

FEATURE ARTICLE

**THE LONG-TERM IMPACT ON WAGES OF ENTERING THE LABOUR
MARKET IN A RECESSION IN SINGAPORE**

THE LONG-TERM IMPACT ON WAGES OF ENTERING THE LABOUR MARKET IN A RECESSION IN SINGAPORE

EXECUTIVE SUMMARY

- This study examines whether university graduates who entered Singapore's labour market during recessions suffer from depressed wages over the long term compared to their peers who entered during better times.
- Findings show that graduates who entered during recessions would receive lower wages on average. However, their wages would fully catch up with their 'luckier' peers after three years of job experience.
- This suggests that Singapore's labour market is sufficiently efficient, and that the overall social loss is small.

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, the Singapore Department of Statistics or the Government of Singapore.

INTRODUCTION

Singapore has experienced increasing economic volatility in recent years. In the past 15 years, Singapore went through three recessions compared to only one before 1996. Although Singapore rebounded strongly and quickly from each of these recessions, the recessions could leave a long-term impact on certain segments of the labour force. One such segment is fresh entrants to the labour market.

The immediate disadvantages of entering the labour market in poor economic conditions are apparent. Youths who complete their education or vocational training during recessions are likely to experience longer job search times, suffer from job mismatches, and receive lower starting wages compared to those who start when economic conditions are better.

What is unclear is whether these 'unlucky' youths will continue to receive lower wages in the long run compared to their luckier counterparts. If the disadvantages of entering the labour market in poor economic conditions persist in the long run, the Government may need to look into policies that support youth employment during recessions to minimise the extent of (downward) wage persistence. Conversely, if the wages of 'unlucky' youths rebound quickly after the recession, one can infer that the labour market is sufficiently efficient in minimising wage persistence. There will then be less need for policy interventions by the Government.

To the best of our knowledge, there has not been any empirical research that examines whether youths in Singapore face downward wage persistence if they enter the labour force during a recession. Yet, this is an area of research that is of growing importance. With rising economic volatility in Singapore, more cohorts may have to enter the labour market during periods when the economy is not doing well. This paper therefore seeks to answer the key question – *does entering the labour market in a recession have a long-term negative effect on wages?*

LITERATURE REVIEW

Why entering in a recession may leave a lasting negative impact...

Workers who enter the labour market during economic downturns may have persistently lower wages – hence lower lifetime wages – compared to those who enter during favourable economic conditions. Besides long-term contracts which bind ‘unlucky’ workers to jobs that pay less (Beaudry and DiNardo, 1991), wage differences between lucky and unlucky cohorts can also arise from disparities in human capital accumulation.

With limited job options in a recession, individuals are more likely to face job mismatches or be underemployed.¹ According to Gibbons and Waldman (2004), these workers could then end up with low skill acquisition or acquire skills with low transferability. Given lower levels of human capital, their future wages may then be constrained. Gardecki and Neumark (1998) provide support for this theory with evidence that on-the-job training in the early stages of a person’s career has a lasting impact on wages. Oreopoulos, von Wachter and Heisz (2006) further find that lasting reductions in the quality of employees can explain up to 40-50 per cent of persistent earnings losses.

As to why ‘unlucky’ workers may not switch jobs when economic conditions improve, Gibbons and Waldman (2006) argue that workers acquire “task-specific human capital” in their first jobs which then give them a comparative advantage with their initial employers. Neal (1995) also shows that a portion of the returns to tenure with a prior employer, which is often used as a proxy for specific skills, is rewarded when workers are reemployed in the same industrial sector. Therefore, even if the job market is frictionless, ‘unlucky’ workers may choose to stay with their first employers because they may obtain higher utility from doing so.

