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Full employment does not mean low unemployment

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1. Introduction

In November 2007, the Reserve Bank of Australia (RBA) raised interest rates for the sixth time since 2004. The former Federal Treasurer Peter Costello said that the latest rise was proof of good economic management. He was quoted as saying 'When you have low unemployment there will always be more pressure on inflation ... You would always expect interest rates to be higher during a period of low unemployment than a recession' (ABC, 2007). This appears to be an appeal to "Phillips curve" logic. However, things have significantly changed in the Australian economy since the last outbreak of inflation in the 1970s which was only tempered by the harsh 1991 recession.

In this paper we propose that based on these changes to the Australian economy over the last 15 or so years mean that it is fallacious to assert that low unemployment will always put more pressure on inflation.

In Section 2, we argue that the popular notion of the Phillips curve mechanism that increases in unemployment are needed to hold inflation down are no longer relevant for the Australian economy. We show that on the one hand the potential labour force is much larger than official unemployment suggests, while on the other hand, a significant number of employed persons are underemployed, and willing to work more hours if they were available. The supply-side potential of the Australian economy in terms of productive capacity is thus grossly underutilised despite the "full employment" rhetoric of the outgoing Coalition government.

The implications of these observations are examined more formally in Section 3, where we estimate Phillips curve equations and reject the traditional notion that unemployment rates, *per se*, discipline the wage inflation process. Instead, we show that the labour market restraint works through short-term unemployment rates and, significantly, via underemployment. The reasoning is that short-term unemployment increases sharply in a downturn, which in turn, reduces inflation because the inflow into short-term unemployment is comprised of those currently employed and active in wage bargaining processes. In a prolonged downturn, average duration of unemployment rises and the pressure exerted on the wage setting system by short-term unemployment falls. However, as real GDP growth moderates and falls, underemployment also increases which implies an alternative for employers to increase employment and hence placing further constraint on wage bargaining.

We further analyse this process by examining the dynamics of employment in Australia. We distinguish between a primary and a secondary labour market. The wage setting outcomes are mainly determined in the primary labour market, which is dominated by persons in full-time employment. Unemployment in this "market" is mainly of a short term nature. Underemployment typically occurs in the secondary labour market, where part-time employment is more prevalent and jobs often have a casual nature. Wages in this market are subject to less formal negotiations.

Labour market dynamics are represented by the processes of job creation and job destruction, and their interaction with full-time and part-time employment by gender is discussed in Section 4. In this context, we show that by distinguishing the various labour market flows (gender and status of employment) we are able to develop a better understanding of the dynamics of short-term unemployment and underemployment better. Moreover, our preliminary results are consistent with the schematic representation of wage formation described in the last paragraph. Further, our analysis also shows that we should develop a better understanding of the interactions between the various labour market flows– in

particular female job flows. This remains a question for further research. Section 5 provides a conclusion.

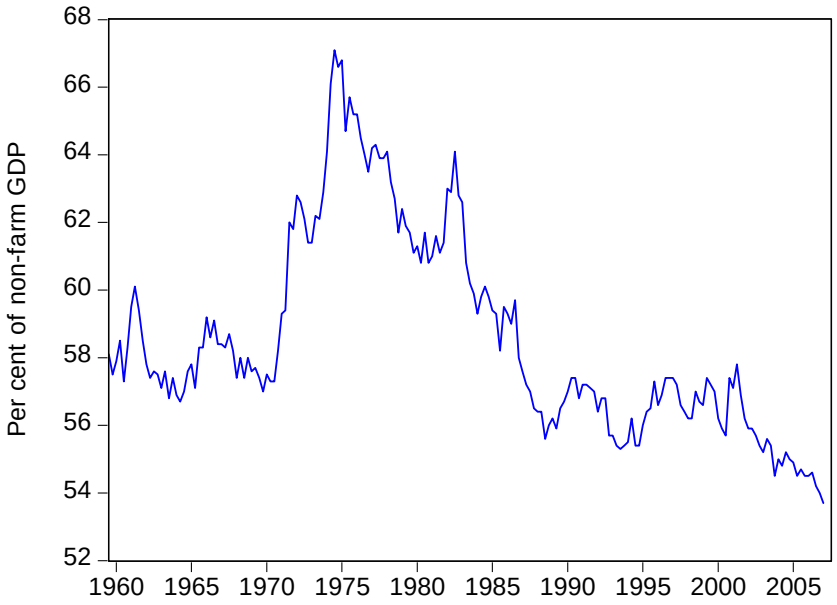
2. Is this a Phillips curve world?

2.1 Trends in real wages and unit labour costs

A natural anchor for nominal wage increases consists of inflation on the one hand and productivity growth on the other. From that perspective we can gauge the extent to which wages have lagged behind productivity growth by examining the movement in unit labour costs at the aggregate level. These costs are the ratio of average nominal labour costs (sum of employee compensation plus payroll tax less employment subsidies as a percentage of total hours worked by employees) to average labour productivity (real gross value added divided by the number of total hours worked) (ABS, 2006a). Real unit labour costs take into account the fact that general price level increases will push nominal labour costs up over time by deflating the average labour costs with the GDP deflator (ABS, 2006a).

ABS (2006a) argue that the real unit labour costs measure 'provides an indicator that focuses more specifically on the direct labour cost pressures associated with the employment of labour, which excludes general price impacts.' The share of wages in GDP is a close approximation to this measure. So rises in real labour costs matched by proportional increases in labour productivity leave the wage share costs unchanged.

