Harbour Business Forum
海港商界論壇

Hong Kong Harbour:
An economic asset not fully realised

By Professor Bill Barron

April 2007

Realising the Economic Value of Hong Kong's Harbour

Executive Summary

The economic value (rather than the financial value) of Hong Kong's harbour is often undervalued and decisions made regarding its use and stewardship do not accurately reflect the true value it offers our community. Instead, the value of Hong Kong's harbour largely depends upon market revenues such as land prices or local jobs.

Hong Kong's harbour has many values associated with it. It provides for example:

- A resource for recreation, leisure and tourism
- Vital ecosystem services – such as climate regulation, air circulation, flood management and carbon storage
- Habitats for wildlife
- Commercial marine activity
- Commercial activity
- A symbolic global brand identity for Hong Kong

Some of these values are reflected in market transactions and are priced. These are the financial values. But financial values are only one part of total economic value.

Total economic value also includes values that are unpriced as they are intangible in nature and quantifying and measuring such unpriced values is often difficult and complex. The reason for this is, in part, because many of the important and quite real goods and services provided by natural assets such as the harbour cannot be precisely defined or accurately measured. Additionally, environmental values are not directly priced in markets so when there is damage to the harbour, e.g., pollution or its shrinkage through reclamation, there is no single measure of value to reflect the associated loss in environmental and social 'services'.

Environmental economists apply a number of techniques to value the environment. One technique involves tradeoffs, and in evaluating such tradeoffs a number of 'valuation' techniques are available, including direct costs, hedonic pricing and contingent valuation. To some this may seem inappropriate in that it puts a 'price tag' on nature. In fact, however, it is not the environment or nature itself which is being measured or valued, but rather the values or tradeoffs which people place on the 'services' offered by the environment.[1]

[1] CIWEM, p. 4., loc. cit.

The concept of unpriced value is expanded further in Professor Bill Barron's paper *Maximising the value of Hong Kong's harbour* (overleaf). From his study two things stand out. First, there is a lack of concern for the unpriced value of the harbour and decisions relating to the harbour tend to focus on the 'opportunity costs' in terms of commercial land sales (and their resulting revenues). From the standpoint of an 'economic' analysis total value for the harbour front is certainly not being optimised and when we consider only a subset of the full set of values, we are unlikely to maximise 'returns' from assets; man-made or natural. Second, we are making decisions about the harbour with little regard for how unpriced values change at the margin. 'Utility theory' (and indeed 'price theory') tells us that the 'value' of each unit of goods or service depends to a significant degree on how much or little we have of it.

At best there is a 'balance in expansion' or a 'balance' in terms of future development. In other words harbour front amenity spaces typically come in a package coupled with more roads, commercial property development, etc. Yet from a marginal value perspective, such a 'balance' for new development would only make sense if the existing split in land uses were not so heavily skewed toward priced values and away from unpriced ones.

An alternative form of contingent valuation is *willingness to pay*, which determines the amount an individual is willing to pay for goods or services. In support of this technique, HBF recently commissioned a contingent valuation study that examined how much people resident in Hong Kong were willing to pay for improved planning and development of the harbour beyond or outside the considerations of costs and revenues of specific development projects. This is the first time such a study has been undertaken in Hong Kong and the outcome provides a new and powerful view of the value of Hong Kong's harbour.

- Hong Kong's community values harbour improvements at HK$73 billion and HK$69 billion under two alternative scenarios
- Land values of alternative scenarios for the central reclamation range from HK$8.5 billion to HK$37.3 billion
- This study assists in understanding the trade-offs in harbour planning and development
- Wider policy implications suggest revisiting priorities for planning and development of the harbour

Such a high dollar value should provide evidence to Hong Kong's decision-makers that harbour planning and development is a priority and government revenue-generating land uses may not be the best solution for the harbour front.

了解香港海港的經濟價值

報告摘要

香港海港的經濟價值(並非財務價值)經常被低估，令有關其使用及管理職責的決定，不能準確反映海港爲社會帶來的真正價值。現是，香港衡量海港的價值，主要取決於爲市場創造多少收益，如地價和本地就業機會等。

香港的海港擁有很多重要的價值，功能包括：

- 文娛康樂、旅遊消閒的好去處
- 調節生態系統的重要服務，如調節氣候、空氣循環、洪水管理及碳儲量等。
- 爲野生生物提供天然棲息地
- 海洋商業活動
- 商業活動
- 國際知名的香港標誌

以上的價值，有些已反映在市場交易上，明碼實價；然而，這些財務價值僅是總經濟價值的一部份而已。

總經濟價值還包括一些尚未計算價值的標價，要估算這些無形價值通常都很困難，非常複雜，箇中原因有很多，其一是不少由海港等天然資產提供的真正貨品和服務，都是無法準確定義或衡量。除此之外， 環境價值亦難以透過市場機制直接定價。所以，當海港受到破壞，如海水污染，又或因填海而變得愈來愈小，便沒有任何方法可以計算出在環境及社會「服務」方面的損失。

環境經濟學家則應用多種不同的經濟學技巧來評估環境的價值，其中有一種涉及取捨的問題。在衡量取捨的代價時，可使用一系列的「估價」技巧， 包括直接成本法、享樂定價法以及條件價值法。當然，有些人會覺得，爲自然環境附上「價錢牌」的做法並不恰當。但事實上，需要量度或估值的，並非是環境或自然界本身之價值，而是自然環境向人類提供「服務」的價值或代價。[2]

在Bill Barron教授的研究文件《Maximising the value of Hong Kong's harbour》 (參閱背頁)，便對未標價的價值之概念進一步闡明。在他的研究中，有兩點最爲重要。第一，沒有人關心海港之未標價的價值，令有關海港發展的決策傾向注重「機會成本」 ，一切以商業用地銷售 (即賣地收入)爲依歸。從「經濟」角度分析，海旁一帶的總值肯定尚未最高，而由於我們只考慮整體價值的其中一環，因此無論從人工或天然資產，都沒法獲得最高的「回報」。第二，在決定海港的發展計劃時，我們甚少考慮未標價的價值之差額變化。「效用價值理論」 (其實是「價格理論」)告訴我們，每項貨品或服務的「價值」，在很大程度上視乎我們所擁有多少。

海港的未來發展，充其量只能說是「平衡擴展」或「平衡」。換言之，海旁一帶的休憩空間通常會有更多的道路及商業地產項目等。從邊際價值角度出發，只有在劃分土地用途時不會嚴重偏向已標價的價值，不再忽視未標價的價值，這種爲新發展項目制訂的「平衡」才有意義。

另一種可行的條件價值法，便是了解使用者的「支付意願」，從而推算出貨品或服務的價值。爲支持這種估價方法，海港商界論壇最近委託專家進行了一項條件價值評估研究，調查香港的海港在更完善的規劃發展下，香港市民願意付出多少來實踐有關構想，研究結果顯示市民對海港的取向非常重要，但當局卻沒有把這些意見計算在特定發展項目的成本和收入之內。這項有關香港海港的價值研究，開創本港先河，其結果更提出強有力的新觀點，證明海港具有獨特價值，不可替代。

[2] CIWEM, p. 4., loc. cit.