‘Unlucky’ cohorts could also suffer from depressed wages because the job market takes the initial job placement as a signal of their ability, and fails to take into account the condition of the market when they first joined. In particular, when determining the wages of a new employee, employers typically look at the last drawn wage. Therefore, for a graduate who received a lower wage in his first job because he had entered during a recession, his new employer may take the lower entry wage as a signal of weaker ability, rather than attribute it to the effect of initial labour market conditions. He thus continues to pay the graduate a lower wage, causing the graduate to be disadvantaged over the long term. Einav and Yariv (2006) find evidence of such cognitive biases in the economics job market. They show that economists fail to adequately compensate for the advantages conferred by alphabetical ordering to those with a last name early in the alphabet when they evaluate one another.

Why entering in a recession may not leave a lasting negative impact...

However, entering the labour market in an economic downturn may not leave a lasting negative impact on wages if job mobility is high. Bachmann, Bauer and David (2010) find that workers with initial cohort wages below the average are more likely to leave their jobs. By changing employers, workers can close the initial wage differentials between entry cohorts. In fact, using a job search model, Topel and Ward (1992) show that wage gains from job changes account for a third of early-career wage growth. ‘Unlucky’ cohorts can therefore potentially overcome their initial disadvantaged position if they are able to move into better or preferred jobs with higher pay once the economy recovers.

In particular, job mobility in early careers is important to help overcome the negative impact that initial labour market conditions have on wages. As Oreopoulos et al. (2006) show, search frictions intensify with age and cause initial unemployment rates to lead to permanent earnings differences. Hence, factors that affect job mobility in early careers can determine the extent to which entry labour market conditions exert a persistent negative impact on wages.

¹ Glyde (1977) defines underemployment as “an involuntary employment condition where workers are in jobs in which their skills, including formal and work experience training, are technically underutilized and thus undervalued relative to those of other individuals of similar ability who have made equivalent investments in skill development”.

One such factor is the enforceability of job contracts. According to models of implicit contract, wage contracts could be sticky downwards, implying that economic conditions at entry could be less important than the economic conditions faced by the individual during his career in determining his wages over the long term. In the United States, Schmieder and von Wachter (2010) find that wages increase as outside options improve if employers are contractually prevented from lowering wages or laying off workers, while workers are able to leave if they get better job offers outside. As such, wages could be less affected by the economic conditions at entry than they are by the minimum rate of unemployment faced by the worker while he is on the job.

DATA DESCRIPTION

In this study, we focus on university graduates who are either Singapore Citizens or Permanent Residents (PRs).² We treat a university graduate as a fresh entrant to the labour market in a particular year if:

- a) He or she is aged 28³ or below in that year; and
- b) That year marks the first year in which wage data for him/her is recorded.

Using a longitudinal dataset of these graduates that spans the period 2000 to 2008, we are able to track the wages of eight cohorts of graduates who entered the labour market between 2000 and 2007.⁴

Annual resident unemployment rate is used as an indicator of the health of the economy.⁵ This is similar to the strategy used in most of the related literature.⁶ [Exhibit 1](#) shows the annual resident unemployment rate in Singapore over the period of study. It can be seen that Singapore has enjoyed relatively low resident unemployment in recent years, with the resident unemployment rate hovering within a 2.2 percentage-point band.

Plotting the annual resident unemployment rate against the real mean starting monthly wage of graduates entering the labour market, we can see that the two tend to be inversely related ([Exhibit 2](#)). When the annual resident unemployment rate is higher, the real mean starting monthly wage of the entry cohort tends to be lower. Details are in [Exhibit 5](#) of the appendix. Beyond the immediate impact of the recession on entry wages, it is important to find out whether the negative impact continues over the longer term.