Figure 1 Wage share of Non-farm GDP, Australia, 1959(3) to 2007(1)



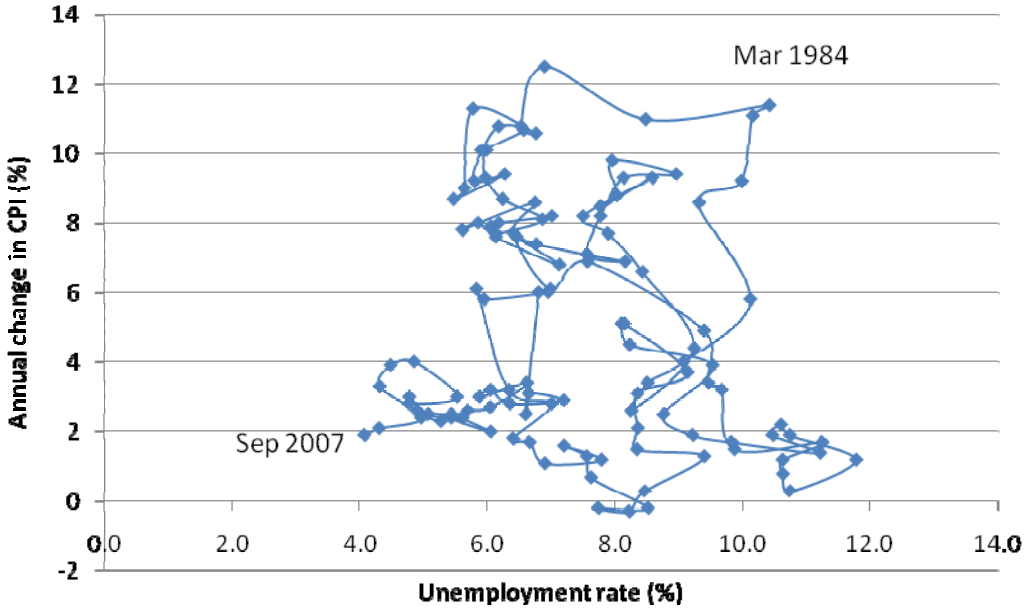
Source: ABS, Australian National Accounts, Cat. No. 5206.0, various editions.

Figure 1 shows the movement in wage share of non-farm GDP since September 1959. The share is at its lowest since that time and is continuing to fall. One sees that real wages growth has been modest and below annualised productivity growth for most of the Howard years (1996 onwards).

2.2 The relationship between inflation and unemployment in Australia

Figure 2 plots the annual inflation rate (on the vertical axis) against the unemployment rate (horizontal axis). Readers familiar with the text-book Phillips curve would not be able to recognise such a pattern in Figure 2.

Figure 2 Australian Phillips Curve, 1978 to 2007



Source: RBA Bulletin Statistical database. The inflation rate is the annual percentage change in the All Groups CPI.

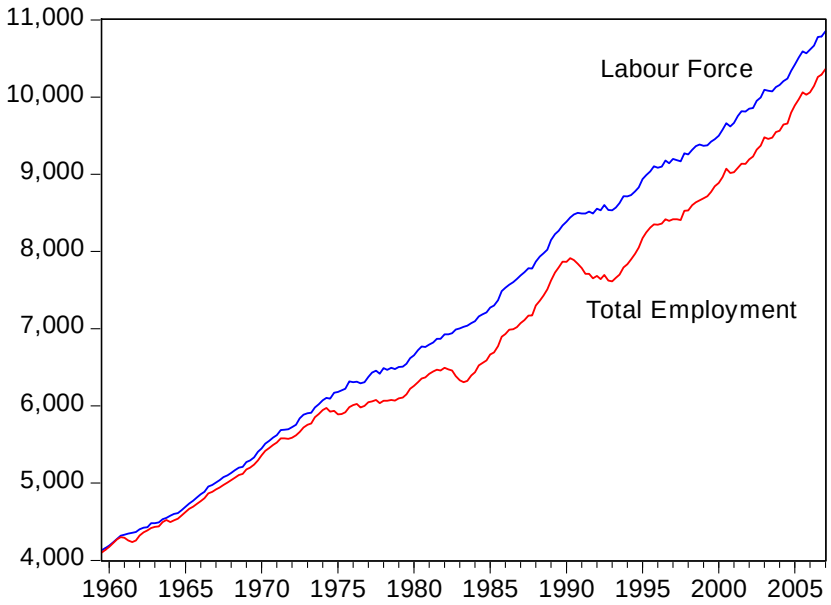
One might infer therefore that the popular notion of the Phillips curve mechanism that increases in unemployment are needed to hold inflation down are no longer relevant for the Australian economy. A possible explanation is that the potential labour force is much larger than official unemployment suggests and that a rising proportion of the employed are underemployed. We demonstrate these points in Section 2.3.

2.3 Trends in labour underutilisation

Readers might wonder about the title of the paper "Full employment does not mean low unemployment". In this section, the meaning of that title will become clear. Figure 3 shows the employment gap (the difference between the official labour force and total employment measured in persons) in Australia since the late 1950s. Up until 1975, Australia enjoyed true full employment and the gap was under 2 per cent. Since that time the gap has never been close to the "full employment" level and now, despite 16 years of growth, remains at 4.2 per cent (September 2007).

The reduction in official unemployment has prompted various commentators and politicians to claim that we are at or approaching full employment. They are unable to be exact because they have been influenced by the NAIRU rhetoric which previously had the steady-state unemployment rate estimated to be well above 6 per cent. So there is some disbelief and uncertainty in their minds when the official rate falls to 4.2 per cent.

Figure 3 The persistent employment gap in Australia, in 000s persons



Source: ABS Labour Force, Australia, various editions.

