



Review of economic analysis of the Wellington runway extension

NZIER report to BARNZ, the Board of Airline Representatives New Zealand Inc

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Executive summary

BARNZ commissioned NZIER to peer review an Economic Impact Assessment of Wellington Airport's proposed runway extension. That assessment was undertaken by Ernst Young (EY) for Wellington International Airport Ltd, and was dated 24 February 2014.

The cost of the extension is broadly estimated at \$300m.

An impact assessment is a very poor substitute for a cost-benefit analysis

The EY report documents an Economic Impact Assessment which is heavily reliant on multiplier analysis. As such, it cannot be regarded as anything more than preliminary.

Any decision to proceed with the proposed extension of the runway at Wellington Airport must be informed by more rigorous analytical tools, specifically formal Cost-Benefit Analysis, perhaps supported by Computable General Equilibrium modelling. The risk that the methodology employed by EY overstates benefits while overlooking costs is too great to be ignored.

There are high risks that benefits would not be realised

There are good reasons to believe that the case for extending the runway is founded upon a number of assumptions with a questionable empirical basis, such as:

- travellers have no preference as to when they travel, and a substantial proportion of them will be willing to wait for up to two days for their one 'direct' flight out of Wellington
- passengers will avoid connecting flights, even overseas, despite the fact that Wellington will routinely connect to a vastly smaller set of Asian cities than Auckland or Sydney
- international tourists will prefer arriving in Wellington and executing a figure-of-eight to cover the main tourist destinations rather than simply arriving at one end of the country and traveling to the other before leaving
- the runway end safety areas will not need to be lengthened for long-haul aircraft.

Given these considerations (and perhaps others), it is difficult to see why an extended Wellington Airport runway would be an attractive destination to long-haul carriers, given the infrastructure that already exists elsewhere in New Zealand.

Recovering the \$300 million cost will cause wider costs to Wellington

It is not clear how the cost of extending the runway would be recovered. All likely options have significant drawbacks: they would either depress demand by raising prices, or would require subsidy from tax-payers or rate-payers.

These outcomes make the case for carrying out a rigorous cost-benefit analysis even more compelling.

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1. Introduction

NZIER was commissioned by the Board of Airline Representatives New Zealand Inc (BARNZ) to peer review a report written by Ernst Young (EY) entitled *Economic impact of the proposed runway extension* dated 24 February 2014.¹ The EY report was commissioned by Wellington International Airport Ltd (Wellington Airport). EY used an economic impact assessment (EIA) methodology.

This report summarises NZIER’s review. The report commences by briefly summarising the approach that was taken by EY in its EIA. Chapter 3 then discusses why for the purposes of the analysis, Wellington Airport would have been much better served by commissioning a cost-benefit analysis rather than an EIA. We then in Chapter 4 review specific substantive issues with the economic impact assessment that either could make or break the case for the runway, or that struck us as being anomalous.

NZIER strongly recommends that a rigorous cost-benefit analysis be undertaken to assess the viability of this project. However, we stress that we have not undertaken a cost-benefit analysis (CBA) in this report. Instead, we have indicated areas in which there is good reason to believe that the EIA carried out is seriously deficient for the purpose of assessing the runway extension’s potential economic viability.

¹ EY. (2014) *Economic impact of the proposed runway extension*. Report to Wellington International Airport Limited. www.connectwellington.co.nz/static/documents/WIAL-Economic-Impact-Report-010414.pdf

2. Brief summary of the runway EIA study

The runway extension

The runway at Wellington International Airport is currently 2,081 metres.² Wellington Airport states that 2,300m is the required take-off distance for long-haul services from Wellington.³ Wellington Airport is investigating a 300 metre extension, with a construction cost of \$300 million.⁴ We note that Wellington City Council documentation now refers to a 350 metre extension at a presumed cost of \$350 million.⁵

The objective is to establish long-haul non-stop travel options to/from Wellington to North America and Asia which are not possible at present given the current runway length. This would avoid the need to travel via other regional hubs, such as those in Australia or Auckland airport.

Wellington Airport's commissioning of an impact study

Wellington Airport commissioned EY to undertake a multiplier study of the runway extension. The EY report states that a cost-benefit analysis was not undertaken (page 3), and that the environmental and social detriments were not costed (page 13).

The option scenario was an extended runway operational from 2020. The key assumptions were (page 12):

- long-haul travel would not be possible in the business as usual scenario, and that there would be no technological advancement of aircraft
- that international travel growth would continue as per national forecasts
- there would be no fewer flights from Auckland or Christchurch, despite there being fewer travellers via those airports.