- 在兩種不同的情況下，市民心目中理想海港的價值分別爲730億元和690億元。
- 根據不同的發展方案，中區填海地的價值在85億元至373億元之間。
- 研究結果有助決策當局在規劃海港的發展時權衡取捨
- 更廣泛的政策含義意味著有需要重新審視海港規劃及發展的緩急次序

市民給予海港高的現金價值，爲香港決策當局提供有力的證據，不但證明海港規劃及發展工作是當務之急，而且政府亦不應只計算土地可帶來的收益作爲發展海旁用地的最佳方案。

Maximising the value of Hong Kong's harbour

By Professor Bill Barron

Biography

Bill Barron is an environmental economist who received his PhD in environmental economics from the John Hopkins University in 1980. In 1989, he joined the faculty of the Centre of Urban Planning Environmental Management at the Hong Kong University (HKU) to work on the Master of Environmental Management programme. In 2005, he left HKU and joined the staff of the Institute for the Environment of the Hong Kong University of Science and Technology (HKUST). His work has focused on environmental aspects of transport policy, urban planning, and energy use. He also works for the public policy think tank Civic Exchange, in both advisory (Board of Directors 2003-05) and research capacities.

While comments are made in this paper with respect to the author's views on how efficiently the harbour has been, and should in the future be managed, such comments are meant to be illustrative and not a comprehensive assessment. In-depth assessments of total economic value, adequately resourced and conducted in a fair and transparent manner should be carried out for all significant future harbour and harbour front development proposals.

Economics is not about <u>money</u>. It is about <u>value</u>

It is important to consider that economics is about the efficient use of resources so as to maximise <u>total</u> value. Being economically efficient in the context of the harbour requires taking into account unpriced, as well as priced, values so as to maximise *Total Economic Value*[3] of the harbour and the land surrounding it.

The value of some things is reflected in market prices. But not everything is bought and sold. For example, many people are better off (that is, they experience higher value) when they can periodically escape the high density, polluted and noisy urban setting of our city and go to the harbour front with its spectacular views, better air circulation, and cooler temperatures. This 'value added' occurs even if people do not spend money to obtain it.

In addition, a large body of water such as Hong Kong's harbour provides *for free* important environmental services by stimulating air circulation and moderating

[3] The term 'economic' here does not refer to monetised values <u>alone</u> but includes unpriced *values* as well.

temperatures. Sometimes these priced and unpriced values are combined when people willingly pay more for office space or a flat with a harbour view compared to one without such views. Yet, often these values may be outside what can be readily bought and sold and, sometimes they are even unappreciated until they are lost. For example, in Hong Kong we often hear complaints about the 'wall effect' that is created by tall buildings constructed near the harbour which block the breezes circling into areas which are not on the harbour front.

If we truly seek to maximise society's TOTAL ECONOMIC VALUE, WE CANNOT IGNORE UNPRICED VALUES. Likewise, if the harbour's environmental serves are degraded (for example though massive reclamation) then people will face higher *monetised* costs in the form of additional air conditioning requirements, and if cleansing winds are diminished or blocked by high rise buildings near the waterfront, we then pay more in health care due to the increase in pollution-related illnesses.

Economics and Finance are not the same

This raises an important point. Although people often use the terms 'economics' and 'finance' interchangeably, this is not correct.

> Finance deals only with monetised (priced values).
> Economics can, and should, be more encompassing by attempting to account for unpriced values as well as priced ones. Only by doing so can we hope to maximise TOTAL ECONOMIC VALUE.

Further, in a financial analysis, the prices as seen by buyers and sellers are taken as appropriate indicators of value and a financial analysis is conducted from the perspective of a particular entity which generally represents only a portion of society as a whole. That entity might be a person, a firm, or a government agency.

An economic analysis is much broader in two senses. First, it looks at a wider set of values than a financial analysis. Second, an economic analysis is conducted from the perspective of society as a whole, not a particular segment of it. While an economic analysis will include values expressed in market prices, an effort is made to cancel out the effects of taxes which artificially raise the price of certain things bought or sold, and subsidies which artificially lower prices as seen by buyers and sellers. Taxes and subsidies distort value, and so are removed from an economic analysis, though they are generally not removed from a financial analysis.

Value at the margin: for efficiency marginal valuation is key

One of the most important concepts from 'utility theory' of economic analysis is that the value of a unit of something depends to a significant extent on *how much* of it we have. Economists refer to this as value at the margin. Simply put when we have a little of something we want, we put a high value on getting an additional increment of it. Yet, when we have a lot of something we want, we tend not to value so highly obtaining a further increment of it.

> Thus, if we have a lot of item 'A' but relatively little of item 'B', we might quite willingly trade the option of getting, say, several more units of item 'A' , if instead we could get one more unit of 'B' . This concept of the value of each unit of something depending on how much or how little we have is crucial for assessing the efficiency of tradeoffs between priced and unpriced values.

It is simply common sense, as well as established economic principle, that in the allocation of newly available land – such land should be put to its highest valued use. For Victoria Harbour today consider how much of its waterfront and adjacent land are given over to roads, to logistics activities, and to specialised public facilities (e.g. wholesale markets, car parks and sports facilities) and how relatively little of it is open and accessible for general public use and enjoyment.

> What this means in the context of planning for the harbour front is that *when there is a severe imbalance* in current uses, *total value is likely to be increased by beginning to redress that imbalance.*
>
> In other words, when there are lots of roads, logistics activities and public infrastructure, etc., and little in the way of public amenity space, it is almost certainly inefficient to not *overweigh* amenity space in the allocation of the newly available space.

