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COVID-19 Wage Subsidy: Outcome Evaluation - Value for Money

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1 Document information

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Disclaimer

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit https://www.stats.govt.nz/integrated-data/. The opinions, findings, recommendations, and conclusions expressed in this file are those of the authors, not Stats NZ or MSD.
All results presented have been confidentialised in accordance with Statistics New Zealand's requirements. In particular, all sample sizes and counts have been randomly rounded to base 3 (RR3).

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Abstract

The value for money of the COVID-19 Wage Subsidy Support programme (WSS) was evaluated using cost-benefit analysis from a societal perspective, that encompassed the New Zealand economy as a whole. The subsidy was treated as a transfer (from the government into the wider NZ economy) and negative transfers - government money repaid or not spent, i.e.– subsidy repayments and unemployment support avoided - were subtracted from this. As the analysis was undertaken from a societal perspective, transfers were included as both a cost and a benefit, but with a 20% deadweight burden of raising tax revenue added to the cost side. The cost of administering the wage subsidy was also included.

The quantified benefits of the wage subsidy were increased output associated with people remaining in employment, and the value of the wellbeing they experienced from avoiding unemployment. Outcomes were calculated by employment months gained over the short (6 month) and medium (12 month) term. The March 2020 wave had a favourable benefit-to-cost ratio of 1.20 after 6 months and 1.45 after 12 months. The 12-month ratio was 1.14 for the Extension wave, 0.83 for the Resurgence wave, and 1.63 for the March 2021 wave.

Overall the COVID-19 wage subsidy represented value for money. It allowed more workers to remain in employment and more sole traders to remain in business, than was predicted would occur without a wage subsidy. To understand whether the effectiveness of the wage subsidy as an intervention remained stable over time, it is recommended that an evaluation be undertaken on the August 2021 wage subsidy.

The value for money analysis could only identify direct benefits of the wage subsidy and so was limited to examining microeconomic outcomes. An investigation of fiscal interventions to mitigate the impact of the COVID-19 pandemic on the New Zealand economy is recommended to determine their effectiveness at a macroeconomic level.

JEL codes

J08, J20

Keywords

COVID-19, Wage subsidy, value for money, employment retention, sole trader survival, cost benefit analysis

Summary haiku

COVID hit us hard
Wage subsidies helped secure
Time in employment

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1 Introduction

1.1 Background

The Value for Money Evaluation of the COVID-19 Wage Subsidy Support programme (WSS) sits alongside the Outcomes Evaluation and sources employment data from this.

The WSS was the largest of a suite of measures rolled out in response to the COVID-19 pandemic and subsequent lockdowns since March 2020. Its purpose was to support workers' incomes and livelihoods and enable employers to maintain employment of their workers during COVID-19 lockdowns. Other measures included:

- Leave support scheme to help pay leave for employees isolating due to COVID-19.
- The COVID-19 Income Relief Payment (CIRP) - a temporary, short-term (12 weeks maximum) payment for people who lost their jobs from 1st March 2020 to 30th October 2020.
- Small business cashflow loan to businesses with less than 50 employees that have experienced a 30% drop in revenue in the previous fortnight as a result of the COVID-19 pandemic.
- Events transition support payment scheme to cover non-recoverable costs incurred by events' organisers for COVID-19related cancellations.
- COVID-19 Support Payment (CSP) to help viable and ongoing businesses that experience a 40% drop in revenue.
- Short term absence payment – to support workers isolating whilst they await the result of a COVID-19 PCR test.

The support measures were initially put in place to address economic uncertainty related to the global COVID-19 pandemic and the necessary Public Health measures implemented in response to it. Later support was aimed at helping businesses adjust to changes in markets and working practices resulting from the pandemic.

1.2 Scope

The scope of the value for money assessment covers only the COVID-19 wage subsidy. It did not investigate any other of the support measures listed above. Due to lack of information, it could not consider whether firms that received the wage subsidy did or did not receive additional support from the Government during the COVID-19 pandemic response. There was an interaction with the CIRP payment, which is detailed in section 4.1 of this report.

Only the first four iterations of the COVID-19 wage subsidy were investigated, due to insufficient time having passed for impacts from the August 2021 wage subsidy to have been realised.

Each iteration of the wage subsidy was examined separately and treated independently from all other iterations. As documented in the Outcome Evaluation, uptake of the wage subsidy was dominated by the March 2020 wave - representing 46% of the 50% uptake from any wave - and fell progressively with each subsequent wave. There was therefore a strong likelihood that firms that received the wage subsidy for named workers (workers named in a subsidy application) in the Extension, Resurgence and March 2021 waves had already received the March 2020 subsidy.