The EY report contained predictions of long-haul passenger movements, but some of the bases for the predictions are unclear. The report states that its prediction is based on the number of current long-haul travellers (that need to trip-chain via Auckland, Christchurch, or Australia), and that it also accounts for induced demand from lower costs of travel. It assumes that a flight will be scheduled whenever there are 220 passengers wanting to go to the same part of the world (i.e. Asia or North America rather than a specific city or country) within a two-day period. It assumes that from 2020 all long-haul travellers will wait up to two days for the one direct flight in and out of Wellington, rather than travel when they want via Auckland, Christchurch or Australia to make an international connection.

Each overseas visitor is assumed to spend between \$2,400 to \$3,600 per trip (page 34) in constant dollar terms. The number of passenger movements is predicted in the

² en.wikipedia.org/wiki/Wellington_International_Airport, accessed 1 December 2014.

³ www.connectwellington.co.nz, accessed 1 December 2014.

⁴ www.scoop.co.nz/stories/AK1305/S00674/wellington-airport-to-begin-plans-for-runway-extension.htm

⁵ WCC Supplementary Council Agenda 17 December 2014 - Report 3.3 Airport Runway Extension, page 7 paragraph 25 wellington.govt.nz/your-council/meetings/committees/council/2014/12/17

report to grow from 240,000 in 2020 to 576,000 in 2060 in the ‘medium scenario’ (page 22). This number is halved to determine the number of return trips and between 40%–60% is attributed to overseas visitors as opposed to resident travellers.

Discounted back at a 6% real discount rate (the same as used by the NZ Transport Agency), this expenditure equates to some \$2.5 billion dollars in present value terms (page 26).

Just over half (53%) of this spend was assumed to be ‘gross value add’ (GVA), which excludes the cost of intermediate consumption (page 26). Why and how the figure of 53% was chosen is not described in any way or in any detail. We discuss this further in Section 3.3.

This results in a GVA impact of \$1.327 billion, ranging between \$714 million and \$1.751 billion.

These direct impacts were then scaled upwards by a factor of 2.5 to account for flow-on expenditures (e.g. every \$1 million direct impact would become a \$2.5 million overall impact). Where the factor of 2.5 comes from is quite unclear. This is discussed further below.

The results are summarised in Table 1.

Table 1 Results of the multiplier study

Millions of dollars

	Direct economic impacts	Total economic impact
National	\$714 – \$1,751	\$1,785 – \$4,379
Regional	\$389 – \$684	\$974 – \$1,709

Source: EY (2014) page 2

On Wellington Airport’s public relations website they represent these results as ‘economic benefits’ and that they pay back the \$300 million cost up to 5 times over:⁶

Economic return: 500% potential direct economic return for New Zealand.

For every \$1 invested in the runway extension there will be up to \$5 in direct economic returns for New Zealand.

On the same webpage Wellington Airport focuses on the direct economic impacts; they do not emphasise the total economic impact:

Respected international consultancy EY has calculated that the Net Present Value⁷ of direct economic benefits is up to \$1.75 billion for New Zealand and up to \$684 million for Wellington.

The detail of the analysis is reviewed in the next chapters.

⁶ www.connectwellington.co.nz/benefits, accessed on 1 December 2014.

⁷ Note EY’s result is not a net present value because the \$300 million cost is not netted off; rather it is a present value of their calculated GVA impacts.

3. Why a cost-benefit analysis is preferred

3.1. Introduction

In this chapter we explain some key issues inherent in the use of a multiplier study to appraise the economic impacts of the runway extension. In the following chapter we drill into further detail of the analysis.

The purpose of an initial economic assessment such as that commissioned by Wellington Airport should have been to identify how likely it would be that the initiative would pass a detailed assessment.⁸ This would inform whether it was worth expending the resources in doing a full and proper assessment, and where analytical effort should be focused. We understand Wellington Airport and Wellington City Council are spending some \$6 million now to produce a full business case for the extension and process the consent.⁹

The initial economic assessment suggests the project could be economically viable; indeed Wellington Airport goes so far as to claim that the project could return \$5 of benefits for every \$1 spent. However, this is likely to be an artefact of the methodology used. There is good reason to believe that subjecting the project to the more rigorous standards of formal cost-benefit analysis would produce an assessment in which the economic viability of the project could be in doubt.

