take a motivated tourist keen to get to know the city and its attractions around 90 minutes to complete on foot. This route encompasses practically 88% of the historical buildings in the city of Valdivia.

The vehicle of payment for the valuation question was posited in the common and easily understandable form of a ticket for the guided walking tour, thereby offering a bid at a specific price for the good to be used. As mentioned earlier, the bidding consisted of a double dichotomous method with a vector of eight initial prices, selected in accordance with an empirical distribution from the responses obtained in an open question pre-test exercise, and subsequently adjusted using the data gathered in the pilot survey.

Table 2 shows the ticket prices in Chilean pesos and euros[2], randomly allocated to the individuals in the sample. If the respondent's answer to the first price is affirmative, a higher price is then offered, as can be seen in the second column in the chart. Should the answer be negative, a lower price is then proposed, shown in the third column. These vectors were chosen such that the likelihood of responding affirmatively to the maximum price offered was close to zero, whereas the likelihood of responding affirmatively to the minimum price was close to one.

WTP analysis for tourists was performed with those manifesting a willingness to take part in the hypothetical market, and yielded a final total of 485 valid surveys. For non-parametric estimation of WTP and following An and Ayala's algorithm, the number of individuals who fall into each valuation interval (ti, tj) must be known, depending on the various initial and second bids, a figure denoted by $\gamma i,j$. Moreover, it is necessary to determine certain initial values so as to obtain the survival function [11]. In our research we used an initial survival function, such that any jumps in the extremes of the intervals will be the same size, in our case (1/18).

The findings to emerge after applying the An and Ayala algorithm may be seen in Table 3, where the first row reflects the lower

[2] We chose to provide all the monetary values used and obtained throughout the research in the national currency, namely Chilean pesos, with a conversion into euros, since most of the foreign tourists visiting Valdivia were European (58%). The exchange rate in 2004 was 1 Euro to 750 pesos and 1 US$ was worth 600 pesos and 0.80 €.

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Table 3
Distribution of tourists' WTP.

Bids[a]	0	1.5	2.0	2.5	3.0	3.5	4.2	5.0	5.7	6.5	7.5	8.5	9.5	10.5	12.0	13.5	15.0	20.0
S(x)	1	0.97	0.93	0.92	0.81	0.74	0.68	0.63	0.57	0.45	0.38	0.35	0.26	0.22	0.16	0.12	0.02	0
f(x)	0.03	0.05	0.01	0.11	0.06	0.06	0.05	0.07	0.11	0.07	0.03	0.09	0.05	0.06	0.04	0.10	0.02	1
WTP		1.46	463	457	403	372	476	506	397	364	382	349	263	218	240	177	32	0
NL (likelihood) −716.396 Mean WTP pesos (€) 6,558 (8.74 €)																		

[a] Thousands pesos.

extreme values of the intervals in which tourists' WTP is located. The second row shows the value of the empirical survival function resulting from the application of the algorithm ($S(x) = P(X > x)$; Fig. 3), the third represents the likelihood function, and the final column an approximation of the willingness to pay.

When calculating consumer surplus on the empirical survival curve, taken as the demand curve of tourists visiting Valdivia, the mean WTP for each individual is 6,558 Chilean pesos (8.74 €). This value reflects each tourist's mean willingness to pay for the guided walking tour, and is taken as an estimation of the direct use value of Valdivia's historical heritage. It should be pointed out that when estimating WTP amongst national and foreign tourists, a higher value was found in the latter, probably due to a higher consumer purchasing power. Nevertheless, for the practical purpose of taking a single non-discriminatory price, we opted for the mean WTP over the whole set of tourists.

3.3. Value of urban cultural heritage given by residents

The study to estimate the passive use value of historical heritage in Valdivia was carried out in June and July 2006 by means of a telephone survey amongst residents aged over 18. Four interviewers trained for the purpose were involved, calling at various times of the day so as to gain as wide a spread as possible in the sample. Sample size showed an error of 5%, with 95% confidence. To gain a sample of 389 valid results of people who accepted the contingent market, a total of 1,227 calls had to be made from amongst the 18,000 numbers listed in the phone book.

As with the previous survey, the questionnaire was divided into three parts. The first addressed the respondent's cultural consumption. The second focused on the monetary valuation of the case study and the third dealt with individuals' socioeconomic characteristics. Here, the case study was linked to the guided walking tour but involved the overall heritage ensemble of the city. An annual amount paid to a non-profit foundation entrusted with the restoration and upkeep of the heritage was proposed as the vehicle of payment. By using this approach, which is one of the most common means of funding local public assets through a financial contribution, in this case is a voluntary donation, we wish to address the concept of the existence value and bequest value expressed by the residents of Valdivia with regard their heritage. The range of initial bids was the same as for the first valuation exercise, since we felt that these figures reflect the socioeconomic situation of the local residents, in what is a ground-breaking valuation in cultural terms in Chile. The double-bounded dichotomous method was again employed.