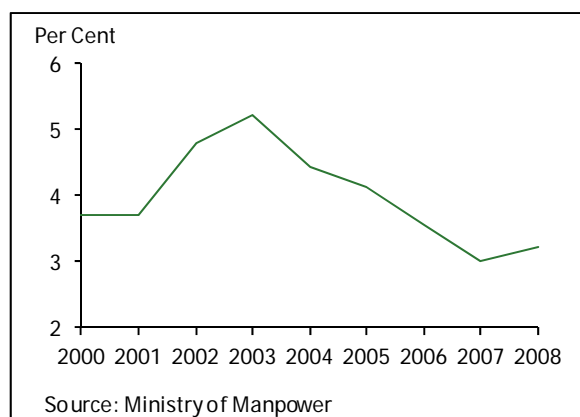
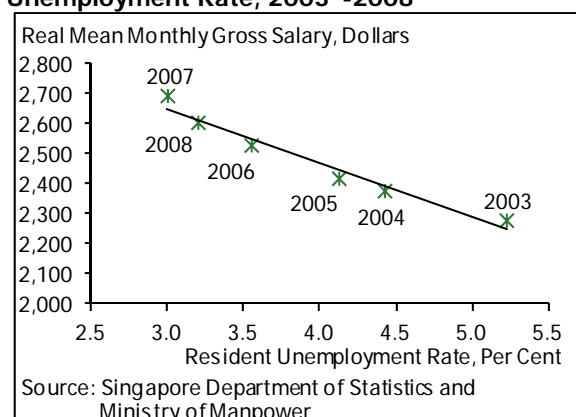
² Those with postgraduate education or who are self-employed are excluded.

³ We consider three cut-off ages - 25, 28 and 30 years old. When the cut-off age is raised from 25 to 28, the sample size more than doubles. Comparatively, the sample size increases on average by only 10 per cent when the cut-off age is raised from 28 to 30. Therefore, the cut-off age of 28 is deemed to be reasonable as it would capture most individuals who graduated with their first degree.

⁴ Individuals who passed away or left the country during the period of observation are removed from the sample. If an individual did not have wage data for any of the years within the period of observation, his or her wage would be recorded as zero for that year, but he or she would still be retained in the sample.

⁵ We use resident unemployment rates instead of unemployment rates for degree holders because we do not want to pick up influences from cohort-specific changes in the labour supply of university graduates. We use resident unemployment rates instead of overall unemployment rates because our analysis focuses on residents, and we want to exclude the effects of foreign manpower.

⁶ See for instance Kahn (2010) and Brunner and Kuhn (2009).

Exhibit 1: Singapore's Annual Resident Unemployment Rate, 2000-2008**Exhibit 2: Real Mean Starting Monthly Salary of Entry Cohorts and Annual Resident Unemployment Rate, 2003⁷-2008**

EMPIRICAL STRATEGY

Our empirical strategy is adapted from Kahn (2010).⁸ We use a standard Mincer earnings function, with the resident unemployment rate included as an indicator of the overall health of the economy.

Equation (1):

$$\begin{aligned} \text{Log}(\text{wages}_{it}) = & \beta_0 + \beta_1 \text{urt}_{it_0} + \beta_2 \text{urt}_{it_0} \cdot \text{exp}_{it} + \beta_3 \text{exp}_{it} + \beta_4 \text{exp}_{it}^2 + \beta_5 \text{industry}_{it} + \beta_6 \text{race}_i \\ & + \beta_7 \text{maritalstatus}_{it} + \beta_8 \text{gender}_i + \beta_9 \text{citizenship}_{it} + \epsilon_{it} \end{aligned}$$

with i denoting the individual and t denoting the year of observation.

The dependent variable in the equation is wages_{it} , which refers to the real monthly wage of an individual in each of his observation years. The explanatory variables are as follows: urt_{it_0} is the annual resident unemployment rate during an individual's year of entry into the labour market; exp_{it} measures the individual's experience and is proxied by the number of years since the individual entered the labour market⁹; exp_{it}^2 is its square; $\text{urt}_{it_0} \cdot \text{exp}_{it}$ is the interaction of the resident unemployment rate in an individual's year of entry and his/her experience; and industry_{it} , race_i , $\text{maritalstatus}_{it}$, gender_i , citizenship_{it} are dummy variables used to control for various individual observable characteristics.

