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Public Preferences for Land uses' changes: valuing urban regeneration projects at the Venice Arsenale

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by

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Abstract

This paper discusses the results of a conjoint analysis study developed to assess alternative land uses for an important part of the city of Venice: its Arsenal. Aim of the study is to illustrate the potential of stated preferences techniques for placing a value on redevelopment and reuse alternatives for an underutilized site with high historical, cultural and architectural significance. Very few studies have used conjoint choice to assess public preferences for alternative land uses in an ex-ante framework, i.e.

masterplans. In this paper we present the results of a conjoint choice study conducted on the Arsenal of Venice.

We surveyed individuals in Venice asking respondents to engage in conjoint choice tasks, gathering 168 usable observations. Members of the general public were intercepted at the Multimedia Library at Palazzo Querini Stampalia/FEEM and asked to indicate which choice they preferred among *hypothetical*—but realistic—redevelopment projects of the Arsenale historic site. Each project was described by a vector of attributes, such as land use, use of basins and waterways, architectural features, access, employment implied by the reuse, and cost. The responses to these choice tasks was used to infer the rate at which respondents trade off land uses, aesthetic features, and costs, and hence to derive the value of marginal changes in the attributes, and the value of a proposed policy package.

Keywords land use, decision-making, sustainable development, local economic development, conjoint choice questions.

1. Valuing Urban Regeneration Projects

Sustainable land uses

In the last decades many European cities have been faced with the problem of vacant lands, often previously industrialised areas, which had become redundant and for which new uses were sought. Land use is one of the crucial choices that either when planning the city or developing it, architects, urban economists and planner have to make. Social, economic, and often urban preservation issues play a role in the way the city is developed. Some land uses might be more sustainable than others, and should be preferred. Therefore, assessing the impacts of urban regeneration projects is one of the most important steps to take in an *ex ante* framework. At a European level these needs have been partially addressed by the Directives establishing an Environmental Impact Assessment (EIA) of new developments, or a system of Strategic Environmental Assessment (SEA) of programmes and projects.

In 1985 Directive 85/337/EEC of the European Commission, then amended by Directive 97/11/EC, introduced environmental impact assessment as a statutory instrument. The directive referred to the need to assess the impacts of public or private projects on the environment, including “landscape, material assets and cultural heritage”. The Strategic Environmental Assessment (SEA) Directive was finally adopted in 2001. This instrument appears more targeted to cultural heritage. It envisages the identification, description and valuation of the negative and positive effects of plans and programmes on areas that may be more sensitive, such as those with special natural characteristics or cultural heritage, including architectural and archaeological heritage. Alternative options for development should be assessed *ex ante*, in terms of their social and economic impacts. The introduction of EIA and SEA has brought to the forefront the role of valuation methods in redevelopment projects. Valuation methods come to the aid of decision makers involved

with the physical transformation of the built environment. Urban development strategies need to achieve a balance between public commitment, private investors and community initiatives. Understanding the meaning that a specific urban heritage bears for the community it relates to is an important step towards a sound management project.

Development options might be more complicated when planners and architects have to intervene within an historic urban context. Urban cultural heritage is the physical representation of a community identity that demands to be passed on to others. Preserving the environment for future generations is one of the key concepts of sustainability, which refers to the need for *intergenerational equity*. This call for conservation is extended to the built environment, though the nature of cities dynamics implies that we have to make trade offs between conservation and development issues. Therefore, preserving our built heritage means managing it for the benefit of current and future generations. In order to manage, we need to assess the relevance of the urban heritage we are dealing with.

In case of urban rehabilitation, the chances to touch somewhere an asset with a socio-cultural value is very high, and therefore, the question emerges which types of evaluation instruments are available. In the history of evaluation a wide variety of different methods has been developed, such as social cost-benefit analysis, planning balance sheet analysis, community impact assessment, multicriteria analysis, participatory group decision analysis, shadow project evaluation, and so forth. There is not a single best method, as the valuation of non-traded goods cannot be solved in a straightforward manner. Nonetheless, the above mentioned valuation methods seem more rooted into social participation, which is a necessary component of any urban sustainable development alternative. In particular, survey based methods, such as contingent valuation and conjoint choice experiments, have the advantage to convey a monetary measure, which might help decision makers in assessing alternative options.

Valuation of urban cultural heritage sites may be performed in different ways. If the aim of the assessment exercise is to ascertain how the relevant population perceive the benefits of a transformation, then the understanding of the good characteristics, the relevant status quo and the policy implications of the rehabilitation project seem to be essential.

In general, we could say that whatever the used valuation technique, the research work needs to tackle the following issues:

- Good presentation. Given the complex nature of cultural goods, the correct specification (and graphic representation for survey-based methods) of the major characteristics of the good is of foremost importance.
- Policy implications. A clear statement of the policy implications of the valuation exercise needs to be made at the start, or provided to the interviewees in the case of survey-based methods.
- Alternatives definition. It is crucial to achieve simple and effective descriptions of the possible future scenarios, limiting the aim of the study to specific realistic and manageable questions. This will help downsizing the number of alternatives to consider.

The results will likely vary according to the aim of the valuation exercise. Values that people attach to different cultural assets and their rehabilitation will depend on local situations. The more the research aim is focused, the higher the degree of confidence of the results and their validity in the public arena. This attitude responds to the acknowledgment of the subsidiarity principle. Indeed, cultural heritage values are highly site- and good-specific.

Conservation and development: transforming the historic setting

In this paper we report the results from a case study where we elicit monetary expressions of public preferences for alternative land uses in a world heritage site: the city of Venice. The issues of conservation and development are here present at their highest. Therefore, the need of assessing regeneration projects becomes paramount.

