FEATURE ARTICLE

THE IMPACT OF THE WORKFARE INCOME SUPPLEMENT SCHEME ON INDIVIDUALS' LABOUR OUTCOMES

THE IMPACT OF THE WORKFARE INCOME SUPPLEMENT SCHEME ON INDIVIDUALS' LABOUR OUTCOMES

EXECUTIVE SUMMARY

- The Workfare Income Supplement (WIS) scheme has been a feature of Singapore's social safety net since 2007. This study examines how WIS has influenced the labour outcomes of less-educated Singaporeans.

- Using a difference-in-differences estimation strategy, we find that WIS was effective in incentivising less-educated Singaporeans, particularly those in the older age groups, to enter and stay in the workforce. For WIS-eligible Singaporeans who were already in the workforce, there was no evidence that WIS resulted in a change in the number of months worked for most age groups, suggesting that the negative income effect of WIS on labour supply was offset by the positive substitution effect.

- While the gross wages (i.e., wages excluding WIS payout) of workers in all age groups increased, we find that WIS-eligible workers recorded a slower rate of increase in gross wages compared to those not eligible for WIS. This could be due to WIS-eligible workers working fewer hours (even though they were working the same number of months), or the sharing of the WIS subsidy between workers and employers as predicted by economic theory.

The views expressed in this paper are solely those of the authors and do not necessarily reflect those of the Ministry of Trade and Industry or the Government of Singapore.

INTRODUCTION

The Workfare Income Supplement (WIS) has been a key feature of Singapore's social safety net since 2007. WIS aims to encourage older low-wage workers to remain in the workforce by supplementing their income, and in the process, raise their retirement savings. A brief description of WIS is included in Annex A.

This study attempts to evaluate the impact of WIS on the labour market outcomes of less-educated Singaporeans between 2007 and 2010. In particular, we estimate the impact of WIS on (i) the extensive margin of employment[1] (i.e., whether more individuals entered the workforce); (ii) the intensive margin of employment (i.e., whether individuals who were already participating in the workforce worked more or less months); and (iii) the gross wages of workers eligible for WIS. We also analyse the impact of several rounds of changes in the design of WIS, with a particular focus on the impact of the temporary Workfare Special Payment (WSP) introduced in 2009[2] and the enhancements to WIS (i.e., higher payout quantum and income ceiling) in 2010.

The rest of the paper proceeds as follows. First, we present a brief literature review. Next, we describe the data and our empirical strategy for the study. Then, we discuss our findings before concluding.

---

[1]   The employment rate in this study refers to the proportion of individuals who worked at least one month in the year within our sampling frame.

[2]   The WSP was introduced as an additional assistance scheme to help workers cope with the economic downturn.

LITERATURE REVIEW

Evaluations of similar workfare schemes, like the Earned Income Tax Credit (EITC) in the US and the Working Families' Tax Credit (WFTC) in the UK, have generally found them to be successful in attracting more workers into the workforce. For example, Eissa and Liebman (1996) found that the expansion of the EITC scheme in 1986 increased the employment rate of single mothers in the US by up to 2.8 percentage-points. Similarly, in an evaluation of the UK's WFTC, Blundell, Brewer and Shephard (2005) estimated that the employment rate of single mothers rose by 3.6 percentage-points between 1996 and 2002.

While most empirical studies have found favourable extensive margin responses, the impact of workfare schemes on intensive margin responses is more ambiguous[3] as it depends primarily on the relative strength of the substitution and income effects. Specifically, as workfare schemes augment income, the income effect leads to more leisure being consumed (i.e., the incumbent will work less), while the substitution effect works in the opposite direction due to the higher opportunity cost of leisure (i.e., the incumbent will work more).

Beyond labour supply decisions, workfare schemes have also been found to have a negative impact on wages. For example, Rothstein (2008) found that EITC-induced increases in labour supply placed downward pressure on wages, resulting in a part of the incidence of the subsidy falling on employers. Specifically, Rothstein estimated that more than 72 per cent of the US government wage subsidy went to employers over the period 1992 to 1997.

DATA

The dataset used in the study consists of individual-level data collected from administrative sources, including data on gross wages[4], demographic characteristics, educational status and housing type. The dataset, which is structured as a panel, covers Singapore Citizens with secondary and below educational qualifications for the period 2004 to 2010.[5] Only employees (and not self-employed) are captured in the dataset.