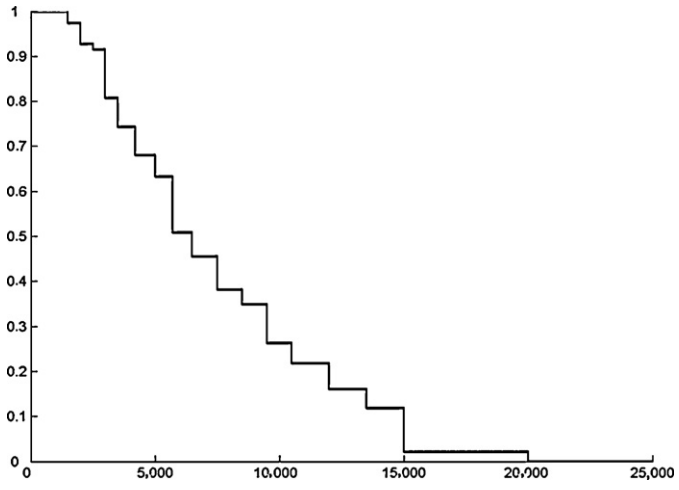

Fig. 3. Empirical survival distribution of tourists.

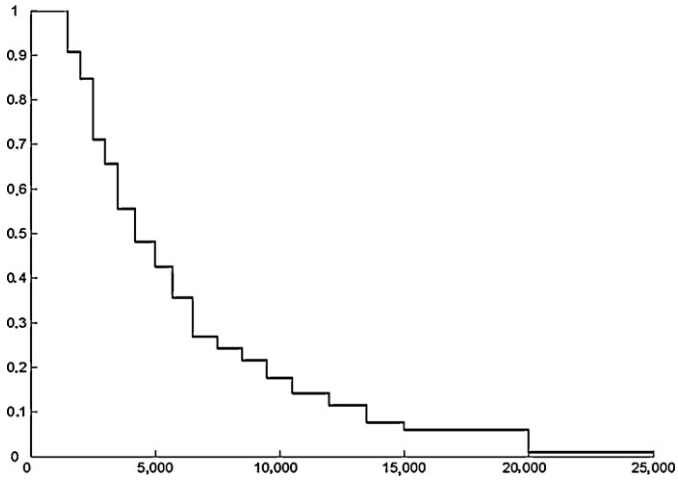

Fig. 4. Empirical survival distribution of Valdivia residents.

The findings to emerge from non-parametric WTP estimation for residents of Valdivia with regard to their historical heritage using the An and Ayala algorithm are shown in Table 4 and Fig. 4. Thus, considering the consumer surplus value of the empirical survival curve, we calculate the mean WTP to be 5,072 Chilean pesos (6.76 €).

4. Evaluation of the social viability of a project to restore urban cultural heritage

4.1. Background and institutional design of the project

Valdivia boasts a highly esteemed cultural and historical heritage thanks to its 456 years of rich history. The task of recovering and preserving this heritage currently lacks any local body or entity to take charge of and promote this vital mission, with only general legislation existing to afford protection for certain buildings classified as national monuments. For this reason, we propose in the current research the idea of implementing a cultural project aimed at setting up a non-profit foundation whose main function would be to undertake an urban and cultural restoration plan for Valdivia's historic ensemble. The important thing is to show the feasibility of the project, which may subsequently be promoted by a local or national public body. Choosing a non-profit foundation is a convenient institutional prototype, since it ensures reinvestment of possible benefits in the ultimate goal of the foundation (preserving cultural heritage) and allows greater sponsorship

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Table 4
WTP distribution of Valdivia residents.

Bids[a]	0	1.5	2.0	2.5	3.0	3.5	4.2	5.0	5.7	6.5	7.5	8.5	9.5	10.5	12.0	13.5	15.0	20.0
S(x)	1	0.91	0.85	0.71	0.66	0.56	0.48	0.43	0.36	0.27	0.24	0.22	0.17	0.14	0.11	0.08	0.06	0.01
f(x)	0.09	0.06	0.14	0.05	0.10	0.07	0.06	0.07	0.09	0.03	0.03	0.04	0.03	0.02	0.04	0.02	0.05	0.01
WTP		1.359	423	355	328	278	336	340	249	214	242	216	176	141	171	114	89	43
NL (likelihood) −604.763 Mean WTP pesos (€) 5,072 (6.76 €)																		

[a] Thousands pesos.