For our study, we wanted to concentrate on a “city of art,” where the relationship between cultural heritage resources management and city development is more critical. Venice was an obvious choice for the national and international relevance of its heritage. The Arsenale is one of the few places in Venice that has the potential for a real transformation of its uses, with important impacts on both residents and visitors. Moreover, the Arsenale plays a strong symbolic role: it was the place where the strength and power of the Serenissima was built. The City Council of Venice has recently deliberated that the Arsenale is an inalienable heritage of the city of Venice.

In recent years, the importance of the Arsenale has resulted in a heated debate on its possible new uses. Many architectural proposals have been submitted through international competitions. These proposals—whether submitted in the past or currently under consideration—have shown that there may be a conflict between different possible land uses and the transformation allowed by the existing architectural structures.

We surveyed individuals in Venice asking respondents to engage in conjoint choice tasks, gathering 168 usable observations. Members of the general public were intercepted at the Multimedia Library at Palazzo Querini Stampalia/FEEM and asked to indicate which choice they preferred among *hypothetical*—but realistic—redevelopment projects of the Arsenale historic site. Each project was described by a vector of attributes, such as land use, use of basins and waterways, architectural features, access, employment implied by the reuse, and cost. The responses to these choice tasks was used to infer the rate at which respondents trade off land uses, aesthetic features, and costs, and hence to derive the value of marginal changes in the attributes, and the value of a proposed policy package.

The Venice Arsenale is owned by the Italian government and is currently used by the Italian Navy. The Arsenale site accounts for about 15 percent of the area of the city of Venice (about 45 hectares), and is located in the Castello district. Tradition has it that doge Ordefalo Falier founded the Arsenale—a shipbuilding yard—in 1104. In 1340 the “Darsena Nuova” was created, which marked the birth of the Arsenal Nuovo and of the Corderie building. Further expansion started in 1473, covering an area of 26 hectares. This phase lasted more than 100 years, resulting in the construction of the New Corderie

building, among others, in 1591. In its heyday, the Arsenale employed roughly 20,000 workers in an assembly-line fashion and produced one ship a day.

The Arsenale, after the navy largely withdrew from the complex over 40 years ago, suffered from abandonment and under use. The Arsenale is, therefore, one of the few places in Venice that has the potential for a real transformation of its uses.

In this paper we investigate how the development of the Arsenale site, involving alternative land uses, may influence the welfare of the residents of the historical city center of Venice.

Starting from the evidence of our survey in Venice, the paper broadens its scope to discuss ways of improving the management of cultural heritage cities, focusing on new forms of involvement and public participation based on public preferences' elicitation. We debate the issues related to city governance and the need for an appropriate level of democratic participation. An *integrated approach*, capable of bridging the practice of economic valuation, urban design, conservation of the built environment, and decision-making support systems is here analyzed. The paper is structured as follows: first we discuss the potential of conjoint choice experiments to attach monetary values to alternative land uses, i.e. alternative masterplans, then we report on how we developed the study, its questionnaire and the econometric analysis, finally we discuss the results' policy implications.

2. Land uses and non market valuation methods

Conjoint Choice Experiments

Conjoint analysis is a survey-based technique frequently used to elicit preferences and place a value on a good. It is a stated-preference method, in the sense that it asks individuals what they would do under hypothetical circumstances, rather than observing actual behaviors on marketplaces.

In a typical conjoint analysis survey, respondents are shown alternative variants of a good described by a number of attributes, and are asked to rank the various alternatives, rate them or choose the most preferred (Hanley et al., 2001). The alternatives differ from one another in the levels taken by two or more of the attributes.

In this study, we use *conjoint choice* questions, where we show respondents a set of alternative representations of a good—transformations of the Arsenale—and ask them to pick their most preferred. Through appropriate statistical modeling of the responses to the choice questions, it is possible to estimate the marginal value of the attributes. In addition, if the “do nothing” or status quo option is included in the choice set, it is possible to estimate the full value (the willingness to pay, or WTP) of any alternative of interest.

The conjoint choice approach has the advantage of simulating real market situations, where consumers face two or more goods characterized by similar attributes, but different levels of these attributes, and must choose whether they would buy one of the goods or none of them. Another advantage is that the choice tasks do not require as much effort by the respondent as in rating or ranking alternatives.

Conjoint choice experiments were initially developed by Louviere and Hensher (1982) and Louviere and Woodworth (1983). Louviere and Hensher (1982) apply the technique to forecast the choice of attendance at various types of international exhibitions. Conjoint choice experiments have been widely used to value environmental and natural resources, decisions in the allocation of scarce health care resources (San Miguel et al., 2000), and to measure workers' tradeoffs between pay and workplace risks (Gegax and Stanley, 1997).

Our prior experience suggests that conjoint choice experiments are well suited to study preferences for land use. In Alberini et al. (2003a), we explore the potential of conjoint choice questions for urban planning decisions by eliciting people's preferences for regeneration projects that change the aesthetic and use character of specified urban sites. In Alberini et al. (2003b), we apply conjoint choice experiments to examine the response of real estate developers to different market-based mechanisms and other incentives intended to promote the environmental remediation and reuse of brownfields.¹ Katoshevski and Timmermans (2001) use conjoint choice experiments to elicit the preferences of recent immigrants to Israel for housing and settlement types, while Oppewal and Timmermans (1999) ask respondents to rate various shopping center designs and management attributes.^{2 3}

¹ Brownfields are real estate properties—usually, prior industrial or commercial sites—where actual or perceived contamination complicates expansion or redevelopment.