2 Literature review

Wage subsidies, amongst other support strategies, were established (or re-deployed in countries which had previously used wage subsidies) in many countries globally to support COVID-19 related lockdowns. Wage subsidies effectively encourage businesses to retain employment relationships during the eligibility period. Take-up of wage subsidies varied significantly across nations. NZ had the highest take-up in OECD nations, with 66% of all New Zealand jobs estimated to have been supported through the original Wage Subsidy Scheme (OECD, 2020). However, take-up of wage-subsidies reflected the suite of supports available, which differed across nations. An important difference was whether subsidies aimed at firms came with a requirement for employee retention, or for a specific level of support to be passed on to employees. A detailed review of literature examining wage subsidy schemes, their recipients and their impact is provided in the Outcomes Evaluation. This review focuses on cost effectiveness of wage subsidy schemes on across different countries.

No other cost-benefit analyses of a COVID-19 related Wage Subsidy Scheme has been identified by the authors to date, however, cost estimates per job saved have been made. In Australia the Jobkeeper Payment, was estimated to cost A$100,000 per job saved over the short term (6 months), equivalent to NZ$106,992 - at the April 2020 A$ to NZ$ exchange rate. (Bishop and Day, 2020), or A$107,900 per job saved – time period not specified (Borland and Hunt, 2021). Unlike, in Australia, New Zealand, and other OECD nations, the US the Paycheck Protection Programme was not linked to a requirement to retain employees or pass on a particular amount to workers. It was estimated to have cost US$170,000-257,000 (April 2020 NZ$278,433 - $420,925) per job-year saved (Autor, 2022) to US$337,000 per job retained (April

2020 NZ$551,952) (Chetty et al, 2020). These much higher costs per job are partly due to the scheme not saving as many jobs as expected (Autor, 2022).

The most closely paralleled recent economic response to a disruptive event in New Zealand, was the Earthquake Support Subsidy, introduced following the 2010/2011 Christchurch Earthquakes. An examination of the impacts of this was conducted by Fabling, Grimes and Timar (2016). The authors identified initial adverse employment outcomes following the second (2011) earthquake, but greater likelihood of employment and higher wages (in comparison to a control group) over the longer term (3 years). The Earthquake Support Subsidy kept workers in their jobs in the short term (5 months) but with no difference between workers from subsidised and unsubsidised firms thereafter – once the subsidy had ended. This was found to reduce immediate outward migration from the city, which persisted in the longer term (Fabling, Grimes and Timar, 2016).

Several studies have also provided calculations for firm survival (Demmou et al., 2022; Lalinsky 2021; Kuchakov & Skougarevskiy 2021), and worker outcomes, including job-turnover (Acheson, 2021; Janzen 2022). These studies generally agreed that wage subsidies significantly improved firm survival throughout 2020. A study using data from the Russian federal tax register, reported that 68.6% of firms that took advantage of interest free bank loans to cover wage payments (name of scheme not stated) continued to operate until end-year 2020. By comparison versus only 6.3% of non-recipient firms continued to operate until end-year 2020 (Kuchakov & Skougarevsiy 2021). In Slovakia, Lalinsky & Pàl, (2022) found that more productive firms were more likely to receive a wage subsidy (name of scheme not stated), and that wage subsidies somewhat mitigated the effect of financial losses to firms. However, although statistically significant this mitigation was small in comparison to the size of the shock. Smaller firms were helped more by wage subsidies than larger firms The risk of illiquidity was reduced in those smaller firms by 30%-50% between March and June 2020 (Lalinsky et al 2022).

In Ireland an estimated 25% of jobs were supported through wage subsidies (Andrews, et. al. 2021). A reported €2.8 billion investment in wage subsidies resulted in 664,500 jobs being saved through to the end of 2020 (Acheson 2021). This equates to a cost per job saving of €4214 (April 2020 NZ$7494). Since each of these figures (relating to the cost of jobs saved) were calculated using different methods, they cannot be considered entirely comparable.

Janzen and Radulescu (2022) found that take-up of wage-subsidies amongst 10,000 Southern and Eastern European firms was unrelated to the (proportional) reduction in sales. There was a statistically significant reduction in layoffs amongst firms accessing wage subsidies in some models. However, deferral of payments schemes were associated with stronger and

more consistent reductions in job losses (Janzen and Radulescu 2022). Studies of wage subsidies from pre-pandemic times found that such subsidies had no impact on employment levels generally, or only resulted in a short-term increase (Lalinsky 2022).

In general, we can see that wage subsidies were effective protection to economies globally, against the immediate impacts of COVID-19 and associated lockdowns. Spill over effects of emergency policies (for example on trading partners and supply chains) as well as more general economic uncertainty, still appear to have had a significant impact. The exact degree of protection provided cannot be clearly understood due to these externalities. Nevertheless, several useful points emerge from these initial studies.

Firstly, the benefit of wage subsidies is consistently evident for the short-term (<12months) only.

Secondly, wage subsidies linked to employment retention requirements saw a larger proportion of the support flow through to households, and comparatively less support used for stabilising firms. This meant that non-productive firms were less likely to be unintentionally kept afloat (zombie firms) where employee retention was a requirement.