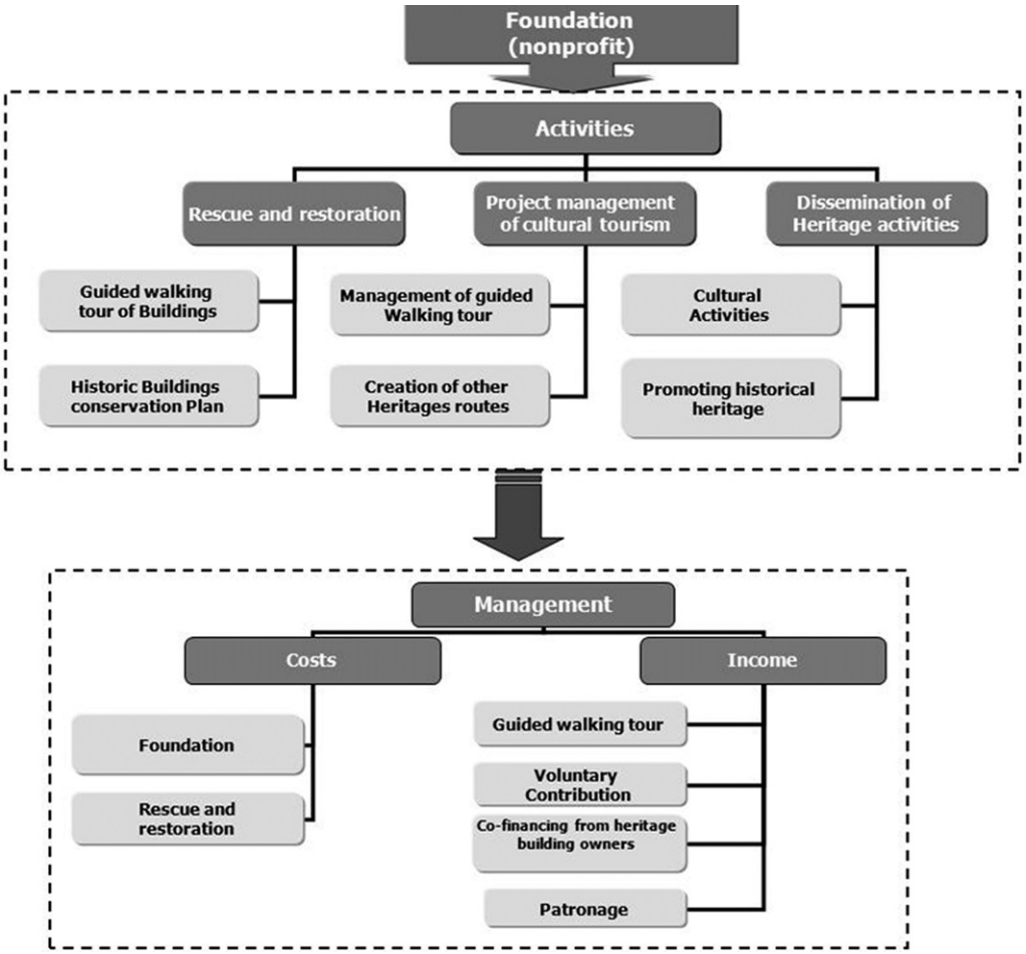

Fig. 5. Institutional design of the Historical Heritage Foundation.

to be obtained as well as greater involvement on the part of society.

As a result, this project firstly involves drawing up and specifying the tasks for a new body at an institutional level, a summary of which is detailed in Fig. 5. The main activities to be undertaken by this foundation revolve around three major areas. The central task would be to restore and maintain the urban historical heritage. A further mission would be to manage products related to the tourist industry, while a third area would engage in the task of disseminating activities and promoting Valdivia's cultural heritage. The first provides the project with its very essence, namely the recovery of historical heritage, whilst the other two are exploitations which derive from the project and are required to ensure its viability. We propose an extremely simple management plan. Costs would result from the recovery and restoration of heritage, as well as the setting up and running of the foundation. These costs also include the investment and expenses linked to exploiting the urban heritage for tourist purposes (signposting, guides, etc.). There would be four sources of estimated revenue, related to tourism (guided walking tour), voluntary contributions from residents and other private sources, co-financing by the owners of the heritage buildings to be restored, and finally a further source of revenue which would consist of external patronage.

This would therefore involve the creation of an extremely straightforward and functional cultural policy, eminently applicable in nature as it would draw on the findings of the research itself, such as the valuations allocated to the cultural heritage of Valdivia, by tourists and residents alike. These valuations would be deemed a kind of revenue reflecting the value of the heritage and thus considered as income in the proposed project. To estimate the value of this cultural project and institutional proposal, we use one of the most widely known and implemented project valuation techniques, cost-benefit analysis [19]. In our case, the particularity is the consideration of the social profit of certain goods, which are not easily expressed in market terms, such as the value of historical heritage.

Integrating the findings to emerge from a contingent valuation exercise as estimations of the social benefit when calculating

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Table 5
Cost of the project in million pesos (not Consumer Price Index adjusted).

Cost	Year									
	1	2	3	4	5	6	7	8	9	10
Legal costs	0.630									
Infrastructure	6.660	4.560	4.560	4.560	6.660	4.560	4.560	4.560	4.560	6.660
Found. staff	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000
Guide	5.760	5.760	5.760	5.760	5.760	5.760	5.760	5.760	5.760	5.760
Sub total	34.050	31.320	31.320	31.320	33.420	31.420	31.320	31.320	31.320	33.420
Restoration	28.800	28.800	28.800	28.800	28.800	34.560	34.560	34.560	34.560	34.560
Maintenance		0.720	1.440	2.160	2.880	3.600	4.464	5.328	6.192	7.056
Signposting	0.612	0.180	0.180	0.180	0.180	0.216	0.216	0.216	0.216	0.216
Dissemination	1.722	1.722	1.722	1.722	1.722	1.722	1.722	1.722	1.722	1.722
Sub total	31.134	31.422	32.142	32.862	33.582	40.098	40.962	41.826	42.690	43.554
Total costs	65.184	62.742	63.462	64.182	67.002	71.418	72.282	73.146	74.010	76.974
Total cost euros	86,912	83,656	84,616	85,576	89,336	95,224	96,376	97,816	98,968	102,920

cost-benefit analysis leads to much controversy due to the weakness of the valuation method and because there are as yet few comparable exercises. Nevertheless, since WTP has been perceived as a suitable measure of changes in welfare, it may provide a monetary scale for individual preferences and, when grouped properly, determine social preferences. This is the main argument for accepting inclusion of these findings in a CBA, even though it still represents one of the research borders in this particular area [20].

Estimating non-use values linked to a public good or service is the subject of even greater debate [21], even though these do exist and even when the -use value is not justified due to its high cost [22]. Non-use values are related to so-called option values, existence values and the bequest value of a public good and are not conveniently reflected through the market. However, they may prove a key part of a CBA and determine a project's impact or shape recommendations to emerge therefrom. The key question in this regard is to avoid accounting for effects twice and to adopt a cautious approach when calculating.