The key variables of interest are urt_{it_0} and $\text{urt}_{it_0} \cdot \text{exp}_{it}$. If the coefficient of urt_{it_0} is negative and significant, it suggests that individuals entering the labour market under poorer economic conditions would tend to have wages that are lower than the wages of those who enter when economic conditions are better. However, as human capital accumulates over time, the disadvantage of entering the labour market under poorer economic conditions may dissipate over time. The interaction of the annual resident unemployment rate in the individual's year of entry and the individual's experience, $\text{urt}_{it_0} \cdot \text{exp}_{it}$, allows us to find out whether this occurs among university graduates in Singapore. If the coefficient of $\text{urt}_{it_0} \cdot \text{exp}_{it}$ is positive and significant, we may conclude that the long-term impact of poor entry economic conditions is limited because the initial disadvantage would diminish or even disappear over time.

⁷ The nominal mean monthly gross starting salary of university graduates is available from the Ministry of Manpower's Report on Wages in Singapore starting from 2003 onwards. The nominal wage data has been deflated to 2000's dollar value using the consumer price index.

⁸ This empirical strategy is also similar to Oreopoulos et al. (2006).

⁹ Therefore, $\text{exp}_{it} = t_i - t_{i_0}$. This term does not take into account the possibility that an individual may be unemployed for certain durations after he has entered the labour market.

In addition to the explanatory variables captured in equation (1), current economic conditions may also affect wages. We therefore include the current unemployment rate, urt_{it} , in equation (2) to measure the relative importance of current economic conditions vis-à-vis entry economic conditions on current wages. If the coefficient of urt_{it} is negative and significant, poor current economic conditions would depress wages.

Equation (2):

$$\begin{aligned} \text{Log}(\text{wages}_{it}) = & \beta_0 + \beta_1 \text{urt}_{it_0} + \beta_2 \text{urt}_{it_0} \cdot \text{exp}_{it} + \beta_3 \text{exp}_{it} + \beta_4 \text{exp}_{it}^2 + \beta_5 \text{urt}_{it} + \beta_6 \text{industry}_{it} + \beta_7 \text{race}_i \\ & + \beta_8 \text{maritalstatus}_{it} + \beta_9 \text{gender}_i + \beta_{10} \text{citizenship}_{it} + \epsilon_{it} \end{aligned}$$

Self-Selection Bias

During recessions, individuals may decide to postpone their entry into the labour market voluntarily or involuntarily. In particular, cognisant of limited job opportunities during recessions, individuals who are of lower ability and are financially able to delay their entry into the labour market may choose to avoid the higher job search costs that are likely to be incurred.

Other than by choice, it is also possible that individuals of lower ability may not be able to secure a job despite looking for one, thus resulting in an involuntary delay in their entry into the labour market. Under our assumptions, a university graduate is treated as a fresh entrant to the labour market in a particular year only when he or she has a job.

By influencing the time of entry into the labour market, individual ability thus affects the entry unemployment rate and experience terms. However, individual ability also influences wages directly. As suitable proxies of individual ability, $abil_i$, are not available, it ends up being embedded in the error term of the model specifications, ϵ_{it} , thus causing endogeneity problems. Represented mathematically, this refers to the following:

$$\begin{aligned} \text{corr}(\text{urt}_{it_0}, \text{abil}_i) & \neq 0 \\ \text{corr}(\text{exp}_{it}, \text{abil}_i) & \neq 0 \end{aligned}$$

To overcome this problem, we instrument for entry unemployment rate and experience using indicators of exogenous timing – i.e., unemployment rate when the individual is at the modal entry age, mod_i , and adjusted age, age_{it} , respectively. Based on the sample, 23 is the modal entry age for females, and 26 for males. Therefore, we instrument for the entry unemployment rate using the unemployment rate in the year the individual turned 23 (for females) or 26 (for males).

As for experience, we use adjusted age as the instrument. Adjusted age is the individual's age if she is female, and the individual's age less 3 years if he is male. For males, we take 3 years off his age because the difference in the modal entry age for the two genders is 3 years. This difference is likely to reflect the National Service requirement that most resident males have to fulfil prior to entering university, rather than any inherent differences in ability between males and females. If we do not make this adjustment, the additional 3 years for males will be misinterpreted as additional experience in the labour market.