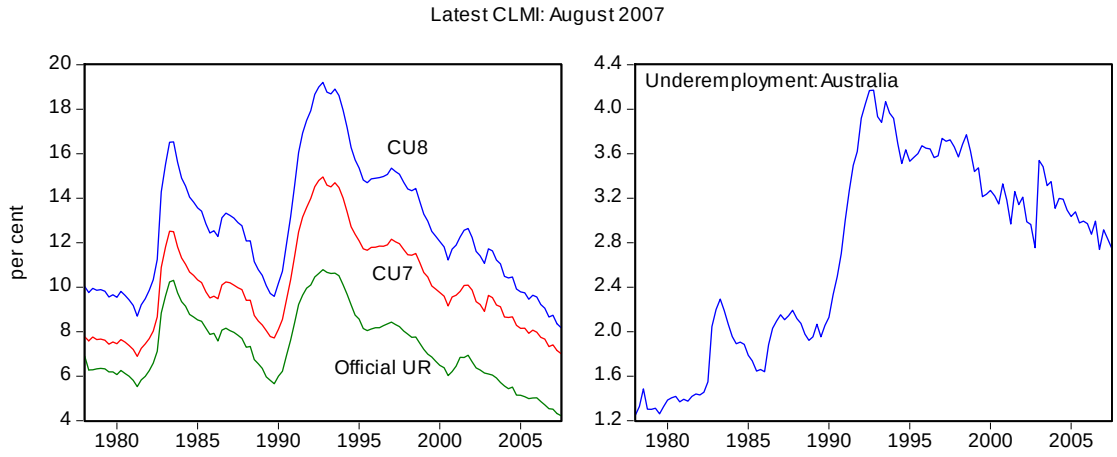
However, the real problem with their analysis is that the official situation captured by Figure 3, understates the true labour underutilisation for two main reasons:

1. It considers total employment measured in persons rather than person hours and thus ignores underemployment. Recent estimates of underemployment from the ABS indicate that it is now a larger problem (in person-numbers) than official unemployment. ABS (2006b) estimates that of the 2.9 part-time workers, 576,400 were underemployed (preferred to work more hours). On average, these workers wanted 14.4 extra hours of work per week. The Centre of Full Employment and Equity CLMI (CofFEE Labour Market Indicator) estimates underemployment to be around 2.8 per cent in August 2007.
2. The employment gap chart treats the labour force as the totality of willing labour in the economy which ignores the marginal and discouraged workers who are classified by the ABS as Not in the Labour Force. Mitchell (2007) updates estimates of hidden unemployment in Australia and concludes that hidden unemployment remains a significant problem in Australia despite the long period of economic expansion since the early 1990s.

The CLMI go back to 1978 and allow us to express the employment gap in terms of person hours. The left-hand panel of Figure 4 represents this gap in a more accessible manner. The official unemployment rate is plotted with two broader measures – CU7 (official unemployment plus underemployment) and CU8 (CU7 plus hidden unemployment). In Australia, the official unemployment rate in August 2007 was 4.2 per cent. Taking into account the estimated hidden unemployment in the same quarter, the adjusted unemployment rate (calculated by expressing the sum of hidden unemployment and recorded unemployment as a percentage of the potential labour force) would be 5.5 per cent. If we add the latest estimates of underemployment to this figure then we would get a labour underutilisation rate in August 2007 of around 8.3 per cent.

This gives a significantly different picture of the economy which the politicians are claiming is at full employment. Ignoring the underemployment, if we wanted to get the official rate of unemployment down to 2 per cent then we would have to increase employment by 478 thousand or 4.6 per cent to allow for the increase in labour force participation that would result (Mitchell, 2007). That tells us that we are a long way from achieving full employment despite the rhetoric from the politicians.

Figure 4 CofFEE Labour Market Indicators, August 2007



Source: CofFEE CLMI, August 2007. UR is the official unemployment rate, CU7 adds estimated underemployment, CU8 adds estimated hidden unemployment to CU7.

The right-hand panel of Figure 4 shows the history of estimated underemployment in Australia since 1978. It rose significantly during the 1991 recession as full-time jobs were shed in large numbers with part-time employment rising sharply and has fallen slowly since. We discuss this development further in Section 4, where we also analyse the evolution of short-term unemployment.

3 The Phillips curve revisited

To test the notion that the broadening of labour underutilisation in Australia over the last 15 years has disciplined the inflation process such that a low unemployment rate is no longer necessarily inflationary, we explore the role that the underutilisation measures outlined in Section 2.3 play in the context of the Phillips curve, where excess labour supply is a key variable constraining wage and price changes.

3.1 Labour underutilisation and the inflation process

There are several interesting testable hypotheses that link the underutilisation measures to the inflation process. First, the standard Phillips curve model predicts a significant negative coefficient on the official unemployment rate (a proxy for excess demand) and nominal homogeneity (to derive a unique NAIRU). Given homogeneity of labour is assumed, we might expect the broader measures of underutilisation to have a stronger negative effect on inflation if this model was meaningful. Second, the hysteresis model suggests that state dependence is positively related to unemployment duration and at some point the long-term unemployed cease to exert any threat to those currently employed. Consequently, they do not discipline the wage demands of those in work and do not influence inflation (Ball, 1999). The hidden unemployed are even more distant from the wage setting process. So we might expect that the short-term unemployment is a better excess demand proxy in the inflation adjustment

function. If the long-term unemployed do not place pressure on inflation, then, at best only a unique level of short-term unemployment consistent with stable inflation may exist. The uniqueness of this level depends on other aspects of the inflationary process, in particular whether the estimated models are nominally homogenous and whether hysteresis is present in the short-term unemployment rate or not (see Fair, 2000; Mitchell, 2001).