In light of this, the government should be actively seeking to redress the heavy imbalance between public amenity and other uses of the harbour front. Yet, at best we are being offered by government today a sort of 'BALANCE IN EXPANSION', i.e., some public amenity coupled with more roads, commercial property development, etc. Such a balance in expansion for new developments would only make economic sense if the existing overall split were not so out of balance.

When there are lots of roads, logistics activities and public infrastructure etc., and little in the way of public amenity space, it is inefficient to not consider amenity space in the allocation of the newly available space.

Why is this happening? Since government would not purposely seek to reduce public welfare, the only explanation would seem to lie in:

(1) The fact that amenity values are largely unpriced, and

(2) That the Hong Kong government takes a financial and not an economic perspective in its harbour front planning.

(3) The need for marginal valuation in deciding on uses for the harbour front is not highly regarded

WATERFRONT DESIGN FOR MAXIMUM TOTAL ECONOMIC VALUE

Tradeoffs between priced and unpriced values

From an *economic*, as distinct from *financial*, perspective,[4] we seek to develop (and in some cases refrain from developing) the harbour front in such a way that arguably maximises the combined priced and unpriced values. In principle this is straightforward enough. But how, in practice, can we compare, and hence assess, possible tradeoffs between priced and unpriced values?

One way to do this is to produce a variety of project designs, each with its own estimated monetised returns (in the form of net present values [NPVs[5]]) and a clearly identified set of unpriced impacts associated with each design. Let us say we have two possible designs for a project; 'X' and 'Y'. Let's further imagine that for design version 'X', the NPV of the discounted priced benefits and costs over the life of the project is HK$1 billion. However, design version X also has unpriced net benefits of '1a' and environmental costs of '3b'. So the *Total Economic Value* of design X is HK$1 billion **+** 1a **–** 3b. To illustrate, unpriced benefit 'a' might refer to a 50 meter tree-lined open space along the waterfront, while 'b' might refer to higher pollution levels and 3b might refer to especially severe increases.

Let us now look at the benefits and costs of project design version 'Y'. Let us say that it has an NPV of HK$800 million for the discounted sum of the priced benefits and costs. Thus, if design Y is selected instead of design X, we would lose (face a forgone benefit, or an 'opportunity cost') of HK$200 million in priced net benefits. However, let us say this design would yield unpriced benefits of 2a **-** 1b + 1c. Let us say that 'c' refers to a visual (and air circulation) corridor reaching inland for 300 meters from the harbour.

Hence the tradeoff decision becomes - are we as a society willing to forgo HK$200 million (i.e., a 20% loss) in priced benefits in order to gain one more waterfront park (a), one air circulation corridor (c) and have much reduced air pollution build up in the project area (down from level '3' to level '2' severity 1)?

> If the government proposes, and the public/legislators accept, design Y over design X, then society is implicitly saying that an additional waterfront open space of 50 meters, a visual and air circulation

[4] As noted an economics perspective is potentially much broader than a financial one. It includes not only values as reflected in prices as seen by buyers and sellers in markets, but also accounts for the distorting effects of taxes and subsidies. Further, in principle economic analysis, but not financial analysis can and should include unpriced values for which markets do not exist (e.g., the amenity value the accessible open space, the negative impacts of air pollution and noise when open space is bordered by busy roads, and *bequest value* of passing on a wide harbour to future generations).
[5] To understand how to calculate the NPV please refer to the glossary

> corridor reaching 300 meters inland and reduced air pollution in the project area are worth at least HK$200 million in lost priced benefits (or put another way, these unpriced benefits are worth enough to give up 20% of the project's net monetised returns).

In such a tradeoff assessment approach, we are not saying *specifically* what the additional waterfront open space site, the air/sight corridors and the project area pollution are worth. Rather, we are using the political process to determine whether they are valued at least as much as some particular monetised value (in our example HK$200 million).

> While a tradeoff assessment between priced project returns and unpriced ones does not yield a precise shadow price, it is often all that we need in order to make policy decisions that incorporate unpriced values.

It ultimately comes down to a decision within the political process whether the project designs which deliver 'y' additional unpriced benefits should be favoured over project designs which yield 'x' additional monetised returns.

> The Hong Kong government typically produces a number of project designs, but in general these are not done in such a way that potential tradeoffs between priced and unpriced (monetised versus non-monetised) values in choosing one project version over others are sufficiently clear to enable the above type of systematic tradeoff to be made. In effect, government planners alone get to decide which values are incorporated into any tradeoff assessment and how much weight they are given.

Imagine how harbour planning and decision making in Hong Kong would be different if unpriced values were a regular part of the assessment process, and the public participated more in the selection of the particular project designs?

The absence of such an approach may be seen in the recent case of how the contract for development of the old Marine Police Headquarters in Kowloon was awarded. If the public had been able to participate in the tradeoff valuation between the extra government revenue from the winning bid, compared to that from other bidders, against the higher environmental destruction associated with the winning bid, the outcome might well have been different. It is also possible, of course, that the incremental revenues to government from the winning bid might be viewed by the public as being so large that it was acceptable to lose the old growth greenery, especially if government promised to undertake remedial greenery enhancement

nearby as an offset for losses on site. We will never know because this particular price versus unpriced impact tradeoff assessment wasn't made explicit and wasn't something for which the public was allowed to express its view.

Unpriced versus Priced Value Tradeoffs Apply at Macro and Micro scale

A fuller and more transparent assessment of tradeoffs could encompass either the larger project design features (the macro scale), or the finer ones (the micro scale), or preferably both.

> For example, should there be a new surface level road along the new reclamation, and if so, what should it look like (e.g., in terms of width, traffic speeds, etc.)? Likewise, we could ask, 'are we willing to give up a certain amount of monetised return from land sales in order to provide not only more open space but open space less hemmed-in by nearby buildings?'

And the examples go on. Once the amount of commercial or residential building space on the site is agreed upon, for example, what are the design options for concentrating that amount of floor space? Might it be best to concentrate it in a few high rise buildings or would it better to spread it out? And what are resulting impacts of particular building layouts on the quantity and quality of the adjacent open space, air circulation etc?