² Contingent valuation, another stated-preference method, is also sometimes used to value cultural resources (Cuccia and Signorello, 2000; Chambers et al., 1998; Morey and Greer-Rossman, 2003; Pollicino and Maddison, 2001; Whitehead and Finney, 2003; Sanz et al., 2003). Noonan (2003) summarizes the empirical literature on contingent valuation of cultural monuments. He concludes that while most studies have poorly applied the contingent valuation methodology, the methodology, when rigorously applied to cultural goods, can produce important information for cultural good management policies. By contrast, Throsby (2003) argues against the use of contingent valuation, which, he feels, provides an incomplete view of the non-market value of cultural goods. He argues that cultural value is multi-dimensional, unstable, contested, lacks a common unit of account, and may contain elements that cannot be easily expressed according to any quantitative or qualitative scale. These include aesthetic properties, their spiritual significance, their role as purveyors of symbolic meaning, their historic importance, their significance in influencing artistic trends, their authenticity, their integrity, their uniqueness, and so on. His suggestion is to look for alternatives to contingent valuation to solve the valuation problem. For example, he suggests to deconstruct the idea of cultural value into some components and to seek simple scales to represent judgements based on defined criteria. Finally, Epstein (2003) considers that cultural amenities are the kinds of things that government hopes to create or preserve, often with tax dollars, for which valuation *has to be done by non-market means if it is to be done at all*. At this point the reluctance to use contingent valuation comes at a far higher price than in ordinary disputes: either we use it or we do nothing at all.

³ Morey and Greer-Rossmann (2003) apply choice experiments and estimate random-coefficient logit models to investigate heterogeneity in the willingness to pay for the preservation of marble monuments of the US capital.

Construction of Conjoint Choice Questions

When developing a conjoint choice survey, the researcher must first select the attributes that define the good to be valued. The attributes should be selected on the basis of what the goal of the valuation exercise is, prior beliefs of the researcher, and evidence from focus groups.

Valuation requires that one of the attributes should be the “price” of the commodity or the cost to the respondent of the program delivering a change in the provision of a public good. It is also important to make sure that the provision mechanism, whether private or public, is acceptable to the respondent, and that the payment vehicle is realistic and compatible with the commodity to be valued.

Attributes can be quantitative, and expressed on a continuous scale, or qualitative. Examples of the former include the cost of a regeneration project to a resident (in euro) and the number of jobs created. Examples of the latter are the construction of new buildings, and the presence/absence of fast transportation links.

The next step in the development of the conjoint choice experimental design is the choice of the levels of the attributes. These should be selected so as to be reasonable and realistic. Failure to do so may result in the rejection of the scenario and/or the choice exercise on the part of the respondent. The number of possible levels and attributes is necessarily limited by the sample size planned for the study.

Our focus groups and initial survey development work suggested that the reuse transformations of the Arsenale are well captured by six attributes: land use, use of the water areas, quantity of new buildings, cost to the respondent, accessibility, and number of new jobs created.

3. The Venice Arsenal: A conjoint choice application to land use

3.1 Motivation and site choice

The purpose of this research project is two-fold: first, we wish to illustrate the use of stated preference techniques for placing a value on redevelopment and reuse alternatives for an underutilized site with high historical, cultural and architectural significance—the Venice Arsenal. Second, we wish to demonstrate how the views of residents can be compared with those of public officials and other stakeholders to inform the decision-making and the policy process.

The Arsenal site in Venice is well suited for experimenting with ways to attain these objectives. Regarding the first of our two goals, we wish to determine what attributes of reuse the general public finds most appealing. This determination is based on the development of a survey questionnaire based on conjoint choice experiments and its

administration to a sample of Venice residents to elicit their preferences for various aspects of reuse.

We demonstrate that individuals *are* capable and willing to trade off attributes describing land use, architectural features, aesthetic quality and local economic impacts of alternative redevelopment projects at the Arsenale. We believe that this shows that stated-preference approaches *can* be successfully used by policymakers and planners seeking the public's input into the decisionmaking process.

The Venice Arsenale is owned by the Italian government and is currently used by the Italian Navy. The Arsenale site accounts for about 15 percent of the area of the city of Venice (about 45 hectares), and is located in the Castello district. Tradition has it that doge Ordefalo Falier founded the Arsenale—a shipbuilding yard—in 1104. In 1340 the “Darsena Nuova” was created, which marked the birth of the Arsenale Nuovo and of the Corderie building. Further expansion started in 1473, covering an area of 26 hectares. This phase lasted more than 100 years, resulting in the construction of the New Corderie building, among others, in 1591. In its heyday, the Arsenale employed roughly 20,000 workers in an assembly-line fashion and produced one ship a day.

In 1797 the French took control of the complex. After 1814 the Arsenale was ceded to the Austrians and underwent significant restoration works (1825-1835). After the creation of the Italian kingdom, the Arsenale undertook an important relaunching phase, with more enlargements and improvements. The Arsenale started to decline after the World War I, and continued to decline at an even faster rate after World War II, when the buildings were progressively abandoned. In 1983 the Soprintendenza per i Beni Ambientali ed Architettonici of Venice started preservation works.

We chose to work with reuse projects for the Arsenale for four reasons. First, as previously mentioned, one of the purposes of this research is to explore the potential of stated preference methods for eliciting the public's preferences for new land uses, architectural features, aesthetic quality, and for the impact economic activity associated with redevelopment.

In principle, any “brownfield” (i.e., abandoned, potentially contaminated industrial property in need of redevelopment) area could have served this purpose, but we wanted to begin our investigation with a well-known site that has (i) a distinctive urban dimension, (ii) symbolic and historical value, (iii) distinctive architectural features, and (iv) an important role for the development strategies of the city (sustainable development).

Second, in this research we wish to concentrate on a “city of art,” where the relationship between cultural heritage resources and city development is often more endangered. Venice is an obvious choice for the national and international relevance of its heritage. The Arsenale is one of the few places in Venice that has the potential for a real transformation of its uses, with important impacts on both residents and visitors.

Third, the Arsenale plays a strong symbolic role: it was the place where the strength and power of the Serenissima was built. The City Council of Venice has recently deliberated that the Arsenale is an inalienable heritage of the city of Venice.