A third factor which runs across these initial studies is the state of the underlying administrative infrastructure on the efficiency of subsidy implementation. New Zealand and Ireland both benefitted from recent upgrades to taxation administration infrastructure, while federal level administrative infrastructure in the US was very poor. These factors dictated what style of intervention was possible at a fast pace. Those countries with better infrastructure benefitted from efficiencies.

As more data become available and deeper analyses are conducted, more information may emerge on longer-term impacts of both the crisis and the response.

3 Value for money outcome evaluation model

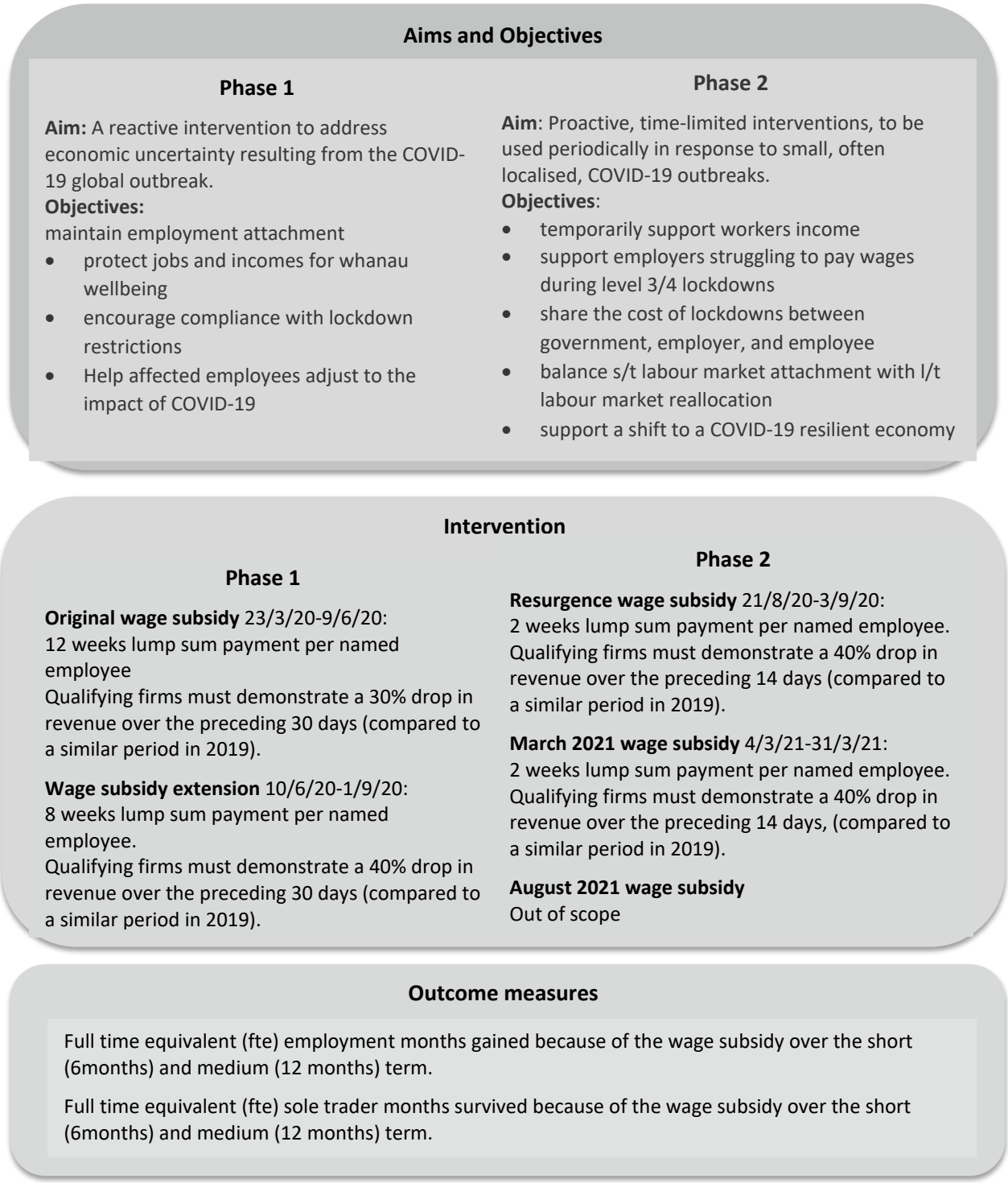
3.1 Outcome measures

Figure 1 presents the process by which the outcome measures were identified. These were based on the stated aims and objectives of the wage subsidy scheme and how they were applied to each wave (interventions).

As detailed in the *Figure 1*, phase one objectives of the wage subsidy were focused around maintaining employment attachment. This is examined in detail in the Outcome Evaluation (Motu Working paper 23-02). The value for money component evaluates employment outcomes of sole traders and workers who were listed (by firms)in successful subsidy applications. This is

more closely associated with the Phase two objectives – employment retention in a changing labour market– and provided a better overall measure of the output and wellbeing benefits achieved.

