

# Integrating job creation into Cost Benefit Analysis

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## Sponsors:

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## Summary:

*Job creation is not necessarily a benefit that should be incorporated into the economic evaluation of projects. Often job creation is rightly considered as the 'costs of labour' required for project implementation, and is appropriately treated as a project cost rather than a benefit. However, there are clearly some circumstances when job creation improves the allocative efficiency of labour resources (e.g. targeted occupations in disadvantaged regions).*

*When these circumstances arise, the estimation of job creation benefits is complex. A variety of approaches are currently adopted by practitioners; some invoke arbitrary assumptions about the labour force origins of newly employed project workers, while others resort to detailed economic modelling to estimate the job substitution effects, and therefore the net employment gains, in the regional economy.*

*SGS has attempted to address this issue by developing a transparent & repeatable modelling process that estimates the costs and benefits, and therefore net benefits, of job creation in Australian regions. Essentially the SGS model assumes that:*

- *Regional workers will only respond to job vacancies if the wages offered outweigh the opportunity costs (i.e. earnings plus value of leisure time) associated with each worker's current labour force status (i.e. fully employed, underemployed or unemployed).*
- *Employers will favour prospective workers who are currently fully employed over those that are underemployed or unemployed.*
- *The size of the region's available workforce is limited to the number of workers who are currently employed or who have previously been employed in relevant occupational categories after accounting for the region's observed labour force catchment.*

*The SGS model shows that the benefits of a project will differ by regional location. It also shows that the benefits within a select region will vary by the mix of occupations and the prospective wages offered by the project. Importantly, the benefits generated by a project follow an inverted z shape, with underemployed and unemployed workers taking up newly offered positions when project wages are relatively low, before a wage threshold is crossed, and the project starts to attract fully employed workers away from existing regional enterprises. As project wages continue to rise, the regional benefits escalate rapidly.*

## Introduction

Government agencies across Australia prefer to use Cost Benefit Analysis (CBA) to inform how they respond to proposed projects. While far from being perfect, CBA aims to identify if proposed projects improve community welfare levels, after considering the economic, social and environment impacts generated by the projects.

Unfortunately CBA is often confused with economic impact analysis by project proponents and decision makers. Economic impact analysis fails to identify if a project generates net community welfare benefits, but estimates how economic activity levels (e.g. value adding, employment levels) increase with project implementation; even if the project costs outweigh project benefits. This often causes confusion.

It is important to note that job creation is not necessarily a benefit that should be incorporated into the evaluation of projects. Often job creation is rightly considered as the 'costs of labour' required for project implementation, and is appropriately treated as a project cost rather than a benefit. In such circumstances, the labour resources are valued using their opportunity costs, largely reflecting that these workers can be used productively elsewhere in the regional economy.

However, there are clearly some circumstances when job creation improves the allocative efficiency of labour resources. For example, when projects:

- Target jobs at underutilised labour force resources (e.g. underemployed and unemployed workers)
- Enjoy a competitive advantage and can offer commensurately high wages, enabling a more productive allocation of the region's workers, and/ or
- Enable an upskilling of the workforce, which will ultimately drive a more productive allocation of labour resources in the medium term.

When these circumstances arise, the estimation of job creation benefits is complex. A variety of approaches are currently adopted by practitioners. Some practitioners assess the labour force conditions in the relevant region before making informed but nonetheless relatively arbitrary assumptions about the labour force origins of newly employed project workers. Others resort to general equilibrium modelling to estimate the job substitution effects triggered in a region, and therefore the net employment and productivity gains, resulting in the regional economy.

Investment promotion agencies (IPAs) often have to make rapid recommendations about the scale and scope of investment facilitation assistance and funding offered to project proponents to secure their projects. This occurs regularly in a competitive environment (e.g. country versus country, and state versus state once country decisions are made) where the project proponent is loath or unable to provide detailed insights about the match of a region's labour force with the profile of jobs a proposed project might create.

Invest Victoria, part of the Victorian Department of Treasury & Finance, is one such IPA. Invest Victoria funded this research to improve the transparency and consistency of valuing job creation benefits in the CBA of proposed projects.