As regards the technical aspects which must be taken into account in any cost-benefit analysis, the first is linked to alternative projects to the one proposed, which in the case of our study will be taken as the *status quo*. In other words, project viability will be assessed from the standpoint that there is no other policy being implemented which pursues the same aims. The benefits together with the costs of the project must then be pinpointed and quantified, and a reasonable time schedule for the introduction of the plan must be estimated, which in our case we have taken to be a period of 10 years. Another strength of the analysis is the calculation of the social discount rate, which is initially set at 10% [23]. The viability of the project would be gauged through commonly used and easily understood financial ratios such as calculating the net present value (NPV), internal return rate (IRR) and cost-benefit coefficient. Finally, a sensitivity analysis of the findings would be performed by comparing them to alternative hypotheses.

4.2. Identifying and quantifying costs

The main costs considered in the cost-benefit analysis of the cultural project are split into two parts, one linked directly with setting up the foundation itself and the other with restoring the city's historical heritage, particularly enhancing the beauty of the route for the guided walking tour. In turn, the first group of costs has been divided into three sections: legal costs involved in setting up the institution, infrastructure costs, and provision of equipment and finally staffing costs. We will now detail each of these sections.

Legal costs for setting up the foundation amount to 630,000 pesos (840€) and are payable only once. These include lawyers' fees, public notary, publication of notification in the official Chilean gazette and unforeseen expenses[3]. This outlay is only incurred at the start of the project. Distribution of costs in infrastructure and provision of equipment include renting premises for 300,000 pesos (400€) a month, which would entail an annual cost of 3.6 million pesos (4,800€). Expenditure on furniture, which would come to 600,000 (800€), is also included, as is the purchase of three computers at a cost of 500,000 pesos (667€) each. Also included are running costs (electricity, telephone, internet, office material, etc.) which amount to 960,000 pesos (1,280€). The cost of these items for the first year reaches 6.66 million pesos (8,880€)[4]. The project estimates that computer and furniture equipment will have to be replaced after five and 10 years, entailing an increase in costs for those particular years (Table 5).

Personnel costs first stipulate the staff required to run the foundation, and would include a coordinator, a specialised manager and an administrative assistant, whose annual salaries would come to 21 million Chilean pesos (28,000€). People who will act as tour guides are then considered, although only for the summer period due to the eminently seasonal nature of tourist visits to the city. For this reason, this cost is only considered for four months each year, and includes a bilingual guide, the total payment coming to 5.76 million pesos (7,680€)[5].

Summing up, the total expenditure involved in setting up and running the foundation amounts to 34.050 million pesos (45,400€). This figure only reflects the cost in the first year of the project. In the following years legal costs should be discounted and after five and 10 years the cost of renewing equipment should be taken into account. For an analysis of the costs involved in managing the foundation throughout the whole period evaluated, we can see Table 5.

With regard to costs linked to restoration and putting into operation Valdivia's urban cultural heritage, these have been divided into three sub-sections: restoration and maintenance of the listed heritage houses, signposting the guided walking tour, and dissemination and promotion of the foundation's work.

Restoration and maintenance will be carried out on the buildings in the municipality of Valdivia which considers 55 buildings as being liable to historical conservation, including heritage houses in the Typical Area of General Lagos, which in turn forms a major

[3] Estimated figures provided by VALDICOR dependent on the Municipality of Valdivia and the Housing and Town Planning Service (SERVIU).

[4] Most of these figures have been estimated based on information supplied by the *Proyecto Puerto Cultura* at the city of Valparaíso, Chile, which offers a certain semblance to our project case study.

[5] Staff salaries have been calculated in *Unidades de Fomento* (UF), an adjustable inflation indexed monetary unit based on variations in the Consumer Price Index (CPI), used to value assets such as houses, loans, payments, consulting fees, insurance policies, and so on.

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part of the guided walking tour proposed in the research. Through a 10-year restoration plan, the aim is to annually restore 10% of the buildings, implying a rate of five houses per year over the first five years and six the following five years[6]. According to figures supplied by the Valdivia Housing and City Planning Service, the cost of restoring the façades of these houses is 8 UF per m^2, which covers labour costs, paint, new laths, woodwork, restoring doors and window frames, in addition to other sundry expenses. At an average of 40 m^2 per façade (ten metres by four), multiplying these figures would give a total restoration cost per year of 286.800 million pesos (382,400 €) over the first five years, and 34.560 million pesos (46,080 €) the following five years. This item also covers annual maintenance costs for the restored buildings, amounting to 0.720 million pesos (960 €), a figure which would gradually increase as new buildings were added to the restoration plan. Details of this expenditure for the total 10-year period can be found in Table 5.

The cost of signposting the guided walking tour includes 13 points of interest around the route (Fig. 2) as well as identifying each heritage house. The cost for the first year comes to 612,000 pesos (816 €), and for subsequent periods considers the signposting depending on the restoration plan for the heritage houses. Table 5 details this information.

Finally, investment in disseminating and promoting activities related to heritage in Valdivia and the foundation's activities covers costs such as designing and setting up the webpage, advertising expenses and promoting the plan, designing and printing brochures and posters, and so on, all of which amounts to an estimated 1.722 million pesos (2,296 €) each year (Table 5). It also includes the possibility of the foundation engaging in activities such as concerts, reinstating traditional local celebrations, courses, exhibitions, and so on, expenses which we have not included due to a lack of any suitable and objective method of quantification and because of the discretional nature of these activities.