Correspondingly, the quadratic in experience is instrumented using a quadratic in the individual's adjusted age; while the interaction of the entry unemployment rate and experience is instrumented by interacting the unemployment rate at the modal entry age with the adjusted age.¹⁰

We argue that the instruments chosen are appropriate¹¹ as they satisfy both instrument exogeneity and instrument relevance conditions:

¹⁰A similar strategy is used in Kahn (2010). Furthermore, the Shea's partial R-squared value shows that there are indeed endogeneity issues with the entry unemployment rate variable and the year of experience variable.

¹¹The first stage results show that the instruments used satisfy the instrument relevance conditions.

Instrument exogeneity:

$$\begin{aligned}\text{corr}(\text{mod}_i, \text{abil}_i) &= 0 \\ \text{corr}(\text{age}_{it}, \text{abil}_i) &= 0\end{aligned}$$

Instrument relevance:

$$\begin{aligned}\text{corr}(\text{mod}_i, \text{urt}_{it_0}) &\neq 0 \\ \text{corr}(\text{age}_{it}, \text{exp}_{it}) &\neq 0\end{aligned}$$

RESULTS AND DISCUSSION

We perform three sets of regressions based on equations (1) and (2). Regression (1) is the Ordinary Least Square (OLS) estimation of equation (1). Regression (2) is the OLS estimation of equation (2), while Regression (3) is the two-stage least squares regression of equation (2). [Exhibit 3](#) presents the coefficients for the key variables of interest. The detailed results are in [Exhibit 6](#) of the appendix.

Exhibit 3: Coefficient Estimates for Equations

| | Regression (1) | Regression (2) | Regression (3) |
|---|----------------|----------------|----------------|
| urt_{it_0} | -0.06** | 0.01** | -0.08** |
| $\text{urt}_{it_0} \cdot \text{exp}_{it}$ | 0.02** | -0.003** | 0.03** |
| urt_{it} | --- | -0.09** | -0.06** |
| IV | No | No | Yes |

Significance level * $p < 0.05$, ** $p < 0.01$

Source: Singapore Department of Statistics

From Regression (1), we find that the adverse economic conditions in an individual's entry year have a significant negative impact on wages. A 1 percentage point increase in the unemployment rate during the year of entry is associated with a wage reduction of around 6 per cent. This suggests that graduates who enter the labour market during recessions would indeed be disadvantaged compared to graduates who enter when economic conditions are better.

However, the initial disadvantage can be overcome with more experience in the labour market. As can be seen from the results, the disadvantage of entering the labour market during downturns diminishes with job experience. In fact, this disadvantage would disappear completely with at least three years of job experience.

For Regression (2), which includes the current unemployment rate as an explanatory variable, we find that adverse current economic conditions also have a significant and negative impact on wages. A 1 percentage point increase in current unemployment rate is associated with a wage reduction of around 9 per cent.

Surprisingly, the sign of the coefficient for urt_{it_0} is reversed, implying that entering the labour market during a recessionary year could have a positive impact on wages. This could be due to the selection bias discussed earlier. The endogenous timing of entry into the labour market could result in an upward bias (of the coefficient of urt_{it_0}) because individuals who are willing and able to enter the labour market during an economic downturn are likely to be those of higher ability who would garner higher wages. By instrumenting for entry unemployment rate and experience in Regression (3), we expect the sign of the coefficient for urt_{it_0} to revert to negative.

In Regression (3), the coefficient for urt_{it_0} indeed becomes negative and significant. A 1 percentage point increase in entry unemployment rate reduces entry wages by 8 per cent. However, job experience helps to mitigate the initial disadvantage. After three years in the labour market, a graduate who entered the labour market during a downturn would enjoy a current wage similar to another graduate who entered under better economic conditions. Compared to Regression (2), a 1 percentage point increase in current

unemployment rate has a smaller effect, reducing wages by 6 per cent.¹²

Our results are similar to those of Kahn (2010). She finds an initial wage loss of 6 to 7 per cent for a 1 percentage point increase in entry unemployment rate in the United States. While this initial impact is smaller in magnitude compared to what we found for Singapore, her estimation also shows that the negative impact would decrease by only 0.4 percentage points each year. This means that in the United States, individuals who enter the labour market under poor economic conditions continue to be disadvantaged for almost 18 years after graduation, or around six times what it would take for the recovery to occur in Singapore.