## Literature review

The research included a review of literature that practically informed the intended estimation process. The key results of this literature review included that:

- About two thirds of workers who left their jobs did so because they were dissatisfied with their current job (including both wage and non-wage satisfaction issues)<sup>1</sup>.
- Sixty percent of workers who left their jobs experienced a real wage gain in their new jobs; meaning that the remaining forty percent departed for non-wage reasons (e.g. better work life balance, needed a change, etc)<sup>2</sup>.
- On average, a ten percent premium in prospective wages, leads to a four-percentage point increase in the probability of a worker leaving their current employer<sup>3</sup>.
- The actual gain in wages achieved by departing workers is up to eight percent but is often less than five percent<sup>4</sup>.

These insights enabled SGS to confidently assume a natural rate of churn in workers for non-wage related reasons, as well as the necessary wage premium for enticing existing regional workers, who are currently dissatisfied for wage-related reasons, to seriously entertain relevant job vacancies.

## Modelling process

The modelling process entailed four key steps using publicly available and regularly published datasets by the Australian Bureau of Statistics at the regional level:

- Step 1 - Assess a region's labour force - to understand the size of the region's labour force after accounting for observable journey to work travel behaviours.
- Step 2 - Disaggregate the region's labour force – to understand the composition of the component labour pools in the region by ANZSCO occupation categories (e.g. Managers, Professionals, Technical & Trade Workers, etc.) and by labour force utilisation rates (i.e. fully employed, under-employed and unemployed).
- Step 3 - Calibrate the project's wage attractiveness & take up – to calculate the number of workers (by labour force utilisation rate) who will accept project employment offers, after accounting for project's proposed wage rates (by occupation) and the region's natural job-separation rates, along with the sequencing of these job acceptances.
- Step 4 - Estimate region's net welfare gain – to calculate the value of regional benefits derived by subtracting the opportunity costs (including existing wages, Commonwealth unemployment benefits and value of leisure time) experienced by workers, who accept project job offers, from their new after tax earnings (by occupational group).

The model enables the net regional benefit of a project's job creation to be calculated assuming the following inputs are provided by a project proponent:

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<sup>1</sup> Atkinson and Hargreaves (2014)

<sup>2</sup> HILDA (2020)

<sup>3</sup> McLaughlin (1991)

<sup>4</sup> HILDA (2020), Altonji and Williams (1992).

- Number and timing of full time equivalent jobs created
- Composition of jobs by occupational category
- Average wage rates by occupational category.

The model estimates the ‘opportunity costs’ and ‘after tax earnings’ experienced each year into the future, reflecting the scaling up of a project’s employment, before discounting these annual streams of costs and benefits back to present day values using nominated discount rates.

## Illustrative results

The model’s results can be best illustrated using a case study project. In this case, the project aimed to employ 1,500 workers across an array of sixteen different occupational categories in Geelong.

Each of the project’s proposed occupations is aligned with ANZSCO categories in Table 1, as are the number of full time equivalent positions and their respective average salary rates.

**TABLE 1 PROPONENT SUPPLIED PROJECT EMPLOYMENT INFORMATION**

Proponent occupation	ANZSCO occupation	Number of FTE jobs	Average salary
Occupation 1	Managers	50	\$134,000
Occupation 2	Clerical and Administrative Workers	120	\$116,000
Occupation 3	Professionals	120	\$145,000
Occupation 4	Professionals	230	\$136,000
Occupation 5	Technicians and Trades Workers	10	\$120,000
Occupation 6	Managers	70	\$138,000
Occupation 7	Professionals	30	\$135,000
Occupation 8	Professionals	70	\$120,000
Occupation 9	Managers	90	\$125,000
Occupation 10	Professionals	20	\$140,000
Occupation 11	Technicians and Trades Workers	100	\$77,000
Occupation 12	Managers	30	\$116,000
Occupation 13	Managers	70	\$101,000
Occupation 14	Labourers	160	\$79,000
Occupation 15	Managers	30	\$114,000
Occupation 16	Technicians and Trades Workers	310	\$81,000

Source: Invest Victoria

The results of the modelling are shown in the Table 2, as are the results of the alternative investment locations of Campbellfield and Ballarat for comparative purposes.