Third, while the short-term unemployed may be proximate enough to the wage setting process to influence price movements, our indicators show that there is another significant and even more proximate source of surplus labour available to employees to condition wage bargaining – the underemployed. This pool of hours can be clearly redistributed among a smaller pool of persons in a relatively costless fashion if employers wish. It is thus reasonable to hypothesise that the underemployed pose a viable threat to those in full-time work who might be better placed to set the wage norms in the economy. The argument that wage determination is dominated by "insiders" (the employed) who set up barriers to isolate themselves from the threat of unemployment is echoed in earlier Australian work that found 'within-firm' excess demand variables (like the rate of capacity utilisation or rate of overtime) to be more significant in disciplining the wage determination process (see Watts and Mitchell, 1990). It is plausible that while the short-term unemployed may still pose a more latent threat than the long-term unemployed, the underemployed are also likely to be considered an effective surplus labour pool. In that case we might expect downward pressure on price inflation to emerge from both sources of excess labour and so reducing the official unemployment rate will not trigger inflationary pressures if at the same time underemployment has risen.

This raises an interesting parallel to another aspect of the hysteresis hypothesis. Ball (1999: 230) argues that 'hysteresis is reversible: a demand expansion can reduce the NAIRU' because 'they … [employers] … would rather pay the training costs than leave the jobs vacant.' A similar observation underpins the hysteresis models in Mitchell (1987, 1993). In a high pressure economy, firms lower hiring standards and address the skill deficiencies of the long-term unemployment by offering on-the-job training. Mitchell and Muysken (2002) demonstrate using gross flows data that when employers access both the short-term and long-term unemployed pools in an expansion yet the long-term unemployed do not exert much influence on the inflation process. They argue that the labour market is structured in a way that increasing low-skill, low-pay fractional (part-time) jobs are being created which overcome the re-employment barriers facing the long-term unemployed. The primary and secondary jobs are functionally related. The secondary jobs allow firms to make adjustments to demand fluctuations, for example, without disturbing the employment structure of the primary labour market. Thus when employment growth is strong enough both pools of unemployed find employment opportunities. So while the long-term unemployed do have employment opportunities in an expansion they are in jobs that do not set the wage norms. However, once they become re-attached to the employed labour force, they may influence wage setting via underemployment, given that they will often only have part-time jobs available to them. As part-timers with some in-house training they become an entirely different proposition than when they were facing skill atrophy and motivation loss after more than 12 months without work.

This discussion leads to two major hypotheses:

1. The short-term unemployment rate (STUR) constrains the annual inflation rate more than the overall unemployment rate (UR). By implication we expect the long-term unemployment rate (LTUR) to be a statistically insignificant influence on the annual inflation rate.

2. The degree of underemployment (UE) exerts a separate negative impact on the inflation process.

We test these hypotheses below.

3.2 Phillips curve estimation

Following Mitchell (2001), we use a general autoregressive-distributed lag Phillips curve representation like:

$$(1) \qquad \dot{p}_t = \alpha + \sum_{i=1}^{n} \delta_i \dot{p}_{t-i} + \sum_{i=0}^{m} \beta_i u_{t-i} + \sum_{i=0}^{q} \gamma_i z_{t-i} + \varepsilon_t$$

where $\dot{p}_t$ is the annual rate of inflation, u is the unemployment rate, z is a cost shock variables (like import price inflation, capital costs), and the ε is a white-noise error term.

The parameterisations of the excess demand variable that we consider are all assumed to be $I(0)$ variables given they are bounded and are:

(a) The official unemployment rate (*UR*). In each case (following Gruen *et al*, 1999) we tried four-quarter moving average representations of the underutilisation variable to match it with the annualised change in the dependent variable. The high persistence in the underutilisation series means the results are very similar and are not reported;

(b) The short-term unemployment rate (*STUR*) defined by ABS as those unemployment for less 52 weeks as a percentage of the total labour force;

(c) The rate of the underemployment (*UE*) computed from the CLMI as explained above; and

(d) The difference between the short-term unemployment rate and its filtered trend derived using a Hodrick-Prescott filter (*STUR Gap*). This construct is now commonly used and has been referred to in papers by the OECD and others as a test of the Time Varying NAIRU hypothesis (Boone, 2000; see also Mitchell, 2001 for more detail). We examine the validity of this inference below.

Within a similar framework to Equation (1), Mitchell (2001) find evidence that the estimated Phillips curve does not exhibit dynamics consistent with a constant NAIRU (see Fair, 2000 for details of the simple homogeneity test based on the lagged inflation term(s)). The same test (results available on request) allows us to easily reject the constant NAIRU hypothesis in all the equations reported in Table 1.

We initially develop a Phillips curve model for Australia using 4 lags on the annualised inflation terms (*Δ4CPI*) and import prices (*Δ4PM*), the level of the unemployment rate, a dummy variable (defined as 1 in 2000:3 and zero otherwise) to take into account the introduction of the Goods and Services Tax system in Australia in July 2000. We also test other influences that have been mentioned in the literature, by including variables to capture the cost of capital, interest spread, and payroll taxes and the like (Phelps, 1994, Modigliani, 2000). The other variables were not significant in the final tested-down specification.

Standard unit root tests (ADF) confirm that the inflation and import price inflation series are $I(1)$ and that they co-integrate, meaning that we can use them in a regression with stationary variables like the underutilisation measures. Our analysis largely ignores any broader interaction in terms of the implied error correction dynamics. The statistical validity of the exercise is to be judged by the diagnostic performance of the models. Sequential testing down from the general equation using different measures of the underutilisation variable yielded the

results shown in Table 1. In each case, the dynamics were so close and the coefficient estimates for the other variables were highly stable that a common specification is employed to aid comparison. In general, the diagnostics of all equations were satisfactory apart from some evidence of fourth-order serial correlation, which could reflect the four-quarter change specification. The estimates are based on regressions with an AR(4) correction applied, although they are not much different to the uncorrected estimates.