Given current data constraints, it is impossible for us to determine conclusively the key factors that would have contributed to the quicker recovery in wages in Singapore. However, we postulate two possible reasons. First, compared to their counterparts in the United States, university graduates in Singapore may have greater job mobility. Second, the wage structure in Singapore may have more variable and performance-linked components. Under such a wage structure, it may be easier for 'unlucky' graduates who enter during recessions and end up acquiring less transferable skills to catch up with their luckier peers by taking advantage of continuing education and training (CET) opportunities.

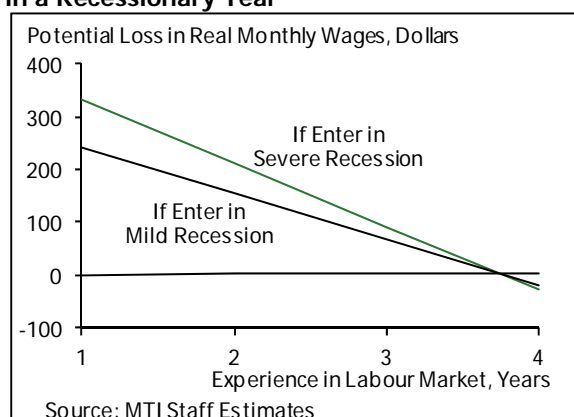
SIMULATION OF POTENTIAL LOSS IN WAGES

To estimate the size of the potential disadvantage that will be suffered by an individual who enters the labour market during a recession, we simulate the cumulative losses in potential earnings over the three-year period needed for the disadvantage to dissipate.¹³ We derive the losses based on the difference between his earnings and that of his counterpart who entered the labour market during a normal year.

We assume that the graduate who entered the labour market during a normal year would receive a real monthly starting wage of \$2,700.¹⁴ We further assume that a mild recession is marked by a rise in the annual resident unemployment rate of 1.1 percentage points.¹⁵ However, if the economy were to be in a more severe recession, the annual unemployment rate would rise by 1.5 percentage points.¹⁶

Our simulation shows that by the time the wage of the graduate who entered the labour market during a mild recession catches up with that of his counterpart who entered during a normal year, the 'unlucky' graduate would have potentially incurred a total wage loss of \$4,000. However, if he had entered during a more severe recession, he would incur a slightly larger potential loss of \$5,500 (Exhibit 4).

Exhibit 4: Potential Loss in Wages of New Entrant in a Recessionary Year



¹² We attempt to examine how the rate of recovery differs across time by specifying a regression model containing a non-linear interaction term, $urt_{it_0} \cdot exp_{it}^2$. Under this specification, the coefficient of $urt_{it_0} \cdot exp_{it}$ becomes statistically insignificant and negative, whereas the coefficient of $urt_{it_0} \cdot exp_{it}^2$ is statistically significant and positive, which suggest that the wage catch-up accelerates with job experience. These results could have come about because the instruments that we have used are unable to completely correct for the endogeneity caused by ability.

¹³ The exact time period needed for the disadvantage to dissipate is 2.8 years.

¹⁴ This level of real monthly wage is derived as the average of real starting wages in years where the resident unemployment rate is similar to the historical average resident unemployment rate.

¹⁵ In the recent financial crisis, the resident unemployment rate increased by 1.1 percentage points from 3.2 per cent in 2008 to 4.3 per cent in 2009. For the economic downturn in 2002, the resident unemployment rate also increased by 1.1 percentage points from 3.7 per cent in 2001 to 4.8 per cent in 2002.

¹⁶ Resident unemployment rate rose by 1.5 percentage points between 1997 and 1998 as a result of the Asian Financial Crisis. This represents the largest change in resident unemployment rate between any two consecutive years since 1991.