Considering such tradeoffs in the abstract can be quite daunting for the non-professional. Yet, for an actual *specific* situation, in which the government and or other professionals have outlined the tradeoffs, clearly <u>is</u> something the average person could come to understand reasonably well and one for which he or she may want to have his or her say.

> While such public participation does tend to complicate matters for the government planners, it also allows the true 'clients' (those who will have to live with the result) to participate.

Tradeoff Assessment and Willingness to Pay

Limitations

The type of tradeoff assessment between priced and unpriced values outlined above differs considerably from Willingness to Pay (WTP) surveys and other forms of contingent valuation (CV). Both approaches have their limitations. Willingness to Pay (WTP) is fraught with methodological challenges and issues of validity with respect to the honesty and accuracy of the answers respondents provide, as well as, the matter of how seriously politicians and government bureaucrats take the results of a *hypothetical* and often very broadly defined statement of willingness to pay.

The tradeoff assessment is by its nature quite specific and it would be risky to generalise too far from a very particular set of circumstances. It also requires that the government defines and assesses alternative project designs with an eye to making the tradeoffs between priced and unpriced values as explicit and clear cut as possible.

The tradeoff assessment approach briefly outlined above might perhaps even be considered an alternative form of contingent valuation in which implicitly determined values are derived in a focused way rather than more generalised way, and indeed indicate only an implicit minimum or maximum threshold value.

The good news is that the two approaches are potentially complementary. Results from a willingness to pay survey might, for example, be used to help inform the political discussions about whether some particular unpriced value is indeed worth at least the value of the forgone priced benefits *in a particular case*.

Like contingent valuation, the tradeoff assessment approach is potentially quite broad and could encompass such things as *bequest value* (i.e., the idea that we wish to pass-on some particular natural feature to future generations) or *option value* (i.e., leaving open the potential to exploit some resource in the near or distant future, rather than foreclose that option by exploiting it today). Further, if we are able to come to a reasonable consensus on how such attributes as 'vibrancy' should be defined, in principle we could look for those harbour-impacting project designs which seem more likely to bring us a 'vibrant' waterfront. If such designs would result in reduced monetised value (i.e., in the form of a lower NPV), we could then decide if the benefit of greater long term 'vibrancy' in this particular case, is worth the loss in discounted monetised benefits.

> With the potential for many different types of unpriced values to be considered, along with difficulties quantifying (or perhaps even

> precisely defining) some of the values of concern, things could potentially get messy. Yet, the political process *is* generally messy and still we struggle to do the best we can within the available framework.
>
> We are hardly able to say that today we are doing the best we can within the existing framework with regard to taking due account of unpriced values when we decide to use the harbour and its frontage.

Instead, with little input from the public, only a few designs are proposed and, it seems, those design variations selected for the public are often skewed in such a way that one particular design stands out as apparently the only reasonable choice.[6] Rarely do the project variations released by government make clear the nature of the tradeoff between important unpriced benefits and costs, and the monetised returns as reflected in differences in the respective NPVs.

Moving forward

The best way to move forward would be to begin by identifying the types of unpriced values that are considered to be important enough to the community at large, and to various interest groups, that government will seek in future to consider them *explicitly* in assessments of harbour and harbour front decisions. To do this in a sufficiently comprehensive manner would, of course, require inputs from different sectors of the community. In light of this, what is put forward in the following figure is meant to be illustrative only. There are various ways in which the components of Total Economic Value might be categorised. One possible framework (and at least a partial listing of potentially relevant values) is shown overleaf.

[6] The situation could be remedied to some degree by putting out for public review and comment the briefs for consultants for harbour front projects prior to finalising the brief.

A Categorisation Scheme for Total Economic Value

PRICED BENEFITS & COSTS (AS SUMMARISED IN NPVS)

- Includes the discounted stream of the project's monetised inputs and outputs over evaluation period.
- Also includes the monetised value of willingness to pay for priced amenities (e.g. waterfront dining, office views).
- Could, in-principle, include shadow prices as developed through Willingness to Pay and other 'valuation' methods (e.g. direct costs)

UNPRICED BENEFITS AND COSTS

Near Term (primary focus here is on the present generation)

- Amenity value of waterfront open space for active/passive uses
- Includes consideration of design features affecting that value (e.g., noise, pollution, sight distances, shade, rain shelter, convenience of access)
- Preserving Cultural Heritage
- Might include retaining artefacts or simply noting what took place on or near the site and keeping that particular spot open
- Natural Environmental Services
- Effects of marine water on local climate (temperature, winds)
- Others?

Long term (primarily focused on future generations)

- *Bequest Value*
- The idea that we may wish to pass on some particular natural or manmade features of the harbour to future generations.
- *Option Value*
- Leaving open the potential to exploit some part of the harbour in the future, rather than foreclose that option by what we do today.
- Others? (e.g., no further reclamation to maximise the harbour's cooling effects in a warmer world)

TRADEOFF ASSESSMENT IN URBAN DESIGN

The type of tradeoffs assessment described above could also be applied to other types of values and design selection decisions. Consider, for example, the case of a proposed development project in which the NPV is highest under Design Version Alpha. In this version, office and retail floor space would be added onto a reclamation site in a few large blocks, with lease terms that tend to limit the types of uses to which the individual units within the block might be put. Further, let us assume that the waterfront development version is regarded by community groups as weak on the unpriced benefits such as accessibility, aesthetics, and diversified time-of-day activities.

Under an open and balanced assessment of a representative range of design options, Design Version Alpha should then be compared with other designs. For simplicity let us look only at a single design, Design Version Omega. In this version the total area of office and retail space is unchanged, but that space is spread out and offered in relatively small blocks with lease terms that allow considerable flexibility in use.[7] Design Version Omega could lead to an *evolving* district that in the daytime came to cater to nearby office workers and tourists, and at night focused on waterfront dining and entertainment for locals and tourists.

The monetised benefits in the form of the market transactions that are expected to take place under each particular design would presumably be captured in the NPV estimations. Yet under Design Omega there arguably are unpriced benefits in the form of a 'vibrant' life after office hours, instead of an otherwise largely deserted evening harbour front setting.[8] This type of 'vibrancy' could attract tourists, further adding directly (in monetised terms) and indirectly (in terms of enhanced image) to the city overall.

The tradeoff question then becomes: should we give up the difference in the NPV between Design Alpha and Omega[9] in an attempt to attain 'vibrancy'?