Summing up, Table 5 reflects the evolution of the flow of costs involved in the cultural project studied over the time period considered. The internal distribution of these expenses indicates that just over half are for restoration and improvement of the urban heritage, the remainder corresponding to management costs and the execution of the activities foreseen for the foundation.

4.3. Identifying and quantifying benefits

One of the difficulties of cost-benefit analysis is estimating benefit when dealing with goods which are not traded on the market, which is the case with our study, cultural heritage in the city of Valdivia. Moreover, there is no specific project to take advantage of the available cultural heritage in terms of tourism. Our methodological contribution thus entails using WTP estimations, obtained with the contingent valuation method, estimations which are seen as representing the social profit inherent in a heritage ensemble and, thus, as input for cost-benefit analysis. Estimating the direct use value given by tourists through a ticket purchased for a guided walking tour will be deemed direct income for the cultural project, deriving from a specific mercantile product such as the exploitation of a tourist route. Estimation of the passive value given by residents of Valdivia through an annual voluntary donation will also be seen as a possible means to contribute financially to the activities of the non-profit foundation. Finally, a further direct source of income to be taken into account is the co-funding plan itself involving owners of those buildings included in the restoration plan[7]. We now show how the various benefits included in the project are obtained and aggregated.

As regards the direct use value, our estimations are based on the WTP expressed by tourists visiting Valdivia ($6,558 pesos; 8.74 €). Taking into account that the average number of visitors in the summer period over the last two years is approximately 15,000 [24], and bearing in mind that 78.9% of tourists interviewed expressed an interest in taking part in the guided tour, we can calculate the aggregate social benefit per year as follows:

Aggregate WTP = 15,000*0.789*$6,558 = $77,613,930 (103,485.24 €)

For the passive value use, we take account of the estimations from the voluntary contributions made by residents of Valdivia towards maintaining their cultural heritage. For the empirical application in this case we used the sample conducted for the telephone survey which, according to the 2002 census was 18,000 subscribers. This sample may be representative of the number of houses and households in the city's historical centre and ensures a certain amount of caution in the overall calculation of the passive use value. Thus, considering that the percentage of voluntary participation in the city's cultural heritage project was 31.7% and with an estimated WTP of $5,072 pesos (6.76 €), we concluded that the projected social benefit per year for residents as a whole is:

Aggregate WTP = 18,000*0.317*$5,072 = $28,940,832 (38,587.78 €)

Finally, it was felt that the owners of the heritage houses should bear at least 10% of the cost of restoring their building, such that they would not only feel involved in the recovery of their own assets but also consider that they were making a contribution to the overall goal of restoring the city's historical heritage. This figure is reached by calculating 10% of the section dealing with restoration of façades, and should be seen as a benefit or specific income for the project.

It should not be forgotten that a project of this nature generates further positive effects which benefit its fundamental purpose. These include enhancing the tourist appeal of the restored heritage ensemble in the medium term, which would in turn attract more tourists, or the inertia in the collective awareness of the city's residents arising from the success of the Foundation's activities, which would bring in further donations. Nevertheless, these effects may not be expressed in the same objective terms as the estimation of the social benefits to derive from the urban cultural heritage, and as such have not been taken into account in the analysis. Table 6 thus reflects specific income included in the project year by year, bearing in mind that revenue from ticket sales for the guided walking tour (tourists) and voluntary contributions from residents are considered after the second year, since the first year is required to set up the Foundation and allow for initial dissemination of its activities.

4.4. Interpreting the findings and sensitivity analysis

Evaluation of the social viability of the restoration project for the urban historical heritage is performed using three financial indicators: firstly, calculating the NPV, which would provide us with a social benefit value (positive or negative) in the relevant currency (pesos or euros). We then obtain the IRR, indicating the rate which equals the NPV at zero, and finally we calculate the benefit-cost ratio of the project.

[6] A lineal restoration plan is proposed to facilitate CBA calculations, although it may be considered one which is implemented gradually, as the foundation's activities became more widely consolidated and accepted amongst stakeholders and local residents.

[7] The possibility of obtaining further revenue from the private patronage of other institutions has not been considered thus far, as it would constitute a discretional item, subject to the management capacity of the Foundation and the consolidation of its activities. This would be additional revenue for the project, thus reaffirming the fact that the estimations for the viability plan are cautious and not over-valued.

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Table 6
Benefits from the project in millions of pesos.

Benefits	Years									
	1	2	3	4	5	6	7	8	9	10
Tourist use		77.614	77.614	77.614	77.614	77.614	77.614	77.614	77.614	77.614
Resident use		28.941	28.941	28.941	28.941	28.941	28.941	28.941	28.941	28.941
Contribution from owners[a]	2.88	2.88	2.88	2.88	2.88	3.456	3.456	3.456	3.456	3.456
Total benefits	2.88	109.435	109.435	109.435	109.435	110.011	110.011	110.011	110.011	110.011
T. benefits (€)	3,840	145,913	145,913	145,913	145,913	146,681	146,681	146,681	146,681	146,681

Source: own.
[a] From year one to year five, five houses are included, whereas six are included in the remaining five years.