Figure 1: COVID-19 WSS value for money outcome evaluation model



Objectives for which value for money could not be directly captured but would have been achieved as an indirect result of resources being successfully allocated, include supporting firm survival through successive lockdowns, aiding adjustment (of both workers and firms) to the

economic impacts of the pandemic and reducing the burden on health services by enabling greater compliance with lockdown restrictions.

3.2 Cost-Benefit Analysis

Value for money was measured using cost-benefit analysis. This was undertaken from a societal perspective (i.e., encompassing costs and benefits accrued by the NZ Economy as a whole). Benefits were measured by employment and sole trader survival months gained at each wave of the wage subsidy over the short (6 month) and medium (12 month) term.

Outcomes were measured against a null counterfactual (of not having received the wage subsidy). Subsidised firms were matched to unsubsidised firms, controlling for industry type, firm size, prior growth and ethnicity and age of employees listed. The difference in months of employment / sole trader survival between subsidised and unsubsidised firms was used to measure the marginal benefits achieved from each wave of the wage subsidy. All values were calculated from the start date of each lockdown period and adjusted to an April 2020 base value.

The benefit to cost ratio (BCR) was calculated for each time-period (*t*) – i.e., the short or medium term - using the equation below:

$$BCR_t = (T_t + B_t) / ((T_t*1.2) + C)$$

where T represents transfers, B represents benefits and C represents costs. Costs were fixed for each wave of the wage subsidy whilst benefits were variable based on number of employment / sole trader survival months gained. Transfers were a mix of fixed and variable values; these are described below (*see section 4.1*).

A BCR>1 indicates that the intervention had a positive economic benefit to society. A net present value was also calculated for each time-period. This indicates dollar gains or losses accrued from the intervention based on April 2020 values, and was calculated using the equation below:

$$NPV_t = (T_t + B_t) – ((T_t*1.2) + C)$$

A limitation of the approach taken was that, whilst a societal perspective was used, only direct micro-economic benefits were accounted for. The wage subsidy provided a fiscal stimulus to the NZ economy as a whole, that reached beyond subsidised firms and their workers. This would have benefited workers and firms that did not receive the wage subsidy as well as those that did. Something that was likely to underestimate the benefits gained by those in receipt of the wage subsidy. Therefore, outcome estimates are likely to be on the conservative side.

4 Model components

A detailed breakdown of components included in the cost-benefit analysis is given in Table 1. Sources are detailed and a validity assessment indicated based on the quality of the data source. Higher validity indicates a reliable primary data source. Lower validity scores indicate a secondary and/ or less reliable data source or where figures have been imputed. The data source and treatment of each component of the cost-benefit analysis are detailed below.

4.1 Transfer Payments

The net transfer value included in the cost benefit analysis was calculated using the equation below:

$$T_t = P - (R + U_t)$$

The majority of Government expenditure associated with the COVID-19 wage subsidy was payments to firms (P). Also included were wage subsidy repayments (R) and unemployment payments (CIRP or Jobseeker Allowance) avoided (U_t) due to workers remaining in employment. Whilst wage subsidy payments and wage subsidy repayments had a fixed value, unemployment payments avoided were variable based on number of employment / sole trader survival months gained.

From a societal perspective these components were considered transfer payments, as they were moved from one party to another within the economy, without the creation or destruction of resources. However, transfer payments have an incentive effect on productivity which needed to be taken into account. This is termed the '*deadweight cost of taxation'* and recognises the propensity for people to choose goods and services at a lower rate of tax over those at a higher rate of tax (NZ Treasury, 2015). Treasury recommend that 20% be added to the cost of transfers as a default loss of value in the absence of an evidence-based alternative (NZ Treasury, 2015).

Transfer costs can be treated in two ways; they can be included on both sides of the ledger, or on neither. Where transfers are not included, the deadweight cost of taxation still needs to be listed as a cost. In this model transfers have been included in the analysis. Not including transfers does not impact on the net present value of gains from each subsidy wave but would inflate the benefit to cost ratio.

4.1.1 Wage subsidy payments

The total amount paid out at each wave of the wage subsidy was extracted from the Statistics New Zealand Integrated Data Infrastructure (IDI). This amounted to $14 billion across all waves.

The number of businesses and number of employees that received the wage subsidy at each wave were also extracted from the IDI. Overall, 85% of employees that received a subsidy were full time and 15% part time. As detailed information was not broken down for each wave, the same proportions were applied to all four waves of the wage subsidy. Unit level payment (per employee per week) were obtained from publicly available information on the Work and Income website.

4.1.2 *Wage subsidy repayments*

The total amount of the wage subsidy repaid ($726.2 million) was identified from the report of the Controller and Auditor General (2021), paragraph 3.44, page 30. Repayments associated with each wave of the wage subsidy were supplied by personal communication with the Ministry for Social Development (MSD). The sum of repayments reported by MSD ($735.7 million) exceeded those recorded in the Auditor General's report. This is likely to be because they were more up to date.