METHODOLOGY

We use a difference-in-differences (DID) strategy to estimate the impact of WIS eligibility on an individual's labour outcomes. Essentially, we compare changes in the labour outcomes of individuals who were exposed to WIS (i.e., treatment group) with the outcomes of individuals who were not (i.e., control group). A key advantage of the DID methodology is that it strips away the effect of macroeconomic factors on individuals' labour outcomes, thereby allowing us to isolate the impact of WIS.[6]

To construct the appropriate treatment and control groups for the DID specification, we exploit the WIS age eligibility criteria.[7] Specifically, an individual is in the control group for a particular year if he was 34

---

[3]   Intensive margin responses would also be affected by differing workfare design schemes. For example, the main unit of assessment for the EITC and WFTC is the household unit, while WIS is assessed at the individual level.

[4]   Gross wages include employee CPF contributions, but exclude employer CPF contributions and WIS payouts.

[5]   We restricted our sample by educational qualifications to create a comparable control group for WIS recipients. For instance, although degree holders tend not to receive WIS, they may not be a suitable control group for WIS recipients who tend to have lower educational qualifications. We also exclude data from 2006 as the introduction of the Workfare Bonus Scheme (WBS) that year may bias our regression results.

[6]   For instance, an improvement in economic conditions may lead to an individual's labour outcomes improving over time, regardless of WIS. The DID methodology allows us to strip away the effect of factors that affected both the treatment and control groups.

[7]   It should be noted that the DID methodology cannot isolate the impact of WIS on labour outcomes from other policies that are implemented at the same time and target Singaporeans in the same age bands (such as CPF contribution rate changes).

years or younger and hence ineligible for WIS that year. If the individual was 35 years or older that year, he is placed in one of four treatment groups corresponding to the different age bands for WIS payouts, *viz.*, 35-44, 45-54, 55-59, and 60-70.[8] We did not use any of the other eligibility criteria for WIS payouts (i.e., income, annual valuation of housing, and number of months worked) to define the treatment and control groups as these could potentially be adjusted by individuals in order to qualify for WIS, which would in turn bias our estimates.

We implement the DID as pooled regressions with the following baseline specification:

$$y_{i,t} = \beta_0 + \beta_1 D_t + \sum_\sigma \beta_{k,\sigma} T_{\sigma,i,t} + \sum_\sigma \beta_{l,\sigma} D_t \times T_{\sigma,i,t} + \beta_m controls_{i,t} + \varepsilon_{i,t} \tag{1}$$

where,

$y_{i,t}$ is one of three labour outcomes for individual i in year t: (i) whether he worked in any one month of the year (the *extensive margin*); (ii) the number of months worked (the *intensive margin*); or (iii) his average gross wage for the months that he worked in that year;

D_t is a time dummy variable taking a value of 1 in the years after WIS came into effect (i.e., 2007 and after);

$T_{\sigma,i,t}$ is a series of dummy variables taking a value of 1 if individual i was in age band σ (35-44, 45-54, 55-59, or 60-70) in year t;

$controls_{i,t}$ is a vector of demographic and employment-related controls (e.g. a functional form on age, marital status, number of children, housing type, gender, race and industry) for individual i in year t; and

$\varepsilon_{i,t}$ is a random shock to the labour market outcome of individual i in year t.

The coefficient of interest is $\beta_{l,\sigma}$, which can be interpreted as the impact of the treatment (i.e., exposure to WIS) on the labour outcomes of individuals in a particular age group.

In addition to the baseline DID specification, we also estimate the impact of the WSP and enhancements to WIS by including time dummies for each year after WIS came into effect:

$$y_{i,t} = \beta_0 + \sum_\tau \beta_{j,\tau} D_{\tau,t} + \sum_\sigma \beta_{k,\sigma} T_{\sigma,i,t} + \sum_\tau \sum_\sigma \beta_{l,\tau,\sigma} D_{\tau,t} \times T_{\sigma,i,t} + \beta_m controls_{i,t} + \varepsilon_{i,t} \tag{2}$$

where, on top of the variables previously defined,

$D_{\tau,t}$ is a series of time dummy variables taking a value of 1 in year τ (2007 to 2010).