Table 1 Phillips curve regressions, Australia, 1982:3 to 2007:1

	1.1	1.2	1.3	1.4	1.5	1.6
C	0.01	0.05	0.01	0.05	0.00	0.02
	(2.81)	(4.08)	(3.13)	(4.07)	(2.22)	(3.39)
Δ4CPI(-1)	0.88	0.56	0.90	0.57	0.89	0.76
	(21.6)	(6.03)	(25.7)	(6.17)	(32.8)	(14.1)
UR	-0.001	0.000				
	(2.13)	(0.12)				
STUR			-0.002	0.000		
			(2.64)	(0.33)		
STUR GAP					-0.007	-0.006
					(5.28)	(4.11)
UE		-0.010		-0.010		-0.005
		(3.27)		(3.33)		(3.09)
Δ4PM	0.06	0.06	0.06	0.06	0.05	0.05
	(4.13)	(4.97)	(4.22)	(4.99)	(3.79)	(3.87)
R-squared	0.95	0.95	0.95	0.95	0.95	0.96
S.E. % of mean Δ4P	15.0	14.1	14.9	14.1	14.1	13.6
SC(1) Prob value	0.40	0.95	0.30	0.94	0.26	0.56
SC(2) Prob value	0.59	0.47	0.57	0.48	0.51	0.79
SC(4) Prob value	0.17	0.51	0.17	0.49	0.09	0.12
ARCH(5) Prob value	0.44	0.68	0.46	0.64	0.58	0.64
RESET(1) Prob value	0.96	0.34	0.83	0.36	0.29	0.19

Notes: SC(n) is the Breusch-Godfrey Serial Correlation LM(n) test, ARCH is a 5^{th} order test for Autoregressive conditional heteroscedasticity, RESET is the Ramsey RESET test with 1 added terms. SE% is the standard error as a percentage of the mean of the dependent variable and *t*-statistics are in parentheses. GST dummy variable is not shown but was highly significant and positive in all regressions as expected.

Equation 1.1 describes a typical Phillips curve using the aggregate unemployment rate (*UR*). The unemployment rate exerts a negative influence on the rate of inflation (-0.001). The added effect of the underemployment variable (*UE*) is depicted in Equation 1.2. It is statistically significant which indicates that it exerts negative influence on annual inflation. Significantly, the *UR* is no longer statistically significant. In Equation 1.3, the degree of negative pressure on inflation exerted by the highly significant *STUR* is -0.002, twice the

impact of the *UR* estimated in Equation 1.1. When UE is added it is statistically significant and the *STUR* is no longer statistically significant (Equation 1.4).

Equations 1.5 to 1.6 utilise the gap specification for the excess demand variable. Mitchell (2002) argues that the NAIRU concept remains on shaky theoretical grounds. The original theory underpinning the NAIRU provides no guidance about its evolution although, unspecified structural factors should be involved to remain faithful to that theory. In this theoretical void, econometricians use techniques that allow for a smooth evolution although there is no particular correspondence with any actual economic factors. Some authors assert that a Hodrick-Prescott filter through the actual series captures the TV-NAIRU (for example Boone, 2000 among many). Of course, the Hodrick-Prescott filter merely tracks the underlying trend of the unemployment and follows it down just as surely as it follows it up. The unemployment rate is highly cyclical and the TV-NAIRU proponents are silent on this apparent anomaly – why do the alleged structural factors cycle with the actual rate?

Equations 1.5 to 1.6 compare *STUR Gap* with and without the *UE* variable. The results suggest that: (a) underemployment plays a significant constraining influence on inflation independent of the unemployment; (b) *STUR Gap* remains significant and generates an inflation discipline that is commensurate with that imposed by underemployment.

The significant values of the coefficients on the *STUR Gap* and *UE* variables suggest the following dynamics are plausible. A downturn increases short-term unemployment sharply, which reduces inflation because the inflow into short-term unemployment is comprised of those currently employed and active in wage bargaining processes. In a prolonged downturn, average duration of unemployment rises and the pressure exerted on the wage setting system by unemployment overall falls. This requires higher levels of short-term unemployment being created to reach low inflation targets with the consequence of increasing proportions of long-term unemployment being created. In addition, as real GDP growth moderates and falls, underemployment also increases placing further constraint on price inflation. The results taken together provide some support for the hypotheses (1) to (2) outlined above.

4 Job creation and job destruction and the dynamics on the labour market

4.1 Employment trends in Australia

Having discussed the general trends in labour underutilisation in Section 2.3, we now turn to a closer analysis of employment trends. Table 2 shows that employment growth has accelerated in the last two years. Between 1995 and 2000, male employment expanded by an average of 70 thousand odd jobs per annum compared to 90 thousand for females. This average has more than doubled for males in the last 12 months while female employment growth has fallen in the last 12 months. Over the 12 year period, a total of 2.3 million jobs have been added (in net terms) to the Australian economy and 51.8 per cent of them have gone to females.

To better understand the changes, Table 2 provides a summary of some key employment trends between September 1995 and September 2007. Over the entire period, part-time employment growth accounted for 41.3 per cent of total net jobs created. However, up until 2005 this percentage was in the high 40s. This proportion has fallen steadily but plunged in 2006. In the 12 months to September 2007, it was 32 per cent. Full-time employment growth has dominated in recent years. The gender differences are remarkable and bear on why females have been losing out in the recent growth phase. For males, 31 per cent of net jobs generated over 1995-2007 were part time but this proportion fell to 11.8 per cent in the 12 months to September 2007.

For females, the opposite is true and despite a plunge in ratio in 2005-06 (September-September – 17.4 per cent), the proportion soared to 62.5 per cent in the 12 months to September 2007. So over the last two years, males have captured a disproportionate per cent of the net full-time jobs growth whereas females have captured a disproportionate per cent of the net part-time jobs growth.