Finally, in recent years, the importance of the Arsenale has resulted in a heated debate on its possible new uses. Many architectural proposals have been submitted through international competitions. These proposals—whether submitted in the past or currently under consideration—have shown that there may be a conflict between different possible land uses and the transformation allowed by the existing architectural structures.

3.2 Questionnaire development

An important goal of the research is to place a value on the regeneration alternatives and on specific attributes of regeneration alternatives. Placing a monetary value on these alternatives is important when one wishes to subject a proposed regeneration program to a benefit-cost analysis.⁴ The value of the plan is the captured by how much income one is willing to give up to obtain the proposed regeneration project.

Usually, one can infer how much individuals value a good by observing the amount of this good that is exchanged on the market and its price. However, most public goods, such as environmental resources or cultural heritage sites, are typically *not* exchanged on regular markets, making it impossible to observe prices and quantities. To circumvent this problem, economists have resorted to special techniques for estimating the value of environmental quality changes.

One such technique is the method of contingent valuation, which directly asks individuals how much they are prepared to pay for specified changes in environmental quality.⁵ The willingness to pay (WTP) for the proposed change in environmental quality (or for obtaining a public good) is the amount of money that can be subtracted from a person's income at the higher level of environmental quality for him to keep his utility unchanged, and is the theoretically correct measure of the value individuals place on the change.

A variant of contingent valuation is conjoint choice, where people are asked to choose between hypothetical commodities described by attributes. This exercise requires people to make tradeoffs between attributes, one of which is typically the cost of the commodity to the respondent. Both contingent valuation and conjoint choice are stated preference methods, in that they rely on individuals reporting what they say they would do under hypothetical circumstances.

⁴ A benefit-cost analysis is a technique used to assess public policies and projects. The goal of a benefit-cost analysis is to see whether the resources invested in the policy or project are worth the gains to society. Although cost-benefit analysis does not substitute for political decisionmaking, it can be an important input into that process.

⁵ See Mitchell and Carson (1989) for a comprehensive survey of the theory and practice of contingent valuation.

Conjoint choice experiments ask respondents to indicate which is the most preferred out of K (hypothetical) alternatives. Each alternative is described by a combination of attributes, allowing researchers to infer what tradeoffs respondents are prepared to make between attributes. In our conjoint choice experiments, the alternatives are projects for the regeneration and reuse of the Arsenale site. Each project is described by a set of attributes, including

- Land Use (e.g., housing, shipbuilding; museums and/or other cultural services, etc.);
- Use of the water areas (basins and waterways);
- Architectural aspects (new buildings in the northeastern part of the Arsenale, the only area where the law allows new construction);
- Other aspects of sustainable economic development and urban regeneration (number of jobs, transportation connections to the mainland and other parts of the city); and
- Cost to the respondent.

Including the cost to the respondent allows the researcher to calculate the marginal value of each attribute and the willingness to pay for a specified alternative (combination of attribute levels).

Since the beginning of the project, we deemed the use of conjoint choice questions preferable to a contingent valuation exercise. This is because conjoint choice allows one to compare many reuse alternatives within the same study, which befits the current debate over the Arsenale. Our survey was self-administered using the computer by a sample of users of the Multimedia Library, most of whom are also Venice residents.

The Choice of the Attributes

One of the most critical moments in a conjoint choice exercise is the definition of the alternatives that respondents will examine in the survey. In developing a conjoint choice survey, the researcher must select the attributes and the level of the attributes that define the good to be valued. The attributes should be selected on the basis of what the goal of the valuation exercise is, prior beliefs of the researcher, and evidence from focus groups.

The complexity of the good we were interested in—the reuse of a partially abandoned area in the historical city center of Venice and its impacts on the local economy and on residents—forced us to spend much effort in defining the hypothetical scenarios.

We started by gathering the blueprints for the reuse of the Arsenale—both published and unpublished—created in the last forty years. Next, during the months of June-August 2002, we talked to the experts representing the stakeholders involved in the area. These were (i) the Italian Navy (Marina Militare), (ii) the local Castello area committee (Consiglio di Quartiere di Castello), (iii) the City of Venice, (iv) Arsenale di Venezia SpA, a public development corporation created by the City of Venice and the Agency of

the State Property Office, (v) the Soprintendenza per i beni artistici e storici di Venezia, the public agency that promotes and preserve the cultural monuments of Venice, (vi) the Biennale, (vii) the National Research Council (CNR), (viii) the Faculty of Architecture of the University of Venice, (ix) Thetis SpA, a private research institute that has its headquarters at the Arsenale, (x) Remiera Francescana, a rowing club, and (xi) Palomar, a shipbuilding company. These stakeholders presented their different views on the reuse of the Arsenale, which we compared with the blueprints.

The next step was to take a hypothetical project and disassemble it into attributes and levels. This was perhaps the most difficult aspect of our research project. We drafted a list of possible attributes that might describe a project, such as the proposed land use, the cost of the project, the presence/absence of new buildings, the architectural style of the new buildings (if any), the number of jobs created, the presence/absence of transportation links with other parts of the city of Venice and the mainland. We investigated the appropriateness of these attributes in focus groups, paying special attention to whether new ones should have been added or substituted for others in this first list. We conducted a total of 11 focus groups between October 2002 and March 2003.

Attribute levels

Focus group participants consistently identified land use as one of the most important attributes of a regeneration project. To form the land use “levels” we first divided the Arsenale into five areas, as shown in Figure 1, and then created four combinations of the following uses: hotels, housing, shipbuilding, museums and other cultural activities, research institutes/labs, and offices.