**TABLE 2 SGS MODELLED RESULTS (COSTS & BENEFITS)**

Present value	Geelong	Campbellfield	Ballarat
Employment benefits	\$116,499,000	\$116,499,000	\$116,499,000
Opportunity costs	\$92,382,000	\$93,499,000	\$95,909,000
Net benefits	\$24,117,000	\$23,000,000	\$20,590,000
Benefit-cost ratio	1.261	1.246	1.215

Source: SGS Economics & Planning

One of the key variables that drives the net benefits by region is the modelled labour force origins of the 1,500 new jobs in Geelong, Campbellfield or Ballarat. This is shown in Table 3, with the notable change in labour force origin share in Ballarat, i.e. with many more jobs being sourced from under-employed rather than unemployed regional workers.

**TABLE 3 SGS MODELLED RESULTS (LABOUR FORCE ORIGINS)**

Labour force origin	Geelong	Campbellfield	Ballarat
Unemployment	34%	29%	18%
Underemployment	2%	7%	18%
Full employment	64%	64%	64%

Source: SGS Economics & Planning

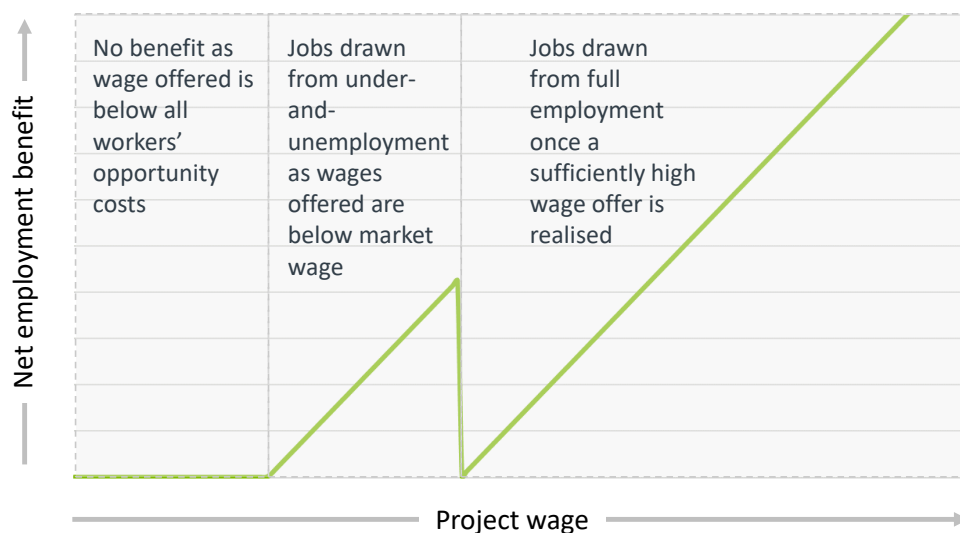
## Z shape benefits curve

One of the most interesting findings of the modelling is the pattern of net benefit creation as the project's wage offers increase (Figure 1). Not surprisingly, a general pattern of increasing employment benefits as higher wages are offered is observable. But, most interestingly, an inverted z shape pattern is revealed as project wage offers rise from 'submarket' to 'at market' and then 'above market' values.

Essentially this means that the value of employment benefits decrease once a threshold is passed, because job substitution effects kick in regionally. Prior to this wage threshold being passed, most of the project's jobs on offer are taken up by under-employed and unemployed workers, who have previously been employed in relevant occupations. As project wage levels continue to increase, the

disbenefits of these job substitution effects are progressively outweighed by the benefits generated by the more productive allocation of the region's labour resources.

**FIGURE 1 NET BENEFITS AS WAGE OFFERS INCREASE**



Source: SGS Economics & Planning

### Implementation ready process

SGS has provided the model to Invest Victoria for its own internal use.

SGS will continue to use this model when assessing the overall costs and benefits of proposed projects for Invest Victoria, noting that many other costs and benefits can be relevant to decision making, e.g. capital costs, recurrent revenues and costs, social benefits, economic benefits and broader economic benefits.

SGS is also in a position to rapidly deploy this modelling approach for other clients.

### Additional information

If you have any questions, or would like to discuss further, please contact:

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