CONCLUSION

This paper contributes to existing research on the effect that entering the labour market during adverse economic conditions has on workers by investigating its impact on the wages of university graduates in Singapore.

In summary, our results suggest that university graduates in Singapore who enter the labour market when economic conditions are poor would suffer an initial wage loss. However, this negative impact would diminish over time and fully disappear after three years in the labour market. Singapore's labour market would thus appear to be efficient enough to prevent the perpetuation of downward wage persistence for 'unlucky' cohorts of graduates.

There are several caveats to our study. First, due to the short timeframe of the longitudinal data, the study covers only one recession between 2000 and 2007. Furthermore, as the wage data for many of the graduates in the dataset span less than four years, we are unable to observe how 'unlucky' cohorts of graduates do vis-à-vis their 'luckier' peers after their wages have caught up with the latter's. We cannot rule out the possibility that entry economic conditions could have long-term negative effects not captured within the period of observation. In fact, the period of observation for similar studies conducted overseas tends to be much longer at 12-22 years. Hence, there may be merit in re-running the analysis in this paper when a longitudinal dataset with a longer timeframe becomes available in future to see if the conclusions remain valid.

Second, it is possible that the wage persistence effect is different for people of differing abilities. Oreopoulos et al. (2006) find that high-skilled workers can catch up quickly by moving on to better firms, whereas low-skilled workers are permanently down-ranked to firms paying lower wages and may consequently never catch up. However, as information on individual ability and job switches is not available currently, we are unable to assess whether recessions affect various segments of university graduates differently.¹⁷

Future studies could attempt to examine the mechanisms of wage recovery for various segments of labour market entrants. Such studies would enable more targeted policy interventions to reduce the disadvantage suffered by 'unlucky' entry cohorts to be considered.

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¹⁷ In Oreopoulos, von Wachter and Heisz (2006), college and programme of graduation are used to proxy for the ability of individuals. However, this approach cannot be used in Singapore's context because most university graduates are enrolled in the three public universities. Also, these three universities focus on different academic disciplines. Therefore, it is inappropriate to infer the individual's ability from the university he/she attended.

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APPENDIX

Exhibit 5: Real Mean Monthly Gross Starting Salary and Annual Resident Unemployment Rate

| Year | Real Mean Monthly Gross Starting Salary (\$) | Annual Resident Unemployment Rate (%) |
|------|--|---------------------------------------|
| 2000 | --- | 3.7 |
| 2001 | --- | 3.7 |
| 2002 | --- | 4.8 |
| 2003 | 2,277 | 5.2 |
| 2004 | 2,376 | 4.4 |
| 2005 | 2,417 | 4.1 |
| 2006 | 2,528 | 3.6 |
| 2007 | 2,693 | 3.0 |
| 2008 | 2,603 | 3.2 |

Source: Singapore Department of Statistics and Ministry of Manpower

Exhibit 6: Detailed Regression Results for Exhibit 3

| Dependent variable, <i>Log(wages_{it})</i> | Regression (1) | Regression (2) | Regression (3) |
|---|----------------|----------------|-----------------------|
| <i>urt_{it₀}</i> | -0.06** | 0.01** | -0.08** |
| <i>urt_{it₀}</i> · <i>exp_{it}</i> | 0.02** | -0.003** | 0.03** |
| <i>urt_{it}</i> | --- | -0.09** | -0.06** |
| <i>exp_{it}</i> | 0.02** | 0.14** | 0.04** |
| <i>exp_{it}²</i> | -0.004** | -0.007** | -0.01** |
| IV | No | No | Yes |
| Number of Observations | 296,813 | 296,813 | 296,787 ¹⁸ |

Significance level *p<0.05, **p<0.01

Source: Singapore Department of Statistics

¹⁸ There are some individuals who entered the labour force at ages younger than the modal age of entry. For the later cohorts especially, the *mod_i* instrument, which is the unemployment rate when the individual is at the modal age, would require an unemployment rate beyond 2010, which is not available. Therefore, observations from these individuals have to be dropped from the sample.