It is important to consider how best to consult the public in this type of tradeoff assessment. *If you don't ask the right questions you will not get the right answers.* In Hong Kong, the public evaluation process has not allowed us to properly frame the questions.

MACRO AND MICRO CONSIDERATIONS

It is important to consider a number of 'macro' and 'micro' design issues with regard to harbour front development.

Macro Design Considerations

Here, the most basic design consideration is the appropriate density of development. While high density is typical in Hong Kong, that fact can be used to argue that high

[7] There is also the matter of the regulatory setting. Potentially flexible leases might come too little, if stymied by inflexible regulatory regimes, as the case of al fresco dining in Hong Kong so clearly demonstrates.
[8] Some *but not all* of this difference in value would presumably become internalised in the value of rents paid.
[9] Each would presumably already reflect of the monetised impacts of increased tourism in the respective NPV calculations.

density is not appropriate for the harbour front.[10] What the harbour offers is, in part, a sense of spaciousness with expansive views. It would be unfortunate if such views were only available directly on or very near to the water itself and largely cut off otherwise by a wall of buildings, or as in the case of Island Eastern Corridor, by an elevated highway.

The next consideration with respect to density is how much of the site should be useable open space and whatever density is decided upon is then restricted to the built-up portion of the adjacent sites. For the open space, there might be a mix of areas with vegetation, walkways, and possibly outdoor sports pitches, along with commercial vendors catering to visitors.

In evaluating the options with regard to density and how the space is used, it would be useful for the planners, to at least informally, attempt to do the type of tradeoff assessment outlined above. In practical terms, all that may be needed for reasonably informed planning decisions is an awareness of the general magnitude of the unpriced impacts and the direction of changes in value as different design possibilities are considered. From this it may become clear that certain design modifications offer a good bargain (much gained in unpriced value for relatively little given up in priced value), while others offer a bad bargain and should be eliminated from further consideration as early as possible. Indeed, such a process of informal tradeoff assessments so that the set of design variations put forward to the public already incorporates as many good bargains as possible, is what we have every right to expect of government planners.

The next macro design consideration within the built-up area (if any)[11], is that of the appropriate balance of different types of infrastructure, such as buildings (for public or private use), roads, water pumping stations, air ventilation facilities or other 'plant'? For the government it may be temping to put as much public infrastructure near the harbour front as possible because government controls so much of the land. It may also be temping for government to maximise the land value by offering to developers attractive options for creating prime office, retail or residential property developments along or near the waterfront.

Finally, it may also be financially and administratively more attractive to deal with large plots, and hence fewer developers, instead of smaller plots and more developers. The same could apply to lease terms. Plot sizes and lease terms (and, as

[10] Compared to other cities in the world Hong Kong has relatively low standards for urban open space (i.e., that within walking distance of each particular urban area) and often we fail to meet even these weak standards.

[11] When redressing the serious existing imbalance, it would be good not to presume that some new open space on the waterfront should necessarily be accompanied by a new development.

noted, a congenial regulatory regime) that allow individual managers to respond flexibly to market opportunities as these arise, may not be as simple for the civil servants to administer.

Yet, as noted, large plots and relatively undifferentiated land use may lessen 'vibrancy'. They will also tend to add to congestion on transport and other infrastructure at certain times of the day, while leaving the area relatively unpopulated and inactive at other times.

> The question raised here is: 'are tradeoffs involving priced and less tangible unpriced values being adequately evaluated?' Or are project designs being determined largely though the narrow lens of monetised values? The task is how to allow for a fair hearing on the community's unpriced values and then to bring such values into the assessment of alternative project designs.[12]

As outlined above, in principle, it can be done. The task is to undertake this effort in an open and transparent manner in which various groups have input before bad bargains become engrained in those designs government will eventually put forward to the public.

Micro Design Considerations

Micro design considerations largely relate to the way in which an individual experiences a site. This includes people using a site for amenity or other personal reasons (e.g., shopping), as well as going past the site on their travels or as a place near their work where they might spend part of their lunch time. Much of the value people, as individuals and in society as a whole, place on the quality of their outdoor harbour front experience lie outside the realm of priced values.[13] Yet, such values can and should be taken into account if we truly seek to maximise total economic value. The most important point here is one worth repeating:

> Even when we cannot put a precise value on (or perhaps even quantify) some unpriced value, it cannot simply be ignored when we claim we are seeking to maximise total value. We can, if we try, frame the decision in such a way as to implicitly determine the maximum or

[12] As demonstrated in the case of the design of highway P2, the government is quite capable of considering alternative designs when faced with sufficient pressure to do so. Originally P2 had appeared to be planned as a traffic signal-free stretch of roadway with no at grade pedestrian crossing. This would have encouraged relatively high speeds for the traffic on P2 and so planned to create another *pedestrian-hostile* environment in Central. More recently it appears that P2 will be a road with crossings at grade and traffic lights to keep down speeds.

[13] The exception, of course, is willingness to pay more to work, shop, or dine in a pleasant and interesting environment.

minimum monetary value we are willing to give up into order to obtain something that is unpriced.

At a minimum, it would be possible to determine how particular unpriced values are enhanced or degraded by a decision to undertake some development option. If we do proceed, we need to consider how particular design features add to or detract from the unpriced values of greatest concern. Changes in unpriced values may then be tracked against, and compared with, changes in priced values in a tradeoff assessment.

When this is the case, we can carry out formal or informal tradeoff assessments about how much monetised value we are willing to give up (if we have to) in order to obtain some particular degree of additional unpriced value. Such an approach requires a willingness on the part of government to incur the additional costs associated with fuller explorations (in the form of project design variations) along with the additional time required for adequate public consultation on the findings.

For a person visiting the harbour front (for whatever purpose), the quality and value of that experience on a micro level will be affected positively by such things as the extent to which views and breezes are unimpeded, the availability of seating, as well as shade and rain shelter and how green (vegetated) the site is. In addition, limited commercial operations such as the selling of drinks and snacks are often valued. Judging by the micro design of such areas as Tsim Sha Tsui, and the outlying ferry piers in Central, it would seem that when government planners take account of such values, they often do so in a utilitarian manner that tends to undermine the overall aesthetics of the site.[14]

The quality of an individual's harbour front experience will be affected negatively by roads near enough for traffic noise to be heard in the open space and where the air quality is noticeably affected. It will also be negatively affected by site designs that do not maximise views and air circulation.