3.2. Alternative approaches for analysis

A cost-benefit analysis is the most important economic assessment

Established economic methods to appraise a major infrastructure project (from a national or regional perspective) are of two kinds:

- **welfare analysis** (or ‘social investment analysis’) of whether benefits exceed costs to society, and so whether the project should be done
- **descriptive analysis** (or ‘impact assessment’) of what will happen to various measures of economic activity, like jobs, gross output, and income.

Cost-benefit analysis is the typical tool of welfare analysis. It aims to capture the full spectrum of economic, social and environmental costs and benefits, and indicate whether an initiative is net beneficial to society overall.

Decision makers often to rely on cost-benefit analysis to guide them, and often do without impact assessments. The impacts of a project on economic activity may have little bearing on whether or not a project is net beneficial to society as a whole. An initiative that creates a lot of jobs may actually be wasteful. Digging holes and filling

⁸ For instance, refer to the concept of a ‘rapid assessment’ described in ATC 2006a, page 12.

⁹ <http://wellington.govt.nz/~media/your-council/meetings/Council/2014/12/supplementary-agenda.pdf>

them back in, or using teaspoons to dig instead of shovels are a couple of traditional tongue-in-cheek examples.

However, some decision makers may want to understand how things play out for local industries and employment, and so reach for a descriptive analysis such as an impact assessment. In this case the descriptive analysis acts as a supplement to the welfare analysis. The welfare analysis remains fundamental.

When an impact assessment is requested, multiplier analysis is the least credible approach to use

There are two typical approaches for impact assessments:

- **input-output analysis** (often a multiplier analysis), which analyses the sale and receipt of goods and services from one sector to another
- **computable general equilibrium** analysis, which models the workings and constraints of an economy.

Input-output analysis has a severe limitation: it assumes resources are infinitely available. This might not matter for a small localised project in an area whose firms and workers are under-utilised such that there will be no effects on prices (Wallis et al. 2012). But it can lead to substantially exaggerated impacts for most other projects, such as the runway assessment.

A growing realisation of the problems with input-output analysis has led government agencies to progressively move away from using it towards cost-benefit analysis and/or computable general equilibrium analysis.

For example, the Ministry of Business, Innovation and Employment (MBIE) in its *Post-Event Economic Evaluation Guidelines* is proactively discouraging the use of input-output multiplier studies in favour of cost-benefit analysis.

The Treasury's Better Business Case guidelines (Treasury 2014, page 8) advise using cost-benefit analysis for economic assessments:

There are various forms of economic assessment tools that can be used for ranking competing investment options, with differing levels of complexity. The expectation is that cost benefit analysis (CBA) will be used, wherever possible, and undertaken from a national perspective...

The runway study first estimated direct benefits, and then used a simple multiplier analysis to estimate the wider (indirect and induced) economic impacts. This approach for understanding wider impacts in the economy is not robust. EY appear to have been aware of the problems inherent in multiplier analysis. On page 13 of their report they state that wider impacts 'were not quantified' and that only an indicative and generic correction factor is used to estimate the likely quantum of impact. (Thus the wider impacts actually were quantified, but through the application of a correction factor, not on a project-specific basis.) Wellington Airport seems to have relied more on its estimate of direct impacts, rather than the multiplied measure.

There are much better methods to assess economic impacts than a multiplier study

If decision makers only wish to understand economic impacts as distinct from benefits and costs for major infrastructure projects, then computable general equilibrium (CGE) models are far superior to multiplier studies. CGE models produce outputs which are substantially more robust, and which are often considerably different to the output of multiplier studies. CGE models are often more detailed and labour-intensive to build and use, but in many cases it is worth the effort if it screens out costly and inefficient projects.

CGE's key difference is that it recognises that resources are not infinitely available, and that growth in one part of the economy draws resources from other parts.

A relevant example that illustrates the difference between CGE and multiplier analysis follows. In 2009 NZIER reviewed a report by BERL (2009) that estimated that Wellington Airport would contribute \$1.4 billion to regional GDP in 2030 and support 21,375 full-time equivalent jobs. BERL used input-output multipliers to arrive at this result. NZIER re-estimated the results using a CGE model using the same input assumptions and found the impacts of Wellington Airport to be around \$773 million and 12,900 full-time equivalent jobs by 2030. The impacts derived from the CGE model were around 45% less for GDP and 39% lower for employment.

3.3. Some ways in which a good cost-benefit analysis would differ

Below we outline some reasons how cost-benefit analysis can differ substantially from an impact assessment like that undertaken. Our concern is that the missing costs and the overstated benefits in the initial analysis may lead the naïve reader to think that the potential economic viability of the runway extension project is much greater than it actually is.