4.1.3 *CIRP and Jobseeker Support Payments avoided.*

CIRP avoided was measured for the first three waves of the wage subsidy. Jobseeker payments avoided were measured for the March 2021 wave, by which time CIRP had ended. Weekly rates for both types of support payment were publicly available on the MSD website[1][2]. Jobseeker Support Payments vary according to household composition therefore payments were calculated from the average monthly value across all payment rates. These were measured by the (full time equivalent) employment/ sole trader months difference between subsidised and unsubsidised firms for each wave of the wage subsidy.

It was assumed that payments made in the Original, Extension and Resurgence waves were CIRP as these were paid at a higher rate. This may have led to the value from CIRP payments being over-estimated, as uptake was relatively low. A sensitivity analysis was therefore conducted using just the Jobseeker Allowance rate for payments across all for waves.

4.2 Costs

Only costs in addition to business as usual were included in the model. Opportunity costs of staff being reallocated from other work were not included, as the full extent of these could not be determined from the information available. In addition, business as usual was likely to have anyway been impacted by the COVID-19 pandemic. As detailed above, the net deadweight cost of taxation from transfers was included.

[1] https://workandincome.govt.nz/covid-19/previous-payments/income-relief-payment.html
[2] https://www.workandincome.govt.nz/map/deskfile/main-benefits-cut-out-points/at-1-april-2020-01.html

4.2.1 *Administrative costs*

Administrative costs were based on additional government funds allocated to Inland Revenue (IR) and the Ministry for Social Development (MSD) to manage the wage subsidy programme. These were $14.9M approved by Cabinet in March 2020 and a further $400,000 agreed in August 2020. The additional funding was allocated for 199 extra staff and updating IT systems to administer the scheme. These figures were extracted from the Controller and Auditor Generals (2021), report (pages 40-41, paragraphs 2.40 and 2.46) and confirmed by personal communication with IR. It has been assumed that all allocated funds were spent. Administrative costs were exclusive of the opportunity cost of staff seconded to the programme, as a full quota of these could not be found. Therefore, the figure quoted may be underestimate the full cost of administering the WSS programme.

As only a total amount was available, the administrative cost of each wave of the wage subsidy was estimated as a proportion of the total, weighted by the number of successful applications in that wave This is summarised in the equation below where A_i is the administrative cost for subsidy wave *i*, A_{tl} is the total administrative cost over all four waves and S is the number of subsidies paid to firms.

$$A_i = (A_{tl}/S_{tl})*S_i$$

4.3 Benefits

Benefits were measured from the start date of the lockdown period that corresponded to each wave of the wage subsidy and calculated using employment and sole trader survival months gained.

4.3.1 Output

The output benefits were calculated from the estimated employment impacts from the Outcome Evaluation (Hyslop et al, 2023), valued at a proportion of monthly earnings. The proportional effects on employment in employing firms were derived from Table 33 (column 5) of Hyslop et al (2023) for the March 2020 wave, and from the corresponding columns of Table 34 for later waves. These are slightly conservative estimates compared with those in column 4. For sole traders, effects are based on estimates of survival impacts from Table 13. The implied monthly pattern of impacts was calculated by interpolating between the estimated 1, 3, 6, 9, and 12 month impacts.

The output benefits are calculated by valuing the employment impacts (in months) in proportion to the average monthly earnings of workers in the 12 months prior to each wave of the wage subsidy. For the March 2020 wave, the average was $4,771 (as shown in the final

column of Table 21 of Hyslop et al (2023). For subsequent waves, a common value of $4,119 was used. The base case scenario calculated output benefits by valuing employment impacts at 50% of average earnings during the lockdown period associated with each wave and 100% thereafter. Sensitivity analysis was conducted assuming 0% and 100% of monthly earnings during lockdowns. The same method was used to estimate output from sole trader survival. More detailed data necessary to calculate sole trader income in the 12-month period prior to each wave of the wage subsidy were not available. Therefore, for the purposes of valuation, sole trader monthly earnings were set equal to the average earnings of subsidy recipient employees as described above.

4.3.2 Wellbeing

The wellbeing benefits were calculated based on estimates of how much unemployment was avoided as a result of the subsidy impacts. The number of months of unemployment avoided was based on the employment impacts documented in the previous section. The monetary value of unemployment-months avoided was calculated using figures included in the CBAx impacts database (October 2022 edition) for *unemployment (general population)* -and adjusted to 2020 prices. The implied wellbeing benefit of each person-month of unemployment avoided is $549. The estimated value of unemployment that is used in the CBAx is based on an hedonic valuation produced by Smith and Davies (2020). Smith and Davies use data from the 2014 and 2016 waves of the New Zealand General Social Survey (GSS) to estimate the change in household income that would lead to the same change in subjective wellbeing as being in a state of unemployment.