Table 2 Employment trends in Australia, 1996-2007

	Full time	Part time	PT/Total	ΔFT	ΔPT	ΔTotal	ΔPT/ΔTotal
	000's	000's	%	000's	000's	000's	%
Males							
Sep-95	4,210.2	522.8	11.0				
Sep-00	4,415.1	668.7	13.2	204.9	145.9	350.7	41.6
Sep-05	4,745.4	806.6	14.5	330.3	137.9	468.3	29.4
Sep-06	4,829.8	841.0	14.8	84.4	34.4	118.8	29.0
Sep-07	4,966.8	859.4	14.8	137.0	18.4	155.4	11.8
1995-2007				756.6	336.6	1,093.2	30.8
Females							
Sep-95	2,074.4	1,535.3	42.5				
Sep-00	2,288.3	1,773.9	43.7	213.9	238.6	452.5	52.7
Sep-05	2,496.9	2,047.1	45.0	208.6	273.2	481.9	56.7
Sep-06	2,611.7	2,071.3	44.2	114.8	24.2	139.0	17.4
Sep-07	2,650.2	2,135.3	44.6	38.5	64.0	102.4	62.5
1995-2007				575.8	600.0	1,175.8	51.0
Persons							
Sep-95	6,284.6	2,058.1	24.7				
Sep-00	6,703.4	2,442.6	26.7	418.8	384.5	803.2	47.9
Sep-05	7,242.3	2,853.7	28.3	538.9	411.1	950.2	43.3
Sep-06	7,441.5	2,912.3	28.1	199.2	58.6	257.8	22.7
Sep-07	7,617.0	2,994.7	28.2	175.5	82.4	257.8	32.0
1995-2007				1,332.4	936.6	2,269.0	41.3

Source: ABS Labour Force, Australia. Δ = change (000s). PT is part-time, FT is full-time.

It is likely that in the face of less available stocks of workers looking for work, firms are restructuring and offering more full-time employment. The corollary is, of-course, as Arthur Okun observed long ago, that unemployment was the tip of the iceberg and as the business cycle became stronger, several labour market adjustments occurred including longer working hours. The increase in full-time jobs relative to part-time is consistent with this observation and reinforces the point we make in the next section about underemployment. The growth in underemployed part-timers has to be seen as one cost of running the economy at low pressure

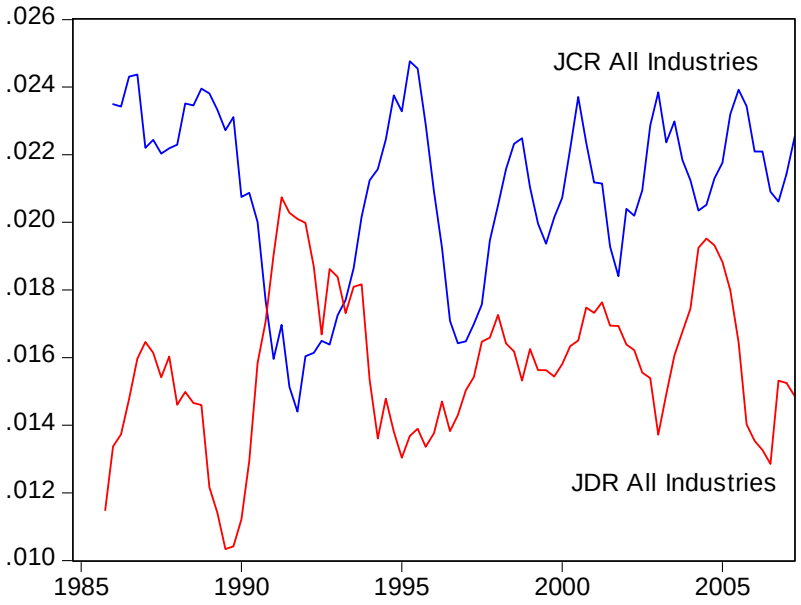
for too long. In Mitchell and Muysken (2008) we lay the blame for this state at the feet of the Federal Government who have refused to pursue a full employment policy and as a result allowed the economy to languish at low pressure with all the attendant macroeconomic inefficiency cumulating losses every day.

4.2 Job creation and destruction and employment growth

By examining the process of job creation and destruction we can gain new insights into the movements of workers between labour force states. Analysis of employment dynamics using macroeconomic data typically focuses on measures of net employment changes over time, as we did in the previous section. However, this aggregate focus prevents an understanding of flows noted above (numbers of jobs created and destroyed and movements of workers across labour force categories). This section builds on previous work by Mitchell *et al* (2005) and Mitchell and Myers (2007).

The analysis in this section is based on the widely used job creation rate and job destruction rate measures introduced by Davis and Haltiwanger (1990, 1992). Davis and Haltiwanger (1992: 827-8) calculate "gross job creation by summing the employment gains at expanding and new establishments within a sector. Similarly, we calculate gross job destruction by summing employment losses at shrinking and dying establishments within a sector." These job flows are converted to rates by dividing by sector size (see Mitchell *et al*., 2005 for more detail).

Figure 5 Job creation (JCR) and job destruction (JDR) rates, All Industries, Australia, 1985-2007

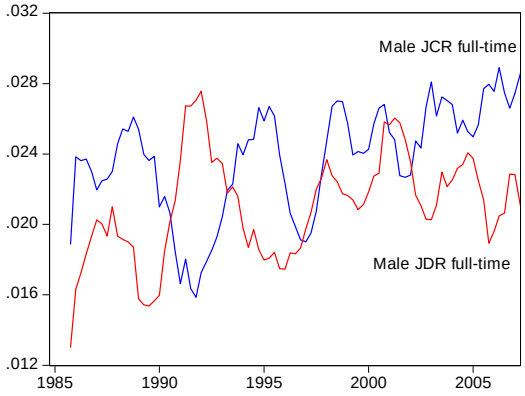


Source: ABS Labour Force, Australia, industry employment tables.