Cost-benefit analysis generally ignores multiplier effects

Cost-benefit appraisals intend to measure all social welfare changes without double counting. Expenditures that multiply across related markets are generally not included in a cost-benefit appraisal in addition to direct impacts as to do so would be to introduce double-counting into the analysis (e.g. see Boardman et al. 2006 chapter 5).¹⁰ The classic example is that of a road improvement that increases property prices for better connected houses: adding the property price increase to the transport benefits double counts the benefits.

However, these induced and indirect expenditures are included in an impact assessment. It is not wrong to do so, but it can often be wrong to think of them as additional national benefits.

Tourism spending is treated somewhat differently from residential spending impacts. That is because the welfare of foreigners usually does not count in a national cost-

¹⁰ The research on 'wider economic benefits' over the 2000s has focused on the existence of additional benefits in the wider economy from complications such as tax and market power of some firms; e.g. see Kernohan and Rognlien (2011).

benefit appraisal. Tourism revenues are treated as export revenues, and to some extent it is an additional national benefit. This is discussed further below.

Goods and services sold to tourists are not costless

The assumption of the percentage of foreign tourist spending that represents net-benefits is of critical importance when appraising an infrastructure project. That is because nearly all (93%) of the benefits of the runway extension are related to tourist spending.

There is a very wide range of potential values for this percentage of spending that is of net-benefit, ranging from 0% to 100%, depending on the circumstance. This point is illustrated in the box below.

Example where tourist spending is nearly all beneficial: Consider a tourist who spends \$1,000 in a hotel which has empty rooms and staff on shift anyway. The cost to serve the tourist is near zero, and most of the \$1,000 could be welfare enhancing, as the tourist is in this case contributing to the recovery of a sunk cost that has already been incurred. (Some costs might be unavoidable, such as consumable items.)

Example where tourist spending is not net-beneficial: Now consider a tourist who arrives in Wellington to find all the hotels full. In order for the tourist to spend \$1,000 on a hotel, a new room and staff will have to be provided all at a cost that would not have been incurred if the tourist had not arrived. If the hotel was pricing competitively and had no unemployed resources, the cost to society is \$1,000. No producer surplus results. Society is indifferent as to whether that tourist spends the money or not. Thus, 0% of that spend enhances New Zealand's welfare (assuming consumer surplus does not count).

NZIER made this point in our submission to MBIE on the Post-Event Economic Evaluation Guidelines in October 2014. We were concerned that major events (e.g. sporting and cultural) counted 100% of tourism spending as a net-benefit.

We submitted that the extent to which the costs to provide goods and services to foreign tourists are below the prices charged should be researched. We are unaware of robust estimates of this that are easily at hand. It would differ by region and by peak/off-peak season. It would differ according to the type of good or service purchased; markets targeted at foreign travellers are likely to have prices marked-up over cost. However, general goods and services supplied in competitive markets could be priced at cost¹¹ plus GST, whereby the GST is one source of net-gain.

We suggested to MBIE that they may wish to commission a one-off piece of research/advice to establish rules of thumb that can be used for routine CBAs. This should include detailed market studies, involve CGE modelling, and be reconciled

¹¹ For instance, refer to Forsyth, P and Dwyer, L (1991) *Measuring the benefits and costs of foreign tourism*, Australian National University, Centre for Economic Policy Research Discussion Papers, Discussion Paper 248.

with CBA theory. Such work would benefit all business cases to government that directly or indirectly aim to induce more expenditure by foreigners, such as major events, conference facilities, stadiums, runway extensions and tertiary education facilities.

How the cost of infrastructure is recovered matters

The EY report considered only the benefits of the extension, but not the costs. This may seem a reasonable simplification, because the costs of some \$300 million have been widely reported in the media. However, the way in which the \$300 million cost is recovered can create additional costs and other economic effects that in some circumstances can matter a great deal to the economic viability of the project.

The costs of the runway extension can be recovered from three broad groups of people: users; central government, either through taxation or by cutting other spending; and ratepayers. The implications for each group are outlined below:

- **Charging users** of Wellington Airport will suppress the quantity of trips demanded, and thus reduce the benefits of the runway extension. This loss of social welfare is exacerbated if Wellington Airport attempts to cross-subsidise the runway extension by using its market power to increase prices for non-long haul travellers.
- **Charging national taxpayers.** Where this leads to more taxes this causes an additional cost of about 20%, called the deadweight cost of taxation (see Treasury 2005, page 18). This cost occurs because incentives to work hard and prosper are blunted, to the detriment to society.
- **Cutting other government expenditure** eliminates the benefits of those other programmes
- **Charging a region** can lead to additional costs from suppressed economic activity, which is a longer-term and more structural problem. It can cause a vicious cycle of a smaller rate-base, as households and firms flee, thereby raising rates for those who remain, and so on.