4.4 Assumptions

The assumptions made below allow the model to be standardised and comparisons between waves of the wage subsidy to be made. Some assumptions have been drawn from standard rates recommended where exact values are not available – for example the deadweight cost of taxation. Others have been made where data limitations make exact values unavailable – for example the proportion of full to part time workers in each wave. Assumptions about the wage subsidy scheme that formed the base case scenario of the cost benefit model were :

- Time periods started from the first day of each wave of the wage subsidy.
- All costs and benefits were adjusted to their April 2020 monetary value.
- A deadweight cost of 20% was added to all government expenditure.
- Workers and sole trader months gained were treated independently for each wave of the wage subsidy

- Impacts of each wave of the wage subsidy were considered independent from any subsidy payments made in previous wave.
- The proportion of full-time to part time workers that remained in employment (used to calculate fte employment/ sole trader months gained) was the same as the proportions of full-time to part time workers that received the subsidy.
- During lockdowns output was valued at 50% of the average earnings of named workers from subsidised firms over the previous twelve months.
- For the first three waves of the wage subsidy (Original, Extension and Resurgence), unemployment benefits avoided were calculated using the CIRP rate. For the March 2021 wave an average value for Jobseeker Support was used, (as CIRP was no longer available).

Whilst enabling comparisons between waves, assumptions do limit the generalisability of the model and the ability to compare outcomes between different models. A further limitation was that some assumptions reduce the accuracy of model outcomes by simplifying input criteria. Sensitivity analysis was used to test the influence of some of these limitations.

4.5 Base case scenario

The base case scenario refers to the preferred set of conditions (assumptions and input values) from which the benefit to cost ratio is calculated (YHEC, 2016). This scenario has been run for the short and medium term using the conditions described below and the assumptions listed in 4.4.

- Benefit to cost ratio of employment / sole trader months gained over the short term (6 months) including transfers and 50% output during each lockdown period.
- Benefit to cost ratio of employment / sole trader months gained over the medium term (12 months) including transfers and 50% output during each lockdown period.

4.6 Sensitivity analysis

Sensitivity analysis adjusts the base case scenario to determine the robustness of the cost-benefit model. This is done by varying assumptions and input values (YHEC 2016). In base case model unemployment payments avoided were assumed to be CIRP during the first three subsidy waves. As CIRP was time limited and uptake low, a sensitivity analysis was conducted using the Jobseeker Allowance value for unemployment payments avoided. In addition, sensitivity analysis varied the valuation of output effects during lockdowns.

Sensitivity analyses run for the short and medium term are listed below. All other assumptions listed in 4.6 remained in place.

- Benefit to cost ratio of employment / sole trader months gained over the short term (6 months) including transfers, valuing output benefits based on 50% of average earnings during each lockdown period, with all unemployment payments avoided assumed to be Jobseeker Allowance.
- Benefit to cost ratio of employment / sole trader months gained over the medium term (12 months) including transfers, valuing output benefits based on 50% of average earnings during each lockdown period, with all unemployment payments avoided assumed to be Jobseeker Allowance.
- Benefit to cost ratio of employment / sole trader months gained over the short term (6 months) including transfers, setting output benefits to $0 during each lockdown period, (lower bound).
- Benefit to cost ratio of employment / sole trader months gained over the medium term (12 months) including transfers, setting output benefits to $0 during each lockdown period, (lower bound).
- Benefit to cost ratio of employment / sole trader months gained over the short term (6 months) including transfers, valuing output benefits based on100% of average earnings during each lockdown period, (upper bound).
- Benefit to cost ratio of employment / sole trader months gained over the medium term (12 months) including transfers, valuing output benefits based on 100% of average earnings during each lockdown period, (upper bound).

5 Outcomes

Table 2 details the base case scenario for each wave of the COVID-19 wage subsidy over the short and medium term. A net benefit to society from the COVID-19 wage subsidy was demonstrated where there was a BCR >1. This was observed at base case for the Original, Extension and March 2021 waves. Only the Resurgence wave demonstrates a net cost in both the short and medium term. The greatest impact was observed for the Original wave, with a BCR of 1.2 over the short term and 1.45 over the medium term, representing a saving to society of just over five and a quarter billion over twelve months.

Table 3 details the application of sensitivity analysis – varying the rate at which unemployment payments avoided were calculated, and the valuation of output benefits during lockdowns based on 0% (lower bound) to 100% (upper bound) of average earnings. Varying the

rate of unemployment payments avoided reduced the BCR very slightly for the Original wave (from 1.45 to 1.43) and Extension wave (from 1.05 to 1.04) and made no difference to the Resurgence or March 2021 waves. The range of the BCR widened as a result of changes in the assumptions about output valuation during lockdowns across all four waves. However, values did not fall below the 1.00 threshold for cost effectiveness in the Original, Extension and March 2021 waves, nor lead to a benefit to cost ratio above one for the Resurgence wave. Variation was greatest during the Original wave and lessened thereafter.