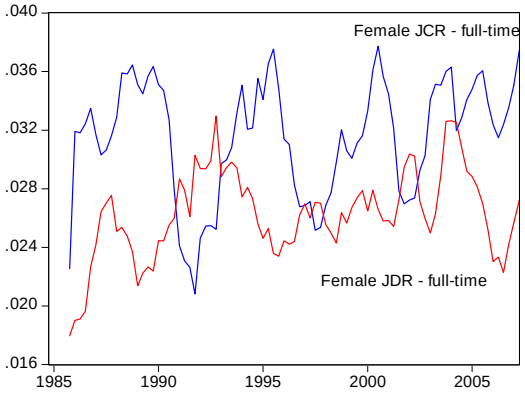
Figure 5 shows the aggregate job creation and job destruction rates in Australia since 1985. Two striking features are: (a) both series show clear cyclical fluctuations. The impact of the 1991 recession is striking (plunging job creation and soaring job destruction rates). Over the ensuing boom, job creation increases while job destruction decreases; and (b) both rates are relatively constant over the cycle: the job creation rate fluctuates around 2.1 per cent, whereas the job destruction rate fluctuates around 1.5 per cent.

Figure 6 shows that diverging patterns of job creation and destruction developments by gender and fraction of employment underlie the relatively constant aggregate rates. When we distinguish the full-time and part-time rates of job creation and job destruction by gender for various periods, several features are worth noting.

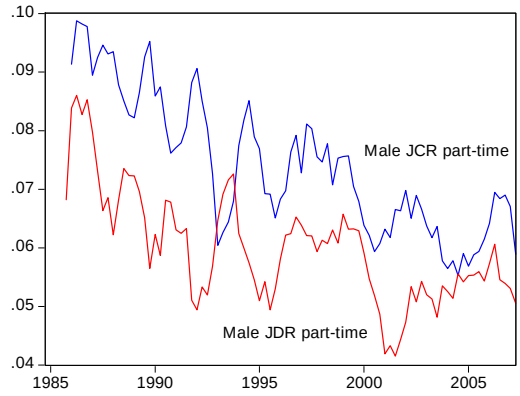
Figure 6 Male and female JCRs and JDRs, full-time and part-time, Australia, 1985-2007



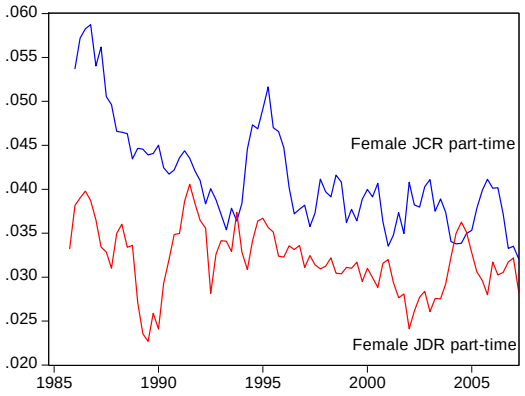
(a) Males – full-time flows



(b) Female – full-time flows



(c) Male – part-time flows



(d) Female – part-time flows

First, from 2000 to 2007, the average rate of job creation for males was 2.6 and 6.2 per cent for full-time and part-time respectively, while the average rate of job destruction was 2.2 and 5.2 per cent. For females, the average rate of job creation was 3.4 and 3.7 per cent for full-time and part-time respectively, while the average rate of job destruction was 2.7 and 3.0 per cent. Thus, the average rates of job creation and job destruction for part-time were much greater than full-time rates. However, in absolute terms there were many more full-time jobs created and destroyed, than part-time jobs.

Second, the rates of job creation and job destruction behave differently during upswings and downswings over the cycle. This holds for both full-time and part-time job dynamics. During the 1991 recession (1990:3 to 1991:3), it is noticeable that while full-time job creation rates fell sharply, part-time job creation rates were less susceptible. Male job destruction rates rose sharply during this period in contradistinction to part-time rates fell. This confirms the results from Mitchell *et al.* (2005) who showed that the 1991 recession was a major turning point in the use of part-time work to replace full-time employment, particularly for males. Female job flows were less sensitive to the recession.

In the ensuing recovery (1991:4 to 2000:1), job creation rates slowly increased for both male and female full-time work but fell for part-time work as the economy added extra hours of activity in response to improving demand conditions. Job destruction rates also fell across the board, with the exception of female full-time rates which rose.

Third, part-time rates have been decreasing over time, while full-time rates increased slowly. In the 2000 to 2005 period, the evidence is that the recovery gathered pace and full-time job creation rates rose for both males and females (to around the average rates for the whole period). Over the same period, part-time rates for both males and females fell indicating the shift towards more full-time employment creation. The volatility in the labour market also increased with full-time job destruction rates increasing for both males and females.

In the last two years (2005 to 2007), full-time job creation rates are now the highest for the period since 1984 for both males (2.8 per cent) and females (3.5 per cent) whereas part-time rates remained steady over the whole period from 2000. The interesting point is that part-time job creation rates for males are still well above the full-time job creation rates whereas for females, full-time rates are nearly on par with part-time job creation rates.

These latest developments seem to modify the earlier observations that recessions have been used to replace full-time jobs by part-time jobs. However, we observe from Table 2 that the share of part-time employment has by now stabilised at an all-time high: 15 per cent for men and 45 per cent for women. As we have seen in Figure 3 this leaves room for considerable underemployment: currently at around 3 per cent of the labour force.