It might be tempting to conclude that spreading the costs as widely and as thinly as possible is the best way to fund infrastructure. Indeed this appears to be the avenue that Wellington Airport is pursuing:¹²

“...even a cursory look at the figures shows why government, local and central, is likely to provide support.”

However, an important problem with socialising costs in this way is that many people will advocate for infrastructure if they benefit from it but do not have to bear the costs.

NZIER supports the well-established principle that the costs of infrastructure provision should be borne by those who benefit from infrastructure provision, unless special circumstances justify a departure from this principle.¹³ This is, for example, the key principle of the Electricity Authority’s attempts to reform the charging for the

¹² Justin Lester and Marko Bogoevski. ‘Runway plan of genuine value’, *Dominion Post* 8 December 2014, www.stuff.co.nz/dominion-post/comment/63925569/Runway-plan-of-genuine-value

¹³ For instance, refer to *The power of price*, NZIER Insight 48 30 October 2014, on the benefits of user charges for Auckland’s transport network. <http://nzier.org.nz/publication/the-power-of-price-nzier-insight-48>

fixed costs of national power grid.¹⁴ One important source of benefit is that it increases the incentive for key stakeholders to engage with investment decision processes with a prudent and critical eye. For instance, the Major Electricity Users Group’s Executive Director Ralph Matthes had this to say (Energy News 2012):

"it will help in several areas including ensuring 'just-in-time investment, assets only being built that are needed, and Transpower being focused in terms of efficiency so you get the lowest-cost supply'."

3.4. Conclusion of cost-benefit analysis vs an impact study

Table 2 summarises the above discussion on some key differences in a CBA and the EIA undertaken.

Table 2 Summary of some key differences of CBA and impact assessment

Consideration	A good cost-benefit appraisal	EY’s impact assessment
Counting spending in related markets	No — double-counts benefits (but foreign revenues treated differently)	Yes
Tourism spending counted as 100% beneficial	No — need to net off costs	53% of spending was attributed as GVA, presumably to net off costs, but this is unclear
Prices and charges, and resulting demand that is suppressed	Yes — lower benefits result from suppressed uptake and economic development	No

Source: NZIER

Before even considering the details of the analysis it is clear that relying solely on a multiplier study (rather than a cost-benefit analysis also) will:

- provide insufficient guidance on whether the project ought to proceed
- not stand up to scrutiny from decision makers because it exaggerates the effects.

¹⁴ www.ea.govt.nz/development/work-programme/transmission-distribution/transmission-pricing-review

4. Review of assumptions and analysis

In this chapter we outline a range of observations that could be important in any initial consideration of the possible economic viability of the proposed runway extension.

4.1. Runway safety zones

The study implicitly assumed that safety requirements would continue to be met and that pilots and airlines would be prepared to use the runway for long-haul operations.

The issue of RESAs (runway end safety areas) is very important. At present Wellington runway operates with a Civil Aviation Authority (CAA) dispensation to operate with 90 metre RESAs at each end, rather than the required 240 metres where practicable.¹⁵

The risk is that no benefits would be realised from a 300 metre extension because either:

- CAA may require Wellington Airport to provide 240 metre RSAs at each end (or an equivalent solution)
- or even if CAA continues the current dispensation, non-Australasian pilots and/or airlines (tired from a long-haul flight) may refuse to risk flying into what is already a challenging airport to land in.

We understand that CAA's position would be determined before Wellington Airport made any commitment to construct.

4.2. The assumption that people have no preference as to when they travel

The report assumes that in 2020 everyone that is travelling between Wellington and an overseas hub will sit and patiently wait for up to 48 hours to catch the one direct non-stop flight out of town. They would apparently do this in order to avoid the extra travel time via Auckland, Christchurch, or an Australian hub.

Probably some people would retime their travel, because they have no particular preference on precisely when they travel. But we expect that most would not retime their travel to this extent. It is unlikely that long-haul travellers are particularly sensitive to travelling via a closer hub given the size of their overall journeys and the fact they transit multiple hubs across the world anyway. Many will want to commence or finish their travel on a given day, or at a given time.