Over all four waves, a greater proportion of gains were over the short term. In addition, greatest gains were observed for the Original wave. These outcomes were in line with that found by Demmou (2022), who observed that the effects of wage subsidy schemes on business outcomes, across 14 OECD countries, were strongest where they were used as a short-term response. A similar response was observed in New Zealand for the Earthquake Support Subsidy, which was found to maintain short term job retention following the 2011 Christchurch earthquake (Fabling, Grimes and Timar, 2016).

Cost effectiveness outcomes were likely to have been influenced by the demographic breakdown of those that benefitted most from the wage subsidy. The Outcome Evaluation identified job and employment retention gains amongst subsidised firms were greatest for the under twenty-five age group and lowest amongst those aged forty to fifty-four years. This was similar to findings outlined in a New Zealand study by Graham and Ozbilgin (2021a), where the wage subsidy was estimated to have saved 17.2% of jobs for workers under thirty but only 2.6% of jobs for workers over fifty, and in Ireland by Byrne et. al. (2020). This younger age group typically earns less, something that would have been reflected in estimated output benefits (which were based on the average monthly wage of named employees over the preceding twelve months). The impact of this was a lower benefit to cost ratio and net present value than had recipient employees been evenly distributed across age groups.

The lack of cost effectiveness of the wage subsidy during the Resurgence wave was due to a negative impact on employment retention, ie. there was a negative net difference in employment outcomes for named employees from wage subsidy recipient firms compared to employees from non-recipient firms, even controlling for observed differences between the groups. The remaining difference in outcomes could reflect unobserved differences between wage subsidy recipient and the non-recipient firms . Whilst adjustments were made for differences in age, gender, ethnicity, region and industry of employer between the two groups, other less visible factors also influenced business resilience. These unobserved differences would have affected estimates across all four waves of the wage subsidy. In addition to the negative

impact on employment retention in the Resurgence wave, lower than expected differences in employment retention between recipient and non-recipient firms resulted in relatively low benefit to cost ratios in the Original, Extension and March 2021 waves.

There are several potential explanations for heterogeneity between recipient and non-recipient firms. To qualify for the wage subsidy, firms needed to demonstrate a 30-40% drop in revenue over the preceding fourteen to thirty days, when compared to a similar period in 2019. This was designed to direct the subsidy to where the COVID-19 pandemic and associated lockdowns had the greatest impact on firms and workers, whilst allowing for seasonal variations in business and employment. However, an unintended outcome of the 30-40% drop in revenue threshold was that firms which qualified for the subsidy tended to already be less financially robust than those that did not. The (accompanying) Outcome Evaluation found a positive impact on firm survival from the wage subsidy suggesting that it did not unduly influence the Schumpeter effect (of creative destruction), by delaying the reallocation of resources (labour) to more efficient businesses (Barrero, Bloom and Davies 2020), (Andrews et. al. 2021). Although job retention and firm survival were overall greater for subsidised firms, employment and individual earnings growth was lower. The wage subsidy helped subsidised firms remain viable rather than thrive, during the pandemic.

The wage subsidy also acted as a fiscal stimulus that benefitted businesses across the board, not just those that received it directly. In advanced economies, estimated average GDP growth was greater than expected, based on modelling of GDP trajectories had governments not introduced fiscal interventions to mitigate the effects of the COVID-19 pandemic (Chudik et. al. 2021). By adopting a microeconomic perspective only, the impact when comparing subsidised and non-subsidised firms is conservative. Firstly, it does not consider economy wide benefits. Secondly it narrows differences in employment retention/ sole trader survival between subsidised and unsubsidised firms , leading to benefits being underestimated.

6 Conclusion

The COVID-19 wage subsidy was cost effective in the short and medium term as a means of keeping workers in employment, and sole traders in business. This was true for three out of the four waves (Original, Extension and March 2021). The Original wage subsidy had the greatest net benefit (i.e., financial saving to society) whilst the March 2021 wage subsidy had the highest benefit to cost ratio (i.e., greatest proportional benefit).

The Resurgence wave had a negative benefit to cost ratio. This was because employment retention and sole trader survival were greater amongst firms that did not receive wage subsidy

support during the Resurgence wave, even controlling for observed differences between subsidised and unsubsidised firms and workers.

Overall the COVID-19 wage subsidy represented value for money. It allowed more workers to remain in employment and more sole traders to remain in business, than was predicted would occur without a wage subsidy. To understand whether the effectiveness of the wage subsidy as an intervention remained stable over time, it is recommended that an evaluation be undertaken on the August 2021 wage subsidy.

The value for money analysis could only identify direct benefits of the wage subsidy and so was limited to examining microeconomic outcomes. An investigation of fiscal interventions to mitigate the impact of the COVID-19 pandemic on the New Zealand economy is recommended, to determine their effectiveness at a macroeconomic level.