As shown in table 1, land use 1 is comprised of shipbuilding, research, housing, offices, and museums. Land use 2 is comprised of housing, research, housing, and two museum sections. Land use 3 is comprised of hotels, museums, housing, research, and museums again. Finally, Land use 4 is comprised of shipbuilding activities, research, housing, research again, and museums. Figure 1 depicts land use 1, where shipbuilding is located in the Northeast Arsenale. We arrived at this division into five areas and allocation of activities to each area after taking into account the current uses of the Arsenale, the current debate among the stakeholders, and the opinions of the focus groups participants. (We therefore ruled out sport centers, marinas for large yachts, and shopping malls because they are excluded from the current debate or because evidence from focus groups suggests that residents are opposed to them.)

Figure 1.



Table 1. Attributes and attribute levels.

Attribute	Level 1	Level 2	Level 3	Level 4
Land use (4 levels)	Shipbuilding (in the Northeast), research, housing, offices, museum	Housing (in the Northeast), research, housing, museum, museum	Hotels (in the Northeast), museum, housing, research, museum	Shipbuilding (in the Northeast), research, housing, research, museum
Use of the water areas (2 levels)	No new moorings	200 new moorings		
New buildings in the Northeast portion of the Arsenale (2 levels)	No new buildings	Presence of new buildings on the 25% of the allowable area		
Access (fast transportation links with other areas of Venice, the airport, the mainland, other islands) (2 levels)	Available	Not available		
Number of new jobs created (3 levels)	150	250	350	
Cost to the respondent (4 levels)	25	50	100	150

Visual Representation of the Attributes

From the beginning of this research project we felt that it was crucial to present respondents with a graphical depiction of the hypothetical transformations of the Arsenale. Accordingly, we used focus groups to experiment with and pre-test visual renditions of the Arsenale and of its transformations. Participants recognized the importance of maps with describing the history and the current land use of the site, the location of buildings and underused areas, and the state of conservation of the buildings. Maps and 3D renditions depicting the status quo and the hypothetical transformations were included in the final questionnaire.

3.3 Survey Results

Survey participants were recruited among the active members of the Querini-Stampalia/FEEM Multimedia Library. The survey questionnaire was installed on three computers and the computer interviews were self-administered by the respondents on July 12-31, 2004.

In sum, a total of 199 respondents started the survey, and 168 completed it. Respondents took an average of 29 minutes to complete the survey, with a few respondents taking only 3 minutes, and one respondent taking 284. Our software was specially programmed to keep a track of the respondent's use of the 3D renditions. To our surprise, however, we found that about 56% of the respondent never clicked the button to view these figures, nor checked back the current land use at the Arsenale when answering the choice questions.

Because our sample was recruited from the users of the Querini-Stampalia/FEEM Multimedia Library, we cannot claim that it is representative of the population of Venice. Our first order of business is, therefore, to examine the characteristics of our respondents.

Descriptive statistics of our respondents are displayed in tables 2 and 3. About 55 percent of our respondents are males, and the average age is 32 years. The oldest person in our sample is 77 years old. Household income is on average 30,286 euro a year, and median income is 30,000 euro a year. Roughly 10 percent of our respondents are married, and the average household size is 3.5 people. Over 42 percent of them are students, whereas 39 percent are gainfully employed, 12 percent are currently looking for a job, about 5 percent have retired from the workforce, and homeowners account for the remaining 0.6 percent. Our sample is very highly educated: about 45% of our respondents has received a university degree (*laurea*).⁶

Our respondents are dedicated to social and civic issues, and to culture: While less than 15% of our respondents belongs to a civic association, over one-third belongs to an environmental organization, and over 90 percent reports having been to a museum or art exhibit over the last year.

The vast majority of our respondents (89%) live in Venice (table 2). Over 45% of them have been Venice residents for 15 years or more, and about two-thirds have lived in Venice for 6 years or more (Figure 3). Over 30% of our Venice-based respondents live in Castello, the *sestiere* where the Arsenale is located, as shown in Figure 4.

⁶ Official statistics are not available for the city of Venice, but comparison with the adult population of the Veneto Region shows that our sample is much more highly educated than the population at large. In the Veneto region, for example, about 6 percent of the adult males and 5 percent of the adult females has a university degree. Comparisons with the official statistics for the Province of Venice suggests that our sample is younger than the population at large (the average age in our sample is 32 years, that in the population at large 42. We do have local statistics about income, but household income in our sample is larger than, for example, that of the Italian population at large.

Regarding the Arsenale, about 77% of our respondents have visited it at some time (table 4), but 57% report that their knowledge of it is only poor or fair at best (figure 5). Only about 2.5% of the sample claim to have an excellent level of knowledge of the Arsenale. This confirms that it was important to describe its history, state of conservation, current owners/leasers and uses, as we do in our survey.

Table 2. Individual Characteristics of the Respondents (categorical variables).

Percentage of the sample who:	
Is a resident of the city of Venice	89.29
Has visited the Arsenale	77.38
Is a male	55.42
Is married	10.24
Is gainfully employed	39.29
Is currently looking for a job	11.90
Is a student	42.26
Is a homemaker	0.60
Is a retiree	4.76
Has a college degree	45.24
Owns a boat	22.29
Has gone to the theater at least once in the last 12 months	70.48
Belongs to an Environmental Organization	36.75
Belongs to a Civic Association	14.45
Has visited a museum or art exhibit over the last 12 months	92.77

Table 3. Individual Characteristics of the Respondents (continuous variables).

	mean	Std. deviation	minimum	Maximum
Age	31.60	12.29	16	77
Household income	30286.14	24050.79	7500	100000
Years of schooling	15.81	2.96	5	21
Household size	3.49	2.45	1	6

Table 4. Respondent Opinion about Aspects of Living in Venice. Percentage of respondents providing each response category.