¹⁵ Dominion Post, *Pilots urge runway safety zone extensions*, 19/06/2013, www.stuff.co.nz/dominion-post/news/8811983/Pilots-urge-runway-safety-zone-extensions, accessed 1 December 2014

This means that the commercial viability of long-haul flights is marginal. If there are no long-haul-flights, no benefits will be realised from the runway extension.

Below is a more explicit summary on EY's calculations:

- by 2020 there will be 104,000 passenger movements (i.e. 1-way) between Wellington and an Asian hub, and 74,000 to a North American hub (page 21)
- the Asian travel corresponds to 4 return flights per week, calculated by 104,000 divided by the product of 52 weeks, 220 people per flight, and 2 directions
- the North American travel corresponds to 3 return flights per week, based on the same formula.

Even if all long-haul travellers waited for the one flight on alternating days to either Asia or the Americas, the number of flights is still close to the threshold of three flights per week that EY assumes is the minimum service level needed to sustain a service.

4.3. The assumption of fewer connecting flights

A key assumption underlying the EY report is that a direct connection between Wellington and the world will reduce connecting flights and make it more accessible. Table 9 on page 29 of the EY report shows that Wellington could almost double its theoretical connectivity within one stop from 35% of the world's population to 61%–65%.

However, this potential connectivity increase will not be realised unless there are routine flights to those locations. In the initial phases of the runway extension's life, only one Asian hub destination is predicted, at a frequency of about four flights a week. In order to realise the projected connectivity increase almost all travellers would then need to make additional connecting flights to other Asian cities. It follows that the four flights per week to one Asian hub is unlikely to drive a substantial reduction in the total number of flight transfers.

Compared to Auckland or Sydney airports, Wellington Airport will continue to be significantly less connected. Consider passenger travel from Auckland and Sydney¹⁶:

- Auckland has non-stop regular connections to 31 cities, 8 of which are in "Asia" (ranging from Bali to Guangzhou)
- Sydney has non-stop regular connections to 43 cities, 12 of which are in Asia.

The lack of actual (rather than theoretical potential) direct accessibility from Wellington to end destinations means that most travellers from Wellington will continue to face connecting flights. It is therefore reasonable to conclude that demand will be significantly lower than that predicted in the EY report.

¹⁶ Source: Sean Ford, Manager Aeronautical Suppliers | Airports, Air New Zealand. Email to Chris Parker dated 17 December 2014.

The combined effect of this issue and the one discussed in section 4.2 above casts doubt upon the commercial viability of the seven flights per week alternating between a North American hub and an Asian hub in the 2020s envisaged in EY's Medium and High scenarios.

4.4. The assumption of no impact on flights from Auckland or Christchurch

The medium and high scenarios assume that larger aircraft that fly to/from Australia can call into Wellington if the runway was longer. Page 14 of the EY report describes that this occurs because of rigid schedules to overseas hubs (such as Dubai), leaving the aircraft idle and needing only to cover its short-run variable costs to make a profit. Such services are called fifth-freedom services.

It follows that the total number of such flights to and from New Zealand is principally determined by the flights between Australia and overseas hubs. It does not seem at all likely that there would be additional flights to New Zealand. Thus, any such flights to Wellington would be at the expense of flights to Auckland or Christchurch as well as narrow-bodied services from Australia to Wellington.

These long-haul flights via Australia would benefit Wellington travellers to the extent that they would not need to transfer between aircraft in Auckland, Christchurch or Sydney. Transfers so avoided may produce a small reduction in demand on domestic flights to or from Auckland. Any net-national benefits from these flights would be marginal, and not a step-change.

4.5. Demand / supply analysis

The EY report relies heavily on data on travel movements from Statistics New Zealand's migration data, obtained by Sabre Airport Data Intelligence. We note that this data is not freely available directly from Statistics New Zealand's Infoshare website.

The report describes:

- 462,000 passenger movements (i.e. each way) between central New Zealand and long-haul destinations for the year end August 2013 (page 8)
- that Wellington has the second highest propensity for residents to travel long-haul (at 340 trips per 1,000 residents, after Auckland's 430), despite the claim that it has relatively poor connectivity to direct long-haul services (page 9)
- that 104,000 passenger movements are to an Asian hub, and 74,000 to a North American hub (page 22).

Wellington's role in New Zealand's international tourism market

Section 3.4 of the EY report outlines Wellington's current role in the tourism market. It describes that less than 5% of Chinese visitor transactions currently occur in the Wellington region, but that there is potential for significant growth in Wellington's international tourism market, particularly from markets in Asia (page 7).