The degree of negative value imposed on visitors to the harbour front by nearby roads will be largely determined by the volume of traffic and the speed at which it travels. Generally, the greater the volume of traffic, the greater the external cost imposed on people on the harbour front, especially from air pollution. Within limits the slower the traffic, the less the noise generated. Likewise, slower speeds generally result in increased safety. However, pollution per vehicle kilometre is likely to be lowest at speeds of about 60-80 kilometres per hour, well above what is optimal

[14] That is, the space seems to be a mere conglomeration of features, lacking in coherence.

from a noise generation standpoint.[15] Hence, some tradeoff between noise and safety on the one hand and air pollution on the other would be required when considering the desired road speed to minimise noise and pollution impacts on people on the waterfront. And of course, traffic managers would have their own idea of 'optimal' speeds on harbour fronting roads.

One common type of tradeoff assessment that we would normally expect to be carried out is an assessment of options for screening between the waterfront and nearby roads (for visual, safety and noise impacts). Indeed, it is this type of assessment of tradeoffs between priced and unpriced values that should become far more commonplace for harbour front areas in Hong Kong.

To conclude, in a framework of maximising Total Economic Value considerable attention must be devoted to:

(i) ensuring that unpriced values are in practice, and not merely in rhetoric, brought into the assessment, and

(ii) developing procedures whereby the most important unpriced values are *systematically* brought into the value estimation processes, as well as into the selection of the project designs at both the macro and micro levels.

As noted, one way to bring unpriced values into the assessment process is through a tradeoff assessment in which unpriced values are implicitly assigned a minimum or maximum monetary equivalent value when we decide (through the 'political market place') *whether or not* we are willing to give up a particular amount of monetised value in order to attain a specific unpriced value.

Traditional 'valuation' techniques such as willingness to pay surveys could be used to help inform the political decision making process. This could be done with respect to the importance the community places on such unpriced values, and then a better structured tradeoffs assessment could be undertaken. The advantage of this combined approach is that the political leadership does not necessarily have to accept the specific monetary equivalent values developed from the survey, but merely to determine at what monetised cost they might be attained.

As in all economic assessments this should not be a simple *all or nothing* tradeoff option. If the decision is made to go ahead with some proposed development on the basis of its monetised NPV, then there must be a sufficient number and range of project design variations evaluated so as to allow for the type of tradeoff

[15] With this noted, it is of course the volume of traffic that largely determines the level of pollutant emissions with speed being only a secondary factor.

assessments in the macro and micro design features between priced and unpriced values described here. In this respect, Hong Kong has a very long way to go.

CONCLUDING REMARKS

One of the most difficult problems associated with valuing environmental benefits is that the improvements in environmental quality come in the form of complex, multi-dimensional public goods. To make the problem even more difficult, people are not accustomed to thinking systematically about their trade-offs among the various attributes of the goods, and are even less practiced and comfortable with assigning monetary values to these attributes.

1. Dominance of a Financial not Economic Evaluation

The main conclusion from this review is the lack of a clear indication that government seeks to systematically bring unpriced values into the project evaluation and decision making process for the harbour. Indeed, it would seem that priced values (the sole focus of financial analysis) dominate government's assessments of development options for the harbour. This would be expected from the private sector perhaps, but is inappropriate for public sector bodies.[16]

Unfortunately, alternative government project designs often seem to have little to do with making the priced value versus unpriced value tradeoffs clear. Without clarity of priced and unpriced values, project designs are based on monetised values alone in a largely financial assessment. Unpriced values when included seem to be add-ons after the basic decision on project design has been made. This is not the way to maximise total economic value.

This problem extends to both the larger project design features (the macro scale) and to the finer ones (the micro scale). For example, how well are the tradeoffs explained to the public and put forward for the public's input between, for example, the value of a road as against new office space on the waterfront and the impact on the quality of the amenity space being offered? And once the decision is made on the road or on the total amount of floor space to be add to the area, how carefully are design alternatives evaluated to allow assessment of what constitutes in the public's view the best bargain (i.e., gaining as much as possible while giving up as little as possible) in the tradeoff between particular priced and unpriced values?

[16] The argument the government is maximising revenue for the public good is not an adequate response. It should be maximising total economic value for the public good.

2. Lack of Evidence of Appreciation of Changing Marginal Values

What is most striking in this critique of the development and management of Hong Kong's harbour from the perspective of fundamental concepts of economics is the very limited evidence of concern in the planning of the harbour with respect to marginal values.

To put it most simply, when we have little of something we desire, we tend to put a high value on getting an additional increment of it. In contrast, when we have a lot of something, we tend to willingly give up some of it, if it means getting more of what we want but have little of. By this logic, government should be actively seeking to redress the heavy imbalance between public amenity and other uses of the harbour front.

Yet, at best the government is offering a sort of 'balance' from now on. In other words harbour front amenity spaces typically come in a package coupled with more roads, commercial property development, etc. Yet from a marginal value perspective, such a 'balance' for new development would only make sense if the existing split in land use was not so heavily skewed toward priced values and away from unpriced ones.

3. Sustainable Development

Finally, when we are considering sustainable development, what is apparent is how far harbour planning has diverted from this principle, with 'short term expediency' being at the forefront and not a balancing of the near and long needs of different parts of society.

Yet, experience suggests at least part of Victoria Harbour's past reclamation demonstrates the acceptability of a key feature of meeting the needs of the current generation, while not diminishing the ability of future generations to meet theirs. The way this would have been done is to take some natural asset for ourselves and use it to pass on some form of man-made capital (e.g., commercial wealth) to future generations.

> In the past the harbour was wide and the people poor. Hence reclamation to create land to build on for economic growth arguably made us much richer today than we otherwise could be. Yet economic utility theory tells us that as the harbour has shrunk and Hong Kong has become one of the wealthiest economies in the world, what arguably constituted a good bargain in the past does not necessarily constitute a good bargain today.

We are long overdue in undertaking a comprehensive re-evaluation of how we use Hong Kong harbour and its adjacent land areas so as to maximise *total economic* (rather than merely financial) *value* from it.

Appendix 1

Glossary: Introduction to Selected Economics Principles

This appendix provides a short summary for quick reference with respect to the particular concepts of economics discussed in the text.