Aspect	1=Not Important	2	3	4	5=Very Important
High Tide	10.71	16.07	19.64	18.45	35.12
Tourists	5.36	7.14	19.64	27.98	39.88
Cost and availability of housing	1.79	1.19	6.55	12.50	77.98
Availability of jobs	7.14	5.36	14.29	19.64	53.57
Mooring spaces for boats	29.76	20.83	24.40	17.86	7.14
Sport facilities	8.93	11.31	22.62	29.17	27.98
Supermarkets	6.55	6.55	18.45	27.38	41.07
Transportation	2.98	4.17	16.07	23.81	52.98
Waste collection	1.79	5.95	12.50	20.24	59.52
Quality of life	1.19	1.19	7.74	17.86	72.02

Children playgrounds	16.67	11.90	20.83	19.64	30.95
Public open spaces	8.33	10.71	16.67	23.21	41.07

We present the frequencies of the responses to the choice questions in table 5. One clear pattern emerges from this table: Respondents are not opposed to regeneration projects for the Arsenale, as is implied by the fact that only about 12-16% of the choice responses are in favor of keeping the Arsenale as it is.

Table 5 also indicates a slight preference for the regeneration project appearing on the left of the screen (A in choice question 1, C in choice question 2, etc.), a result that we attribute to the specific combinations of attribute levels contained in those projects.

Table 5. Responses to the Project Choice Questions.

Choice question	Percent of the sample who...		
	Choose A	Choose B	Choose the status quo
1	40.96	46.98	12.05
2	53.01	30.72	16.26
3	50.60	33.73	15.66
4	43.97	43.37	12.65

As shown in table 6, when we queried them about the reasons for their answers to the choice questions, 45% of the respondents told us that they traded off all of the attributes of the alternatives against one another, while 35% paid special attention to one. About 6.6 percent indicated that they only considered the graphical representation of the regeneration projects, and only 3 percent stated that they are opposed to any transformation of the Arsenale. This is consistent with our earlier conclusion that most people are not opposed to transformations of this site. Those persons who said that there were opposed to any transformations of the Arsenale systematically selected the “status quo” response options for all choice questions. For all practical purposes, these individuals are not participating in the choice “game” and are therefore excluded from the sample we use to fit our statistical models of the responses.

Table 6. Reasons for the Choice among Projects.

Reason	Relative frequency
All attributes of the alternatives	45.18
Primarily one attribute of the projects	35.54
Only the graphical rendition	6.63
Only the cost	1.81
I chose at random	3.61
I am opposed to any transformation of the Arsenale	3.01
Other	4.22

We also checked whether some respondents select the option on the left, the option on the right, or the status quo as their answers to all choice questions. We found 24 individuals out of 168 (14.28%) who picked the option on the left in all choice questions, 8 who picked the option on the right in all choice questions, and 11 who picked the status quo in all four choice questions.

Table 7. Responses to the Debriefing questions. Number of Valid Observations: 166.

Question	Percentage of “yes” responses
Do you think you understood the attributes of the projects?	90.48
Were the visual aids clear?	87.50
Was the language clear?	91.07

As shown in table 7, people generally felt that they understood the attributes of the regeneration projects, and found the visuals and the language of the questionnaire clear.

Model specifications

In these pages we show the dataset econometric analysis, presenting 4 different model specifications. Specification (A) displays the results of a conditional logit model of the responses that includes a status-quo-specific intercept. This coefficient is negative and strongly significant, implying that individuals choose the status quo (keeping the Arsenale as it is now at no extra cost to the taxpayers) much less frequently than the other alternatives. Our respondents are, therefore, willing to incur costs for the regeneration of the Arsenale.⁷

In specification (B), we add variables measuring the number of mooring spaces, the presence/absence of new construction, transportation links, the number of new jobs, and the tax. The regressors in our conditional logit models are, therefore, a mix of continuous variables and dummy indicators.⁸ We do not yet control for the type of land use proposed by each regeneration alternative. In spite of this, the likelihood function shows that the fit of the model increases greatly when these variables are added, implying that the respondents’ choices do depend on these attributes in predictable ways.

⁷ It should be kept in mind that we had to subject our sample to a considerable amount of cleaning prior to running our conditional logit regressions. Of the 168 observations, we deleted those contributed by people who take less than 5 minutes or more than two hours and a half to take the survey (9 persons); those contributed by people that always chose the alternative on the left (24 persons) or always chose the alternative on the right (8 persons); those by persons that always chose the status quo (11 persons); those by persons who stated that randomly selected the alternatives during the conjoint choice questions (6 persons); those by subjects who stated that the members of their family are more than 10 (3 persons); and those by respondents who stated they did not understand the characteristics of the scenario (2 persons). In the end, our cleaned sample was comprised of 118 respondents (some respondents failed more than one of our check tests).

⁸ We prefer the use of dummies to the “effects” coding sometimes used in the conjoint choice literature, where a qualitative attribute with two possible levels, such as the presence/absence of fast transportation links, would be coded as -1 (absence) and +1 (presence).

In this run, the coefficient on the tax is negative and significant, and that on the number of jobs created is positive and significant, as expected. The availability of mooring spots for residents is positively associated with the likelihood of choosing one alternative over another, but this effect is significant only at the 10% level. Fast transportation links are valued by our respondents, whereas the presence or absence of new construction does not influence choices.

Do people respond to land use when choosing among alternatives? We report the results of two model specifications meant to answer this question, (C) and (D). In specification (C), we include dummies for the four types of land-use configurations, and drop the status quo dummy. The coefficients on the land use dummies are relatively large, but only one—that on LANDUSE3—is individually statistically significant (at the 10% level)—and negative. The others are positive and their *t* statistics suggest that they are insignificant. In spite of this, a likelihood ratio test of the null hypothesis that these four coefficients are all equal to zero rejects the null soundly.⁹ The coefficients on the other attributes retain the sign and significance as in run (B). The only exception is the coefficient on the new construction variable, which is now significant at the 5% level.