There is a question of whether Wellington is attractive to international tourists given that it is in the middle of the country. If such tourists then visited the South Island, they would need to double back to visit northern regions. Surely such tourists would prefer to enter the country at one end (Auckland or Christchurch) and then travel through the country in one direction rather than begin in the middle of the country and backtrack?

One useful way of possibly assessing this would be to analyse the travel patterns of Australian visitors, who are not restricted by the length of Wellington's runway. It was unfortunate that Australia was missing from Figure 5 on page 10 of the EY report. If the proportion of Australians that fly between Wellington and Australia represented the preferences of visitors from other parts of the world, this could provide useful clarity on Wellington Airport's ability to develop its overseas market.

The demand modelling process

The process for modelling demand is outlined at a very high level on page 15 of the EY report. However, there is no technical background provided that allows one to rapidly double-check the workings. An analyst wishing to do so would need to start from scratch.

Moreover, references to the analytical sources are not provided (such as to IATA's "generic stimulation curve" for transformational changes in accessibility discussed on page 16). We have contacted IATA to check whether this demand curve existed, as the report implied that this tool differed from IATA's published research on demand elasticities, but have not yet received a detailed response.

EY's broad approach is as follows:

- it starts with what is called 'Phase 1', which considers the existing numbers of long-haul movements, and baseline growth
- it then (in 'Phase 2') considers induced demand (i.e. an increase in the quantity of travel demanded because of what we presume is a decrease in the generalised cost of travel)
- finally, with 'Phase 3' there is an assumption of further increased demand from more services, which in turn increases the attractiveness of travel.

The transport literature calls the third phenomenon the 'Mohring effect'. It is commonly observed in the field of public transport; e.g. more people catching buses will eventually lead to more bus frequencies, which benefits bus users.

The report describes how some other adjustments were also made, such as:

- increased marketing for the new routes
- some proportioning of demand across competing service offerings (so that a service is not all-or-nothing relative to another).

Some benefits for freight were calculated, and the approach appears fit for purpose. A modest increase in air freight is expected to occur, in line with the number of flights from larger aircraft. The benefit is avoiding the higher cost of travelling to Auckland or Christchurch by road. The results (on page 28) show that freight benefits were immaterial (contributing less than 0.5% of benefits).

Considerable new analysis would be required to independently check whether the modelled demand findings are sound.

4.6. The conversion from expenditure to GVA

The EY analysis considered both expenditures from tourists and the impact on gross value added (GVA). EY describes GVA as the difference between output and intermediate consumption (page 26).

Table 8 (page 26) of the EY report presents the potential direct economic impact – at the national and the Wellington level – of the runway extension based on low, medium and high demand scenarios.

From the expenditure side, EY estimates the direct economic impact at the national level to range between \$238 million in 2020 and \$490 million in 2060. It appears that the corresponding GVA effects were then computed by multiplying these expenditure-side impacts by a factor of 0.53, giving rise to national level GVA estimates ranging between \$125 million in 2020 and \$259 million in 2060.¹⁷

Note that the report did not explain the rationale behind the ~0.53 factor as a basis for computing GVA. In principle, the expenditure-side GDP should be equal to the income-side GDP which is the sum of GVA and commodity taxes. An examination of the most recent, Input-Output table published by Statistics New Zealand shows that the ratio of GVA to expenditure-side GDP is roughly 0.90, with the remaining 0.1 share representing the contribution of commodity taxes to GDP.

In short, we have no idea why or how the conversion from expenditure to GVA was done. We would have expected the gap between expenditure and GVA to be more like 10% rather than the 47% used. It may be that the objective of the analysis was different from what we understand it to be, and that a reasonable explanation exists.

4.7. The multiplier used

Direct impacts are multiplied by a factor of 2.5. Where this number comes from is quite unclear – the report seems to have intended to use a figure of 1.5 as the factor to multiply the direct benefits by to get indirect/induced benefits (see footnote 52 on page 32). If this is so then a multiplier of 2.5 applied to the direct benefits could be used to estimate the total benefits.

It might be that the number 1.5 was chosen as the ratio of *'total : direct impacts'*, but then someone else then interpreted the number as the often-used ratio of *'indirect and induced : direct'*. Confusing these two ratios could explain the discrepancies between the Executive Summary and the Economic Impact Results discussion in the report.

The executive summary (page 2) of the report states that the Net Present Value of the total economic impact can be estimated to range between \$974m and \$1,709m at the regional level. These values have been derived by taking the values estimated for regional direct benefits (\$389m and \$684 respectively) and applying the 2.5 multiplier discussed above.