Financial Versus Economic Assessment

A financial assessment is:
(1) concerned only with monetised benefits and costs,
(2) It takes taxes and subsidies as a given and does not address the resulting value distortions, and
(3) Undertaken from the perspective of a particular person or organisation (which might be a government agency)

An economic assessment is more comprehensive:
(1) In principle it considers unpriced, as well as, priced benefits and costs,
(2) Attempts to adjust prices to remove the distortions in priced values created by taxes and subsidies, and
(3) Is undertaken from the perspective of society as a whole, not that of particular individuals, groups, or organisation (even if it is government).

Government agencies would normally be expected to undertake both a financial analysis and an economic analysis for a particular project, the former for budgetary purposes, and the latter as the primary decision tool.

Valuation (shadow pricing)

Valuation techniques attempt to develop a surrogate monetary equivalent value for unpriced benefits or costs. There are various ways to categorise valuation techniques. A rather simple three way split is as follows:

i. Direct Costs

Often some unpriced impacts (e.g., pollution) will lead those who experience the impacts to incur monetised costs they would not otherwise need to incur (e.g., visits to the doctor to treat the pollution-induced health symptoms). Likewise, if

government concludes that traffic noise at a particular location is excessive, it might purchase noise barriers or pay homeowners to install noise-reducing windows.

Other forms of direct costs particularly relevant for people visiting the waterfront might be travel costs and travel time. Here, the minimum value people place on some amenities is reflected in the costs they willingly impose on themselves, such as the money spent on transport and the time they give up on that transport in order to be able to get to the amenity area.

Direct costs are the most reliable of the valuation techniques because they are reflected in actual market transactions. However, in general, they reflect only bare minimum values that people place on the unpriced impacts. It is crucial that the minimum nature of the values inferred be appreciated when discussing direct costs.

ii. Hedonic Pricing

The idea here is that people do pay for certain types of amenity values. For example, the selling price for two otherwise quite comparable flats or offices (perhaps the same sized space in the same building) might be quite different, if one has a harbour view and the other does not. Hedonic pricing, like direct costs, has the advantage of being based on what people *demonstrate* they are willing pay, rather than on what they *say* they would (contingent valuation).

However, like direct costs, hedonic pricing is rather narrow and tends to be limited to a subset of unpriced values such as view, and possibly air flows. Further, the values the market reflects are, of course, limited to what is on offer.

iii. Contingent Valuation

Probably the best known of the contingent valuation techniques is Willingness to Pay (WTP) surveys, but there are others such as Willingness to Accept (WTA), which investigates how much someone would accept in compensation to continue to live with something unpleasant. The advantage of contingent valuation techniques is that, in principle, they can be fully encompassing, overcoming the narrow focus of direct costs and hedonic pricing techniques. Contingent valuation techniques could, for example, address such things as bequest values and option values for passing the harbour on to future generations as well as the range of values relating to the harbour as something of value for people today.

Against these advantages are the major disadvantages of (i) inherent issues of the validity and honesty of the responses, and (ii) issues of how well the questions to the respondents are framed with respect to the subtleties of the values on which they are being asked to put a hypothetical price and (iii) the plausibility of actually paying for them. The bottom line is that monetary equivalent values coming out of such contingent valuations tend not to have particularly high credibility with decision makers.

Threshold Values from Tradeoff Assessments may be considered as another form of contingent valuation. For example if a more user-friendly harbour development design has a net present value $ X million lower than that of a less user friendly design, then the public could be asked 'are you willing to forego $ X million in expected monetary value over the life of the project in order to gain the additional user friendly features?'

The advantage here is that the tradeoff is framed in a specific way and so makes the 'valuation' quite concrete rather than abstract. The disadvantages are (i) that it provides only a minimum or maximum threshold level for the unpriced values[17] and (ii) the values attained tend to be particular to the case at hand and arguably cannot be generalised to different assessment situations and (iii) arguably the public would have a difficult time assessing the significance of 'x million dollars in additional revenue in terms of the government's overall ability to provide necessary and expected publicly funded services.

Externalities, Real and Not

Externalities are unpriced and unintended 'side effects' of our actions (or inactions) for which no compensation is provided to the persons impacted by these side effects. Pollution is a classic externality. It is unpriced, unintended and the ones suffering the effects are not compensated.

Externalities are commonplace. People bump each other on a crowded street. If Scotch whisky consumption goes up in China the price of Scotch in rest of the world (including Scotland) tends to rise. What distinguishes a real externality from a 'pecuniary' or 'technological' externality is that real externalities result in a reduction in overall social welfare, while the others do not.

The key to determining if an externality is real is to ask 'would the person (or organisation) causing the externality change his behaviour if he himself (rather than

[17] Though often, this is all that is needed to make a decision.

someone else) had to experience the full effects of the unpriced un-intended side effect.

In essence, if the perpetrator of the externality did experience its full effects and he did not change his behaviour that would imply that the cost of eliminating or reducing the externality is greater than the cost of living with it.[18] Hence it would be inefficient to eliminate or reduce it. However, when the cost of eliminating (or reducing an externality) saves more value (in avoided damage) than it would cost to eliminate or reduce such damage, then it is inefficient to not reduce it. In other words when an externality is real, the efficient thing to do is attempt to internalise the relevant unpriced values into our decision making.

Marginal Analysis

In a systematic comparison of benefits against costs, the aim is to maximise the difference between the two, that is, to seek the greatest net Benefits.

> Here, it is crucial to keep in mind that beside all or nothing decisions where we would compare the total benefits against the total costs of some action, typically there a number of intermediate steps will also be possible. In such cases a range of steps should be evaluated to determine the level of action that yields the greatest net benefits.

Utility theory tells us that, in general, the more we have of something, the less each additional unit of it is valued. It is also generally true that *Production Functions* indicate that as we produce (or somehow attain) more of something, the higher is the cost of obtaining yet more of it.[19] The combined effect of declining marginal utility and the rising 'production costs' is to give a set of benefits and costs tending, very broadly, to exhibit the type of directional changes as shown in the table.

[18] Imagine in Hong Kong for example designing walkways in such a manner that people would not bump into each other. Common sense suggests that the costs of eliminating or even greatly reducing the bumping externality would be far higher than the value of the inconvenience of the occasional bump.

[19] Basically, if we are rational, we undertake the least cost steps first. With regard to increasing 'economics of scale' this holds for cases of an immature market or technology and tend to represent *temporary* exceptions (i.e., until things mature).