Table 1:Components of the cost benefit analysis

Component	**Source**	**Validity**	**Unit of measure**	**Value per unit**	**Number of units per wage subsidy***			
					Original	**Extension**	**Resurgence**	**March 2021**
Wage subsidy payment ***Transfer***	MSD IDI	High	Weeks	$596 f/t $350 p/t	12	8	2	2
Subsidy repayments ***Transfer***	MSD	High	Firms	Variable	22,918	3,488	914	1,253
CIRP avoided ***Transfer***	MSD IDI	Medium	Employment months	$2,128 fte**	1,047,385 s/t 1,584214 m/t (base case)	144,504 s/t 199,850 m/t (base case)	10,340 s/t 698 m/t (base case)	N/A
Jobseeker support avoided ***Transfer***	MSD IDI	Medium	Employment months	$1,350 average estimate	1,047,385 s/t 1,584214 m/t (sensitivity analysis)	144,504 s/t 199,850 m/t (sensitivity analysis)	10,340 s/t 698 m/t (sensitivity analysis)	25,786 s/t 34,988 m/t (base case and sensitivity analysis)
Administration ***Cost***	IR, MSD	Medium	Firms	$23	396,201	188,406	81,924	51,582
Wellbeing value of remaining in employment ***Benefit***	CBAx	Medium	Employment months	$549	1,047,385 s/t 1,584214 m/t	144,504 s/t 199,850 m/t	10,340 s/t 698 m/t	25,786 s/t 34,988 m/t
Output gain from remaining in employment ***Benefit***	IDI	Medium	Employment months	$4,771 1st wave $4,119 2nd-4th waves	1,047,385 s/t 1,584214 m/t	144,504 s/t 199,850 m/t	10,340 s/t 698 m/t	25,786 s/t 34,988 m/t

*s/t = short-term time horizon value, m/t = medium term time horizon value, **fte=full time equivalent

Table 2: Cost benefit analysis: Base case scenario BCR by time horizon and subsidy wave

	Short term (6 months)				Medium term (12 months)			
	March 2020	**Extension**	**Resurgence**	**March 2021**	**March 2020**	**Extension**	**Resurgence**	**March 2021**
Costs *($ millions)*								
Subsidy transfer	$13,138	$3,084	$381	$220	$13,138	$3,084	$381	$220
Admin cost	$11	$5	$2	$1	$11	$5	$2	$1
Repayments	-$541	-$127	-$16	-$9	-$541	-$127	-$16	-$9
CIRP/JSS savings	-$616	-$85	-$6	-$10	-$932	-$118	$0	-$13
Total costs	$11,992	$2,877	$362	$203	$11,676	$2,845	$368	$199
Benefits *($ millions)*								
Subsidy transfer	$10,948	$2,570	$318	$183	$10,948	$2,570	$318	$183
Repayments	-$451	-$106	-$13	-$8	-$451	-$106	-$13	-$8
CIRP/JSS savings	-$513	-$71	-$5	-$8	-$776	-$98	$0	-$11
Wellbeing benefit	$575	$79	$6	$14	$870	$110	$0	$19
Output benefit	3777	537	40	103	6338	765	0	141
Total benefits	$17,997	$3,184	$354	$294	$16,928	$3,241	$305	$325
Net Present Value (NPV) of gains *($ millions)*	$2,344	$133	$-17	$82	$5,252	$396	$-63	$126
Benefit to Cost Ratio *(BCR)*	1.20	1.05	0.95	1.41	1.45	1.14	0.83	1.63

Table 3; Sensitivity analysis: BCR and NPV by time horizon and subsidy wave

Scenario	**Short term (6 months)**				**Medium term (12 months)**			
	March 2020	**Extension**	**Resurgence**	**March 2021**	**March 2020**	**Extension**	**Resurgence**	**March 2021**
Base case:								
NPV *($ millions)*	$2,344	$133	$-17	$82	$5,252	$396	$-63	$126
BCR	1.20	1.05	0.95	1.41	1.45	1.14	0.83	1.63
Sensitivity analysis 1: Output, unemployment support avoided measured using average Jobseeker Allowance payment								
NPV *($ millions)*	$2,306	$127	$-17	$82	$5,195	$389	$-63	$126
BCR	1.19	1.04	0.95	1.41	1.43	1.13	0.83	1.63
Sensitivity analysis 2 (lower bound): Output is 0% during lockdowns								
NPV *($ millions)*	$1,123	$74	$-20	$79	$4,032	$338	$-66	$123
BCR	1.09	1.03	0.95	1.39	1.35	1.12	0.82	1.62
Sensitivity analysis 3 (upper bound): Output is 100% during lockdowns								
NPV *($ millions)*	$3,564	$191	$-14	$85	$6,473	$454	$-60	$129
BCR	1.30	1.07	0.96	1.42	1.55	1.16	0.84	1.65

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