By differentiating the impact of WIS in each year, these individual-year time dummies will allow us to determine whether the introduction of WSP in 2009 or enhancements to WIS in 2010 had additional impact on the labour outcomes of the treatment groups.

RESULTS AND DISCUSSION
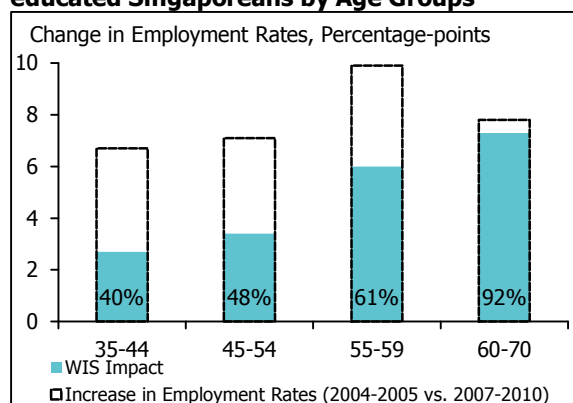
A. Effect on Extensive Margins

Our regression results indicate that WIS has incentivised less-educated Singaporeans to work. Over the period 2007 to 2010, WIS led to a 2.7 to 7.3 percentage-points increase in the employment rate of WIS-eligible Singaporeans, with a larger impact being felt for the older age groups (Exhibit 1A). In fact, the estimated effect of WIS would account for 92 per cent of the increase in employment rate among less-educated Singaporeans aged 60-70 over this period (Exhibit 1B).

---

[8]   We include different treatment groups as older age groups receive more generous WIS payouts and may have different responses to WIS vis-à-vis younger workers.

Exhibit 1A: Impact of WIS on Employment Rates of Workers by Age Groups

Age Band	Estimate (Percentage-points)
35-44	2.7
45-54	3.4
55-59	6.0
60-70	7.3

Note: All results significant at 0.1 per cent level and all placebo tests[9] were cleared at 1 per cent level.

Exhibit 1B: Comparison of Impact of WIS with Overall Increase in Employment Rate of Less-educated Singaporeans by Age Groups

Change in Employment Rates, Percentage-points

40% (35-44), 48% (45-54), 61% (55-59), 92% (60-70)

- WIS Impact
- Increase in Employment Rates (2004-2005 vs. 2007-2010)

Note: Percentages refer to the increase in employment rate attributable to WIS.

The larger impact of WIS among older Singaporeans could be due to several factors. <u>First</u>, WIS payouts were more generous for older workers. For instance, in 2010, the maximum possible payout for workers aged 60-70 was $2,800. This was more than twice the maximum possible payout of $1,050 for workers in the 35-44 age group. <u>Second</u>, older workers may view the same monetary incentive differently from younger workers, perhaps due to the approaching retirement age or other cohort-specific reasons.

Effect of WSP and enhancements to WIS on employment rates

When examining the impact of WIS in individual years for the period 2007 to 2010, we find a statistically significant increase in the employment rates for all age groups from 2007 to 2008, and no further significant increases in subsequent years when the WSP and WIS enhancements were introduced (<u>Exhibit 2</u>). There are two takeaways from this result.

<u>First</u>, since there were no large changes to the payout structure of WIS in 2008, the increase in the effect of WIS that year was likely to be due to learning effects. For instance, workers might have required time to learn about WIS (e.g., the eligibility criteria, benefits from WIS, etc.) and to search for jobs to qualify for WIS. <u>Second</u>, the introduction of WSP in 2009 and enhancements to WIS in 2010 did not seem to have any effect on employment rates. This suggests that most marginal workers might have already entered/re-entered the workforce in the first two years of the implementation of WIS, and much larger payouts than that offered by WSP and enhancements to WIS would be required to further raise employment rates.

Exhibit 2: Effect of WIS on Employment Rates by Year

Age Band	Estimate (Percentage-points)			
	2007	2008	2009	2010
35-44	1.8	2.9§	3.4	3.2
45-54	1.8	3.6§	4.3	4.2
55-59	3.7	6.3§	7.2	6.8
60-70	4.5	7.9§	8.7	7.8

Note: All results significant at 0.1 per cent level and all placebo tests were cleared at the 1 per cent level.
§ denotes coefficients which are different from the year before at 1 per cent statistical significance.