Table: Project Implementation Options

Implementation Level	Incremental Benefits	Incremental Costs	Cumulative Benefits	Cumulative Costs	Cumulative Net Benefits
20%	12	2	12	2	+10
40%	11	6	23	8	+15
60%	8	7	31	15	+16
80%	5	9	36	24	+ 12
100%	3	12	39	36	+ 3

Notice, that if the only option being considered was a 'yes or no' one for the project it would be approved (its benefit/cost ratio at 100% implementation is greater than 1 and the total benefits are greater than total costs). Also notice that net benefits are highest, *not* at full implementation but at the 60% level.

Opportunity Costs

For the most part[20] resources devoted to one thing are not available at the same time to be applied to something else. 'Resources' in this sense include material things, as well as expertise (and indeed the attention of managers), and time.

Hence, we cannot simply look at some opportunity for devoting available resources in some way (say to project 1) and if B> C say for project 1 we then know that is where we should put our resources. In fact, all we can say in this case is that it would be profitable to do so. However, it may be *more profitable* (that is net benefits may be greater) if available resources were instead devoted to Project 2. The concept of opportunity costs is typically employed by economists to remind us of this fact and the importance of considering more than one way in which our resources might be applied.

Time Dependent Valuation (Discounting)

If we assume (as economists typically do) that resources available to us today can and will be devoted to productive uses whereby there will be net benefits (i.e., growth) over time, then costs that can be postponed into the future are worth less than the same costs if they had to be paid today. In other words, instead of paying for those costs today, we could take that money (or other resource) and invest it in

[20] That is, aside from the potential for synergistic effects.

some productive activity and so pay off the debt at some future date and still have money left over.

Likewise, if we had to wait for some benefit to come our way, we cannot invest the returns today and let the nest egg grow. Hence, a benefit or a cost that comes later in time has a lower 'present value' than that same benefits or cost today.

This has nothing to do with inflation, nor even money. If I am supposed to get a bag of rice, it is likely I would put a higher value on it if it were to arrive next week compared to my having to wait 5 years to get it. Likewise, who amongst us would react indifferently to a dentist's report than we need a root canal next week versus her telling us we will need the treatment in 20 years.

Hence, in addition to the matter of investment opportunities, utility theory reminds us that it is simply human nature to prefer (that is to value more highly) benefits obtained sooner rather than latter and to postpone costs if we can.

In standard practice in economics (as well as in finance) we convert future returns (benefits and costs) into their 'present value' equivalents through use of a single discount rate. The discount rate is usually supposed to be set at the presumed 'opportunity cost of capital'. That is, if we could invest the funds what rate of return on average would we earn?[21]

There are number of mathematically equivalent ways to present the present value formula. If we take as the notation that the current year (the present) is year 0 (year zero) and designate each year a 't' (for time period) then the current year is t_0. We would then designate the sum of benefits in any particular year of the project we are evaluating as B_t, with the present being B_0. Likewise, the sum of costs expected to be incurred in some future year of the project evaluation period would be C_t.

We might then designate the years of the project evaluation period as running from t = 0 to 'T' (the final year of the project evaluation period).[22] If we designate the discount rate as 'i' (for interest rate) we have the notation and assumptions we need.

The Present value (PV) of some future benefit or cost would then simply be,

[21] This value could be anything, but normally for investment situation such rates would range from a low of perhaps 3% up a high of say 15%. Nonetheless, *personal discount rates* as exhibited in decisions about tradeoffs between higher purchase prices for major appliances versus lower operating costs much higher discount rates seem to apply, with a discount rate of 25% or higher being not uncommon.

[22] Implicitly we are assuming that any impact of the project that occurs *after* year T is external to the list of the *relevant* benefits and costs and so have a value of zero in the NPV calculations.

PV of B or C = B_t or C_t / $(1+ i)^t$

For the project evaluation period the Net Present Value (NPV) is calculated by the formula

$$NPV = \sum_{t=0}^{t=T} (B_t - C_t) / (1+ i)^t$$

For example, if the nominal benefits in year 25 (i.e., in t_{25}) are '15' and the nominal costs are 10 (i.e., nominal net benefits that year are 5) at the modest discount rate of 4%, the present value of the benefit for that for year is not 5 but, 5 / $(1.o4)^{25}$ = 5 /2.67 = 1.9. At a relatively high discount rate of 12%, the present value of the nominal return of '5' in 25 years would be a mere 0.3

Total Economic Value

Total Economic value is simply the sum of the priced and unpriced benefits and costs of some action (or inaction). The point is that in looking at total economic value unpriced values are relevant to an economic assessment. Below is one classification scheme. Total Economic Value would be the sum of these values

A Categorisation Scheme for Total Economic Value

PRICED BENEFITS & COSTS (as summarised in NPVs)

- Includes the discounted stream of the project's expected inputs and outputs over evaluation period.
- Includes the monetised value of willingness to pay for priced amenities (e.g. waterfront dinning, office views).
- *Could* in principle include shadow prices as developed through Willingness to Pay and other 'valuation' methods.

UNPRICED BENEFITS AND COSTS

- **Near Term** (primary focus on present generation)
- *Amenity Value* of waterfront open space for active/passive uses
- Including consideration of design features affecting that value (e.g., noise, pollution, sight views, shade, rain shelter, convenience of access)
- *Preserving Cultural Heritage*
- Might include retaining and preserving artefacts or simply commenting on what took place on or near the site and keeping the site open
- *Natural Environmental Services*
- Effects of marine waters on local climate (temperature, winds)

- Others

Long term (primarily focused on future generations)

1. *Bequest Value*
2. The idea that we may wish to pass on some particular natural or cultural features of the harbour to future generations.
3. *Option Value*
4. Leaving open the potential to exploit some resource in the future rather than foreclose that option by what we do today.
5. Others (e.g., cooling effects of the harbour in a warmer world)

As noted, economic theory fills many textbooks, and only a few concepts have been applied here.[23] Yet, awareness of the particular concepts presented here is crucial to efficient management of Hong Kong's harbour and so far we seem to be ignoring them to our and the harbour's detriment.

[23] The principles touched on here are developed in greater depth in *Fundamentals of Economics for Environmental Managers*, W. Barron, R. Perlack and J. Boland, Westport Press, Westport Conn., USA, 1998.