As pointed out at the beginning of the Section, a social discount rate of 10% is initially used to estimate the NPV of the overall project, and specifically on a cost and benefit flow which, moreover, are adjusted to Chile's CPI [25], as reflected in Table 7. This clearly demonstrates the viability of the project, since the net present value of the whole shows a positive figure of 215.51 million pesos (287,347 €).

The internal return rate or rate at which the present value of the benefits and the costs of the project balance out, is calculated from the data in Table 7 and shows a value of 78%. This is a key figure as it represents the project's implicit return, regardless of any other type of discount. Thus, one assessment criterion might be to discard any plan which yielded an IRR below a specific value, or accept all of those in which this figure was above the social discount rate. Whatever the case, the IRR obtained in the project we evaluate is high enough to adjudge the plan profitable in social terms.

Another way to express the outcome of the viability analysis is to use the coefficient between the present net value of profit and cost. Should this be above one, the project would prove profitable. This criterion is particularly common when ranking several projects, but may also be used to evidence the viability of a single project compared to the alternative of not implementing it.

The benefit and cost ratio when applying the 10% discount rate is reflected in Table 8 and shows a figure of 1.41. In other words, the accumulated profit is higher than the accumulated costs, meaning that the project is profitable according to this criterion.

Uncertainty surrounding the forecasts from the cost profit analysis is due to various reasons. The goal of sensitivity analysis is to select the model's "critical" variables and parameters, namely, those whose positive or negative variations, compared to the value used as the optimal estimation in the reference hypothesis, have the greatest impact on the IRR, the NPV or benefit-cost ratio, in that they lead to the most significant changes in said indicators.

In order to determine the sensitivity of the CBA outcomes, we use the systematic analysis technique, which gauges the impact of each of the critical variables in the study independently. In our research we deemed the critical variables to be the number of tourists visiting the city, the price of the ticket and the social discount rate. We opted not to include the city resident variable, not only because of the demographic growth of the city, which is not significant, but also because the initial participation of local residents in the hypothetical market is low (31.7%). Therefore, we took this number of contributors as stock, even though the number of members in the Foundation is expected to increase as its activities gain consolidation. Nor did we take into account variations concerning the project's structural costs, given that the time interval required to implement it is short enough to assume that there will be no substantial variations in the cost of works and services.

We thus used three possible figures to reflect the number of tourists visiting the city during the summer, one pessimistic scenario for a total of 10,000 visitors, one intermediate scenario for 15,000 visitors and a third optimistic scenario for 20,000. We also included two values for the maximum WTP, one of which was estimated using the non-parametric method and yielded $6,558 pesos (8.74 €) and another taking a rather subjective although credible figure in the context of an entrance ticket in Chile, which we rounded up to 5,000 pesos (6.67 €). Finally, we decided to evaluate the sensitivity of the outcomes with three discount rates of 5%, 7% and 10%. Table 9 provides a summary of the results to emerge from the three indicators, as compared to the variation in the variables felt to be critical.

This chart clearly shows that the NPV is negative when we apply an entrance price of 5,000 pesos, and the flow of tourists is 10,000 for the three interest rates used. In the remaining two cases, the project is socially profitable, a minimum return of 40.114 million pesos (53,485 €) being obtained when the flow of tourists is 10,000 with an entrance price of $6,558 pesos and a rate of 10%. The highest return of 498.686 million pesos (664,915 €) is obtained in the most optimistic case, when the flow of tourists reaches 20,000, with a ticket price of 6,558 pesos (estimated WTP) and a rate of 5%. The benefit-cost ratio yields the same structure as for the previously stated outcomes.

If we look at Fig. 6, we can see that the project is socially profitable when the entrance price is 6,558 pesos, for any posited flow rate of tourists, whatever the interest rate. By contrast, with a ticket price of 5,000 pesos, the project is profitable when the flow of tourists is equal to or above 11,500 visitors.

In Fig. 7, we evaluate the internal return rate, which measures the rate making the NPV equal to zero. It can be seen that

Table 7
Distribution of flows for calculating NPV (millions of pesos) at a rate of 10%.

	Years									
	1	2	3	4	5	6	7	8	9	10
CPI adjusted cost[a]	65.18	65.06	68.25	71.57	77.48	85.65	89.89	94.33	98.97	106.75
CPI adjusted benefit[a]	2.88	113.48	117.68	122.04	126.55	131.93	136.81	141.87	147.12	152.56
Annual net balance (St)	−62.30	48.42	49.44	50.46	49.07	46.28	46.92	47.54	48.14	45.82
$(1+i)^t$	1	1.1	1.21	1.33	1.46	1.61	1.77	1.95	2.14	2.36
$S_t/(1+i)^t$	−62.30	44.02	40.86	37.92	33.52	28.737	26.48	24.40	22.46	19.43
NPV	215.51 (287,347 €)									

Source: own.
[a] Pesos constant from year 1 (2006).

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Table 8
Distribution of flows for calculating benefit-cost ratio (millions of pesos).

	Years									
	1	2	3	4	5	6	7	8	9	10
CPI adjusted costs	65.18	65.06	68.25	71.57	77.48	85.65	89.89	94.33	98.97	106.75
Updated Costs[a]	65.14	59.15	56.40	53.77	52.92	53.18	50.74	48.41	46.17	45.27
CPI adjusted benefit	2.88	113.48	117.68	122.04	126.55	131.93	136.81	141.87	147.12	152.56
Updated benefit[a]	2.88	103.17	97.26	91.69	86.44	81.92	77.22	72.80	68.63	64.70
Total Updated costs	531.20	Total Updated benefit	746.71		B/C Ratio	1.41				

Source: own.
[a] Rate of updating: 10%.