---

[9]   These are tests conducted to ensure that the trends for the treatment and control groups are similar in the years prior to the treatment, i.e., the parallel trends assumption holds.

B. Effect on Intensive Margins

We find that WIS had no statistically significant impact on intensive margins as measured by the number of months that employed individuals worked in a year (Exhibit 3). In particular, after WIS came into effect in 2007, there was little difference between the treatment and control groups in terms of changes in the number of months worked. In fact, the only statistically significant result obtained was for those in the 45-54 age band, where there was an estimated decline of 0.04 months (or around one working day) worked per year per worker compared to the control group.[10] These results suggest that the negative income effect of WIS was broadly offset by the positive substitution effect of WIS for most age groups.[11]

Exhibit 3: Impact of WIS on Intensive Margins of Incumbents

Age Band	Estimate (Months)
35-44	-
45-54	-0.04**
55-59	-
60-70	-^

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; statistically insignificant results are suppressed.
^ denotes results which should be interpreted with caution as they failed the placebo tests on the baseline regressions at the 1 per cent level.

C. Effect on Wages

Consistent with economic theory and other empirical studies, we find that WIS led to a slower rate of increase in gross wages (i.e., wages excluding WIS payout) among workers eligible for WIS compared to workers who were not. Specifically, while gross wages increased across the board between 2004 and 2010, the wage growth of WIS-eligible workers was 0.8 percentage-points (for workers in the younger age band of 35-44) to 3.8 percentage-points (for those aged 55-59) lower than that of workers in the control group, after controlling for demographic and employment-related characteristics (Exhibit 4).

The lower wage growth may have been due to several factors. First, since the WIS eligibility criterion is stated in terms of months worked instead of hours worked (for ease of administration), workers may have chosen to work fewer hours in response to an increase in income (i.e., gross wages plus WIS payouts) arising from WIS even if the number of months worked did not change. Second, part of the incidence of WIS may have fallen on employers. Specifically, the level of incidence of WIS on employers and employees is dependent on the relative elasticities of labour demand and supply. Based on economic theory, the incidence of WIS would fall more on employers if labour supply is more elastic relative to labour demand (see Annex B for details). Indeed, we find that WIS-eligible workers in sectors with lower barriers to entry for workers and hence higher elasticity of supply (e.g., construction, wholesale and retail, and accommodation and food & beverage) experienced a more negative impact on wage growth as compared to the overall average.

---

[10]   This study is only able to measure intensive margin by the number of months worked, as data on hours worked is not collected administratively (i.e., via CPF records).

[11]   According to economic theory, the effect of an increase in income (arising from the WIS payouts) on the number of months worked is negative because individuals can now afford to work less with a higher income. However, by raising the individual's take-home pay for each month worked, WIS also raises the opportunity cost of not working, thereby inducing a substitution from leisure to work. Whether individuals end up working more or less months will depend on the net impact of these opposing forces.

Exhibit 4: Effect of WIS on Gross Wages

Age Band	Estimate (Percentage-points)			
	Overall	Construction	Wholesale and Retail	Accommodation and Food & Beverage
35-44	-0.8*	-5.7***	-	-
45-54	-2.7***	-6.4***	-3.0***	-4.0*
55-59	-3.8***	-6.8***	-5.8***	-5.9**
60-70	-	-	-5.6***	-4.4*

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$; statistically insignificant results are suppressed.
All placebo tests were cleared at the 1 per cent level.

Nonetheless, even if we assume that WIS' negative impact on gross wage growth was due entirely to employers sharing part of the incidence of WIS, our estimates suggest that the incidence of WIS that fell on employers was low on average when compared to that found in empirical studies on the EITC in US.[12] For example, for workers aged 45-54 earning the maximum possible WIS payout with a monthly income of $1,000, the incidence of WIS on employers was estimated to be around 25 per cent (Exhibit 5). In comparison, Rothstein (2008) found that the incidence of EITC on employers was more than 72 per cent.