Specification (D) is—as shown by the value of the log likelihood function—observationally equivalent to specification (C), but land use is captured by two dummy variables (SHIPBUILDING and HOUSING) that describe the use of the Northeast Arsenale, plus two continuous variables measuring the percentage of the Arsenale area slated for museums and research, respectively. The coefficient on the HOUSING dummy is positive and significant, and that on SHIPBUILDING is positive but insignificant. Since the status quo is coded by setting all attributes to zero, these results imply that people strongly prefer housing projects over hotels in the Northeast Arsenale, and weakly prefer shipbuilding in that portion of the site over hotels.

How important is land use, once one controls for the other attributes of the regeneration plan? To get a sense of the appeal of the land use options, consider two projects, A and B, that are identical in every other aspect. Specifically, they both have no moorings, both have new buildings and fast transportation links, 250 new jobs, and cost €50. Further assume that the only difference between A and B is in the land use: A entails land use 2, while B entails land use 3. The conditional logit model of specification (C) predicts that the likelihood of choosing the status quo is 0.092, whereas the likelihood of choosing A is 0.752 and that of choosing B is 0.155.

If project B were to entail land use 1, the probability of choosing the status quo is 0.066, that of choosing A is 0.536 and that of choosing B is 0.398. In other words, the likelihood of choosing B has doubled when land use 3 is replaced by land use 1.

Using the results of specification (C), we can calculate the marginal values of the attributes. To an individual respondent, the marginal value of the presence of mooring

⁹ The likelihood ratio test compares the value of the log likelihood function for specification (C) with the log likelihood function for specification (B).

spaces is €40.61, new buildings in the northeast Arsenale is €44.24, fast transportation links are worth €131.20, and each new job is worth €0.46.

Individual respondents are willing to pay €351.36 for the alternative A described above, which has housing with new construction and fast transportation links, no mooring spaces, and implies 250 new jobs. Replacing land use 2 (housing development) with land use 1 implies a willingness to pay of €316.12, but individuals would be willing to pay only €163.60 for land use 3 (hotel development).

Table 8. Conditional logit model of the responses to the choice questions.

	Specification A		Specification B		Specification C		Specification D	
	coeff	t -stat	coeff	t -stat	coeff	t -stat	coeff	t -stat
STATUSQUO	-1.4398	-9.623	-0.7312	-1.879				
MOORINGS			0.3047	1.913	0.34114	2.066	0.3411	2.066
NEW_CONS			-0.0896	-0.585	0.3716	2.035	0.3716	2.035
CONNECTI			0.991	6.814	1.1021	7.062	1.1021	7.062
JOBS			0.0023	2.150	0.0039	2.297	0.0039	2.297
TAXES			-0.0059	-3.006	-0.0084	-3.746	-0.0084	-3.746
LANDUSE1					0.2067	0.400		
LANDUSE2					0.5027	1.234		
LANDUSE3					-1.0745	-1.904		
LANDUSE4					0.6049	1.124		
SHIPBUILDING							0.5121	1.496
HOUSING							1.6551	4.267
MUSEUM AREA							-5.2938	-2.351
RESEARCH AREA							2.4887	2.244
log likelihood	-452.01		-421.97		-392.504		-392.504	

In table 9, we report the results of conditional logit models that include interactions between selected attributes and individual characteristics of the respondents. In specification 1, we test whether persons who judged tourism, housing, moorings and jobs important valued the land uses with hotels and housing and alternatives with mooring spaces and more jobs differently from other individuals. As shown in table 9, these expectations are indeed borne out in the data, in the sense that people who worry more about tourists dislike the option with hotels more than other people, while people for whom housing is important tended to attach a higher marginal value to land use with housing. This suggests that the responses to the choice questions are internally consistent.

Finally, in table 10 we report the results of models with random coefficients. We consider two specifications, both of which treat the coefficient on the tax as fixed (not as a random variable). In specification 1, the coefficients on the land use attributes are fixed, and those on the other attributes are random, while in specification 2 the roles of fixed and random coefficients are reversed. As shown in table 10, there is little evidence of random

coefficients. The only variable that show weak evidence of having a random coefficient is the dummy indicator capturing the presence or absence of new construction. In practice, this has virtually no effect on the marginal prices, on the willingness to pay for specified alternatives, and on the probabilities of selecting one option over another.

Table 9. Conditional logit model with interaction terms, 472 Obs, 118 respondents.

	Specification A1		Specification A2	
	coeff	t -stat	coeff	t -stat
<i>Land use</i>				
LANDUSE1	0.1674	0.31956		
LANDUSE2	0.125447	0.279296		
LANDUSE3	-0.84378	-1.44834		
LANDUSE4	0.571147	1.04822		
SHIPBUILDING			0.49268	1.42895
HOUSING			1.34975	3.21261
MUSEUM AREA			-5.53399	-2.43454
RESEARCH AREA			2.44979	2.19354
<i>Other attributes</i>				
MOORINGS	0.53348	2.66869	0.532415	2.67022
NEW_CONS	0.383708	2.08074	0.374878	2.03712
CONNECTI	1.12487	7.07544	1.12111	7.08427
JOBS	0.003416	1.90594	0.003455	1.93078
TAXES	-0.00882	-3.84228	-0.00882	-3.85101
<i>Interaction terms</i>				
LANDUSE3*(DUMMY IF TOURISM IS IMPORTANT)	-1.06786	-2.29473		
LANDUSE2*(DUMMY IF HOUSING IS IMPORTANT)	0.854738	2.04613		
MOORINGS*(DUMMY IF MOORINGS ARE NOT IMPORTANT)	-0.55355	-1.83945	-0.54273	-1.81495
JOBS*(DUMMY IF JOBS IS IMPORTANT)	0.001717	1.75632	0.001704	1.74861
HOUSING*(DUMMY IF HOUSING IS IMPORTANT)			0.841492	2.01835
LogLikelihood	-384.7883		-387.6425	

Table 10. Random coefficient models of choice among projects. 472 Obs, 118 respondents.