If we turn now to the *Economic Impact Results* chapter of the report (chapter 6) we find that the final bullet point in section 6.5 (*"Indirect/Induced impacts"*, page 32) states that rounded versions of the same two numbers are not the total economic

¹⁷ For the year 2020: 0.525 (\$125 million/\$238 million); for the year 2060: 0.528 (\$259 million/\$490 million).

impact at the regional level, as in the executive summary, but merely the indirect and induced impacts, and that direct benefits are to be added to this range to produce total benefits:

“In the context of Wellington airport, this means that an indicative estimate of the scale of induced and indirect economic impacts from the enhanced international connectivity opened up by the runway extension is likely to be in the region of \$970m to \$1,700 in addition to the direct benefits”.

Section 6.5 makes no statement as to whether this range is to be taken as national or regional impact, but it seems clear that it is derived by applying the 2.5 multiplier to the regional numbers.

If the statement in the executive summary is correct, the range given in section 6.5 must be incorrect, and the true values for estimated indirect and induced impacts at the regional level must be \$585 to \$1025. This range can be derived by multiplying the estimates of regional benefit by 1.5.

This of course assumes that 1.5 is intended to represent the ratio of direct to indirect/induced benefits, and not the ratio of direct to total benefits. If the latter is intended the indirect/induced benefits are lower still: a range of \$195m to \$342m.

4.8. International students

Direct connections overseas are assumed to increase the number of international students that study in Wellington. Most (90%, page 34) of this is transferred from Auckland and Christchurch.

The discussion on page 19 of the EY report made it clear that international connectivity/ease of travel is not a key factor that affects students' choice of education destination. It seemed incommensurate then that the report finds on page 28 that international students will benefit the Wellington region by \$130 million to \$230 million (33% of the Wellington benefits reported on page 28).

5. Our findings

The foregoing discussion suggests that missing costs and overstated benefits in the initial analysis may lead the reader to think that the potential economic viability of the runway extension project is much greater than it actually is. There is good reason to believe that subjecting the project to the more rigorous standards of formal cost-benefit analysis would produce an assessment in which the economic viability of the project would be more marginal.

NZIER's key findings are:

- the purpose of an initial economic assessment of a major infrastructure project ought to have been to establish its likelihood that it would pass a detailed investment appraisal. However, this purpose was poorly served by Wellington Airport commissioning an economic impact assessment, and a multiplier study at that. An indicative Cost-Benefit Analysis (CBA) would have been far more suitable. The risk that the assessment undertaken for Wellington Airport substantially overstates the potential economic viability of the project cannot be ignored.
- formal Cost-Benefit Analysis is best practice when appraising investments. Both Treasury and MBIE conduct CBAs as a matter of course when undertaking reviews of investment options.
- the demand analysis that underpins the results cannot be straightforwardly reviewed because the data it relies on is not in the public domain, there are no formal references to the key analytical tools, and the approach is only outlined at a high level.
- most (93%) of the benefits are from tourist visits. A critical assumption is how much of their spend is net-beneficial, given that what they buy has a cost. A much greater understanding of this assumption is needed
- how the runway extension costs would be recovered can substantially affect the benefits of the project and thus its economic viability. If Wellington travellers on other services and Wellington ratepayers bear the costs, wider costs would result. However, if Wellingtonians don't bear the costs themselves, they have an unduly large incentive to advocate for the project that is not net-beneficial.
- it has been assumed that people have no preference as to when they travel, and that in the 2020s all long-haul travellers in the Wellington region are prepared to wait for the one flight on alternating days to either Asia or the Americas. Given the commercial viability of long-haul flights is marginal, this risks not realising any benefits at all.
- direct flights to/from Wellington would likely require additional connecting flights overseas, further reducing the demand for the service, its commercial viability, and the overall value proposition
- the notion of more 5th freedom connecting flights from wide-bodied aircraft from Australia does not appear to be of significant national benefit, as they would likely be displaced from Auckland and Christchurch
- given that the runway proposed reclamation of 300metres may not increase the runway length sufficiently to enable long haul services, there is

a risk that a longer reclamation may be needed at a substantially greater cost than \$300m.

- it is not clear whether the multiplier used represent the ratio of direct benefits to total benefits or the ration of direct benefits to indirect and induced benefits. The report is inconsistent in its application of the multiplier.
- NZIER does not understand the basis for converting from expenditure estimates to gross value added.

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