Exhibit 5: Incidence of WIS on Employers
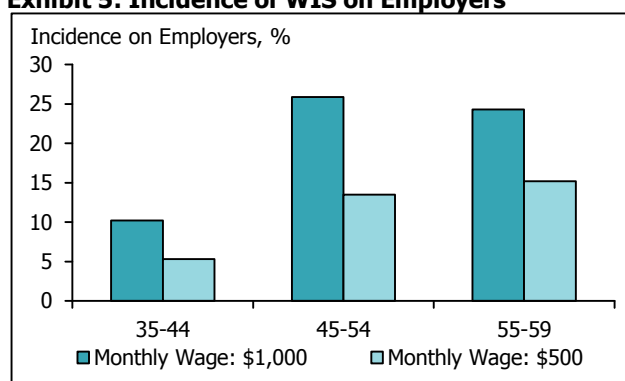
Note: Results for 60-70 age band were statistically insignificant.

CONCLUSION

This study finds that WIS has increased the employment rates of less-educated Singaporeans. This impact was especially strong in the first two years of the implementation of WIS (i.e., 2007 and 2008). There was no significant increase in employment rates thereafter, suggesting that the WSP and the enhancements to WIS in 2009 and 2010 respectively did not incentivise further entry into the workforce. We also find that WIS had little impact on the number of months worked among incumbent workers.

Furthermore, we find that WIS led to a slower rate of increase in gross wages among WIS-eligible workers. This might have been due to workers choosing to work fewer hours or a sharing of the WIS subsidy between employers and workers. Even if we assume that the entire extent of the negative impact on wage growth was due to the latter, the incidence of WIS that fell on employers is still lower than that for the EITC in the US.

---

[12]   Our estimate of the incidence represents an average across WIS-eligible workers in all age groups. As WIS payouts differ across age groups, the incidence of WIS that falls on employers would differ across age groups as well.

Contributed by:

Leong Chi Hoong, Economist
Ong Pinchuan, Economist
Tan Di Song, Economist
Kuhan Harichandra, Senior Economist
Economics Division
Ministry of Trade and Industry

REFERENCES

Blundell, R., Brewer, M. and Shephard, A. (2005). Evaluating the Labour Market Impact of Working Families' Tax Credit using Difference-in-Differences. HM Revenue and Customs.

Eissa, N. and Liebman, J. (1996). Labour supply response to the earned income tax credit. Quarterly Journal of Economics, Vol. 111, No. 2, 605-637.

Rothstein, J. (2008). The Unintended Consequences of Encouraging Work: Tax Incidence and the EITC. Center for Economic Policy Studies, Princeton University, 2008.

ANNEX A: BRIEF DESCRIPTION OF WIS

WIS was announced by the Government in February 2007 as a permanent feature of Singapore's social safety net for Singapore's older low-wage workers. The scheme is intended to encourage these workers to find and stay in work, while at the same time build up their CPF for retirement, housing and healthcare needs. The scheme replaces the earlier one-off Workfare Bonus Scheme (WBS) that was only effective for 2006.

Since the introduction of WIS in 2007, several additional payouts and enhancements have been announced. First, the Workfare Special Payment (WSP) was introduced in February 2009 as an additional one-off payout that year to help vulnerable workers cope with the economic downturn. Second, WIS was enhanced in 2010, with the income ceiling increased from $1,500 to $1,700 and the maximum possible payout increased from $2,400 to $2,800.

ANNEX B: IMPACT OF WIS ON WAGES

WIS is a subsidy paid to employees. Based on microeconomic theory, the introduction of WIS should lead to an increase in the number of workers willing to supply labour at each level of wage offered in the market (known as the gross wage). The labour supply curve therefore moves to the right. The incidence of WIS falls on both workers and the employers, with the level of incidence dependent on the relative elasticities of labour demand and labour supply. Specifically, gross wages should fall more in labour markets with more elastic labour supply curves, holding the elasticity of demand constant.

Exhibit B.1 illustrates the above analysis with two stylised labour supply curves, one more elastic than the other. As can be seen, gross wages fall by a larger amount when the labour supply is more elastic. Intuitively, when the labour supply is more elastic, the same amount of WIS will induce more workers to enter the market. The influx of a larger labour supply gives employers the bargaining power to lower gross wages by more, thereby allowing employers to enjoy a larger incidence of the subsidy. This analysis assumes that workers are not completely mobile across markets.

Exhibit B.1: Effect of Labour Supply Elasticity on Impact