	Specification 1		Specification 2	
	Coeff.	t-stat	Coeff.	t-stat
<i>Land use</i>				
LANDUSE1	0.690285	0.666722	0.018229	0.029468
LANDUSE2	1.14443	1.06326	0.376248	0.785408
LANDUSE3	-0.95541	-0.97767	-1.47594	-1.81559
LANDUSE4	1.35163	1.12798	0.478539	0.778853
<i>Other attributes</i>				
MOORINGS	0.615529	1.67514	0.421863	1.93892
NEW_CONS	0.488797	1.5965	0.410441	1.93047
CONNECTI	1.74972	2.79647	1.2491	4.73226
JOBS	0.006413	1.97906	0.004834	2.15477
TAXES	-0.01216	-2.62064	-0.00944	-3.27832

<i>Standard deviations of random coefficients</i>				
MOORINGS	1.74384	1.51092		
NEW_CO	1.95696	1.83556		
CONNEC	1.39562	1.21987		
JOBS	0.005623	1.19682		
LANDUSE1			0.820132	1.28658
LANDUSE2			0.820132	1.28658
LANDUSE3			0.820132	1.28658
LANDUSE4			0.820132	1.28658
log likelihood	-389.641		-392.161	

4. Discussion

The above results points towards the following six findings:

1. Residents are generally not opposed to regeneration projects and new uses for the Arsenale. When faced with the choice between the Arsenale as it is now and hypothetical regeneration project carefully described to them in the survey, people choose reuse projects in over 85% of the cases.
2. However, people will *not* accept *any* transformation of the Arsenale. On the contrary, they have well-defined preferences for reuse. For example, they like the project that supplies housing for residents, while they are much less favorable to hotels and to dedicating buildings to office space.
3. People paid attention to the use of the water space within the Arsenale, preferring alternatives that provide mooring spaces for residents, even though when queried separately about mooring spaces, they do not seem to find them particularly important. Adding 200 mooring spaces to the transformation alternative is worth €44.
4. We did not have any prior expectations for people's appreciation of fast transportation links with the mainland, the airport, other parts of Venice and islands of the Lagoon. We reasoned that while some people may be pleased about faster connections, others may be afraid of the possible inflow of tourists and of the disruption of the character of Castello, the *sestiere* where the Arsenale is located. The empirical evidence is that people *do* value fast transportation links. The marginal value of the presence of fast transportation is €131.
5. Fifth, as expected people regard job creation as very important, and behave in a manner consistent with the economic paradigm, in that their likelihood of favoring a regeneration projects declines with the cost of the project.
6. Sixth, responses are internally consistent. People that indicated to us that they were concerned about the impact of tourists on the quality of life in Venice, and persons who find that housing problems are important in Venice, value land use options with hotels and housing less and more, respectively, than other respondents. We also explored models with

unobserved heterogeneity that does not depend in predictable ways on individual characteristics like age, education, income, and professional status, but found very little evidence of any.

These results are encouraging from a valuation point of view. Overall, people seem to understand the potential economic benefits that new land uses can bring to the city of Venice, and are very keen in maximizing them. In a city of art, where any urban strategy needs to balance residents and tourists perspectives and potential benefits, and where large number of tourists can cause all the negative consequences of congestion, from a social, physical and environmental point of view, residents seem to appreciate the role played by tourism in the city economic growth, but fight for their own priorities. Houses, and better use of water space, and increased number of jobs are among the most important impacts that a regeneration project should account for.

5. Concluding Remarks

This paper has focused on the potential that non-marked valuation methods, such as conjoint analysis, can have in supporting decision making for urban sustainable development. The results from the Venice Arsenal case study show that people are capable of making trade-offs when presented with land uses alternative, representing different masterplans. Respondents seem to grasp also complex prepositions, when careful attention is devoted to the way the good is presented. When dealing with urban regeneration projects, the good is usually given by the possible land uses' combination brought by the project, by its costs and its major benefits, for instance economic growth, expressed in our case by number of new jobs. Conjoint choice experiments seem to be very suited for this purpose.

Every decision made on the future of cities, needs to be participated, involving the relevant stakeholders. Planners, architects, economists, are among the experts that take part to the physical transformation of the built environment, choosing optimal land uses and valuing their possible economic impacts. These impacts are multidimensional, and involve to different extents different social segments. Valuation methods like community impact assessment, or planning balance sheet are very important in these cases, since they capture different dimensions and criteria. Nonetheless, aiming to achieve a monetary expression of the characteristics defining a masterplan alternative is something that, despite the limitation due to the oversimplification of complex phenomena, can be extremely important for decision makers, and conjoint analysis seem to tackle the problem.

Conjoint choice experiments, in the way they are structured, aim to define the major attributes of a choice and their levels, addressing the complexity issue more than other valuation techniques. This is why one of the most important phases of the research is the definition of the attributes describing the scenario. Many experts consider involving the public in such decision process the wrong way around. However, for a choice to be sustainable also from a social point of view, it is crucial that residents' point of views and

preferences are elicited and accounted for. New, more inclusive forms of governance have been debated in recent years, together with the need of collaborative planning. People need to be given the opportunity to express their opinion on the choices that matter for their welfare in a way that is also accountable for. To this extent, economic valuation methods that are so deeply rooted in social sciences techniques, such as conjoint choice experiments, give the opportunity to combine the need for valuation with the need to increase public participation.

So far little effort has been dedicated to explore the potential of this technique for the impact assessment of regeneration projects, and future applications should focus on the challenges posed to the technique by the complex nature of the scenario. Alternative land use options may be quite difficult to be grasped by lay people. Here the role of visual representation becomes essential. We tried to address the problem in the Arsenal study, but a lot more could be done under this aspect. Computer technology for sure can help in such instances, trying to visually convey a complex urban choice in a simple fashion.

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