Table 9
Sensitivity of CBA results.

Tourists	WTP ($)	Rate (%)	NPV (millions of $)	IRR	Ratio
10,000	6,558	5	60.899	27.0	1.093
		7	51.830		1.087
		10	40.114		1.076
	5,000	5	-43.107		0.934
		7	-43.073		0.928
		10	-43.224		0.919
15,000	6,558	5	279.793	78.0	1.429
		7	251.566		1.420
		10	215.510		1.406
	5,000	5	123.784	43.4	1.190
		7	109.211		1.182
		10	90.502		1.170
20,000	6,558	5	498.686	122.7	1.765
		7	451.302		1.754
		10	390.902		1.736
	5,000	5	290.674	80.3	1.446
		7	261.495		1.437
		10	224.227		1.422

for an estimated price of $6,558 the social rate varies between 27% and 122.7% and in the case of a ticket price of $5,000, calculated for various flows of tourists, we find that this rate is negative for flows of 11,000 visitors or less. For a figure of 11,500 visitors, the rate must be 8.3% in order to make the NPV zero.

By means of this analysis we ascertain that the social viability of the project mainly depends on the cost of the entrance ticket and the flow of tourists to the city. Nevertheless, the most plausible and cautious theoretical situation may be to consider an entrance price of 5,000 pesos for the guided walking tour, estimating an intermediate flow of 15,000 tourists and a moderate interest rate of 7%. With these data we would obtain a total project return of $109,211 million pesos, equal to 145,615 euros.

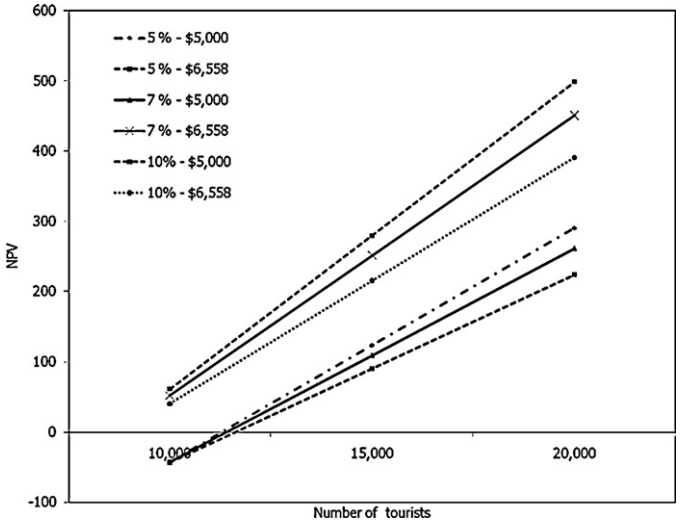

Fig. 6. NPV distribution for an interest rate of 5%, 7% and 10%.

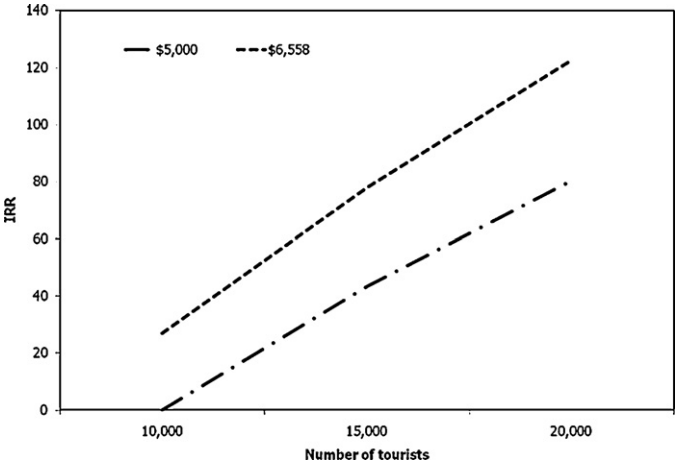

Fig. 7. IRR distribution by number of tourists per type of WTP.

5. Conclusions

Despite criticism of contingent valuation methods, questioning their ability to accurately reflect the cultural value of goods and

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cultural prototypes, they do at least prove consistent when estimating the intensity of individual and social preferences with regard to these elements. Contingent valuation may thus be an invaluable tool for public authorities charged with the care of cultural heritage, as the findings may offer a coherent guideline for allocation of funding or assessing cultural projects, in sum for designing specific cultural policies linked to heritage.

Our research has been developed along these lines, using the valuation estimates of Valdivia's cultural heritage, as stated both by tourists and residents, to estimate the social benefits afforded by said urban cultural heritage. These findings have in turn been incorporated into the cost-benefit analysis of an urban restoration project, implemented through a non-profit foundation entrusted with the scheme.

Findings from the analysis evidence the viability of a project of this nature, which shows a positive NPV within a reasonable execution period and at a prudent social discount rate. The balance between benefit and cost is thus always positive, except in the most pessimistic cases when analysing the sensitivity of the model's critical variables, particularly the flow of visitors and the estimated cost of the guided walking tour used to synthesise valuation of the city's heritage.

Setting up this project also involves the innovative and feasible idea of designing an urban and cultural restoration plan for a developing country, an extremely interesting proposal given the lack of similar schemes in the literature and faced with the urgent need to restore many of these elements. These areas may also become driving factors behind economic development or at the very least emerge as tourist attractions.

The medium term viability of a cultural project such as the one proposed here depends on two basic issues. The first entails readjusting the *scenario* within which the study is framed, and involves changes in supply and demand of cultural activities, possible costs arising from an excessive number of tourists, or even changes in the valuation and appreciation of cultural heritage, issues which would require a lengthy period of time, possibly reaching into the next generation. The other issue is more immediate and concerns calculating the costs involved in restoring cultural heritage, which we assess using primary data from the local construction and restoration sector, without the participation of *star* architects for the new urban development plan. Such specifications might limit the financial viability of the proposed plan, although it might be justified in terms of creating new cultural capital for the city. However, such a consideration lies outside the basic aims of this study, which is confined to evidencing the feasibility of a project to restore urban cultural heritage and to validating the methodological combination of contingent valuation and cost-benefit analysis when assessing cultural prototypes.

References

[1] M. Hutter, I. Rizzo, (Eds.) Economics perspectives on cultural heritage, MacMillan Press Ltd, Basingstoke, 1997.
[2] T. Cuccia, G. Signorello, A contingent valuation study of willingness to pay for heritage visits: case study of Noto, in: I. Rizzo, R. Towse (Eds.), The economics of heritage: a study in the political economy of culture in Sicily, Chapter 10, Edward Elgar Publishing, Cheltenham, 2002, pp. 147–163.
[3] D. Throsby, Cultural capital, Journal of Cultural Economics 23 (2001) 3–12.
[4] T.H. Tuan, S. Navrud, Valuing cultural heritage in developing countries: comparing and pooling contingent valuation and choice modelling estimates, Environmental and Resource Economics 38 (1) (2007) 51–69.
[5] T.H. Tuan, S. Navrud, Capturing the benefits of preserving cultural heritage, Journal of Cultural Heritage 9 (3) (2008) 326–337.
[6] G. Guarda, Nueva Historia de Valdivia, Ediciones Universidad Católica de Chile, Santiago, 2001.
[7] R.C. Mitchell, R. Carson, Using surveys to value public goods: the contingent valuation method, Resources for the Future, Washington, 1989.
[8] R.K. Davis. The value of outdoor recreation: an economic study of the Maine Woods. Ph. D. dissertation, Harvard University, 1963.
[9] W. Hanemann, J. Loomis, B. Kaninnen, Statistical efficiency of double-bounded dichotomous choice contingent valuation, American Journal of Agricultural Economics 73 (1991) 1255–1263.
[10] T.A. Cameron, J. Quiggin, Estimation using contingent valuation data from a dichotomous choice with follow-up questionnaire, Journal of Environmental Economics and Management 27 (1994) 218–234.
[11] J.A. Sanz, L.C. Herrero, A. Bedate, Contingent valuation and semiparametric methods: a case study of the national museum of sculpture in Valladolid, Spain, Journal of Cultural Economics 27 (3–4) (2003) 241–257.
[12] M. Ayer, H. Brunk, G. Swing, W.T.Y. Reid, E. Silverman, An empirical distribution function for sampling with incomplete information, Annals of Mathematical Statistics 26 (1955) 641–647.
[13] B. Turnbull. The empirical distribution function with arbitrarily grouped, censored and truncated data, Journal of the Royal Statistical Society Series B 38 (1976) 290–295.
[14] M.Y. An, R.A. Ayala. A simple algorithm for nonparametric estimation of distribution functions with arbitrarily grouped data, Working Paper 9602, Department of Economics, Duke University, Durham, 1996.
[15] P.A. Diamond, J.A. Hausman, Contingent valuation: is some number better than no number? Journal of Economic Perspectives 8 (4) (1994) 45–64.
[16] R.T. Carson. Contingent valuation: a user's guide. Discussion Paper 99-26, Department of Economics, University of California, San Diego, 1999.
[17] D. Noonan, Contingent valuation and culture resources: a meta-analytic review of literature, Journal of Cultural Economics 27 (2003) 159–176.
[18] T. Cuccia. Contingent valuation, in: R. Towse (Ed.), A handbook of cultural economics, Chapter 14, Cheltenham, Edward Elgar Publishing, 2003, pp. 119–131.
[19] A. Boardman, D. Greenberg, A. Vining, D. Weimer, Cost-benefit analysis. Concepts and practice, Segunda Edición, Prentice Hall, New Jersey, 2001.
[20] F. Papandrea, Regulation and cost-benefit analysis, in: R. Brent (Ed.), Handbook of research on cost-benefit analysis, Chapter 8. Part II, Edward Elgar Publishing, Cheltenham, 2009, pp. 185–225.
[21] V.K. Smith, Nonuse vales in benefit analysis, Southern Economic Journal 54 (1) (1987) 19–26.
[22] C. Nash, J. Laird, Cost-benefit analysis in transport: recent developments in rail project appraisal in Britain, in: R. Brent (Ed.), Handbook of research on cost-benefit analysis, Chapter 5. Part II, Edward Elgar Publishing, Cheltenham, 2009, pp. 110–142.
[23] CEPAL. Metodología general de identificación, preparación y evaluación de proyectos de inversión pública. Instituto Latinoamericano y del Caribe de Planificación Económica y Social, Área de Proyectos y Programación de Inversiones, Santiago de Chile, 2005.
[24] SERNATUR. Estadísticas de turismo-Valdivia, 2006. http://www.sernatur.cl.
[25] Banco Central de Chile. Base de datos económicos. 2006. http://www.si2.bcentral.cl.

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