4.3 Intermezzo: Is there a Workchoices effect noticeable?

Workchoices became the legal industrial relations framework in July 2006 (being an amendment to the 1996 Workplace Relations Act. A central justification for the controversial deregulation of the wage determination system and the abandonment of unfair dismissal protections was that it would increase the rate of job creation (see Mitchell *et al.* 2005). To determine whether Workchoices has promoted a statistically significant change in economic outcomes we ran some simple regressions which are reported in Table 3.

Table 3 Job creation and job destruction regressions, 1985(2) to 2007(2)

	Males				Females			
	JCR	JCR	JDR	JDR	JCR	JCR	JDR	JDR
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Trend	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
	(2.67)	(5.31)	(2.17)	(3.49)	(0.62)	(4.05)	(1.78)	(1.65)
GDP_GAP	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00
	(1.83)	(0.21)	(2.11)	(1.05)	(2.51)	(0.02)	(2.14)	(0.42)
WORKCHOICES	0.002	0.000	-0.003	-0.004	0.005	-0.003	-0.002	0.001
	(0.94)	(0.03)	(1.15)	(0.47)	(1.27)	(0.70)	(0.67)	(0.14)
Adjusted R^2	0.19	0.26	0.14	0.13	0.08	0.20	0.04	0.03
s.e % mean	18.1	22.7	19.5	27.8	20.8	22.0	21.6	26.7

Note: s.e. % mean is the standard error of the regression as a percentage of mean of dependent variable and *t*-statistics are in parentheses. Constant and lagged dependent terms not reported

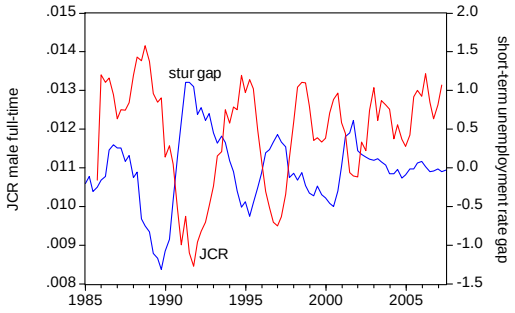
Workchoices is entered as a dummy variable taking the value of 1 after 2006(3) and zero prior to that. The regressions also include a lagged dependent variable, a linear time trend and a GDP gap variable (constructed as the difference between the actual GDP and a Hodrick-Prescott filtered series). The GDP gap variable allows us to determine the cyclical sensitivity of the job flow measures. While these regressions are simplistic they do produce consistent estimates and we argue that if Workchoices has have resulted in a significant shift in economic outcomes the dummy variable should be significantly positive in the JCR regressions and significantly negative in the JDR regressions. In every case, the Workchoices dummy is statistically insignificant. We conclude that the claims made by politicians and business representatives about the Workchoices impacts on gross job flows are unable to be detected in the data.

In terms of cyclical sensitivity, the results support those found in Mitchell *et al.*, 2005) that full-time flows are cyclically responsive (significant coefficients on GDP_GAP variable), while part-time flows are not. The coefficients are as expected but shown as 0.00 although they are positive at 4 decimal places.

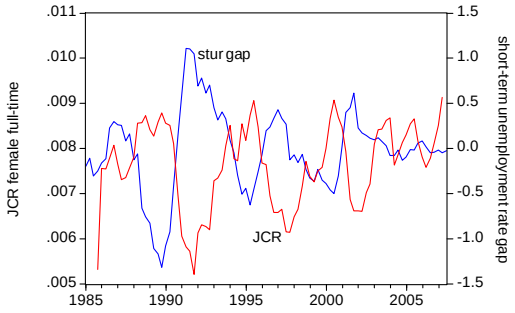
4.4 Job flows and the dynamics of unemployment and underemployment

The regression results reported in Table 2 show that full-time job flows are cyclically responsive, whereas part time flows are not. From that perspective and from our reasoning above, we hypothesise that full-time flows impact on changes in short-term unemployment. Figure 7 shows the relation between these full- and part-time job flows and the short-term unemployment rate gap (*STUR Gap*).

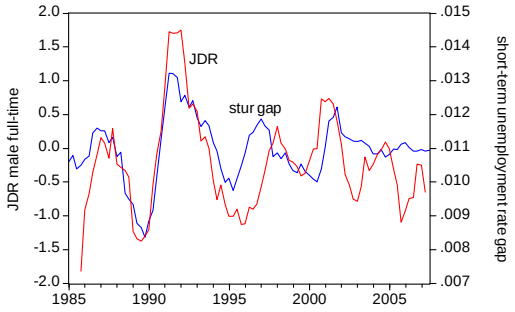
Figure 7 Flows in full-time job creation and destruction and the STUR gap



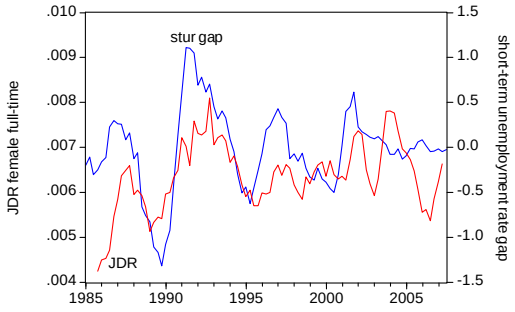
(a) Male full-time JCR and *STUR Gap*



(b) Female full-time JCR and *STUR Gap*



(c) Male full-time JDR and *STUR Gap*



(d) Female full-time JDR and *STUR Gap*

To make the series comparable, all job flow measures are relative to *total* employment. For both males and females, full-time job creation varies negatively with the *STUR Gap*, whereas job destruction varies positively. This is consistent with our intuition that new full-time jobs

draw labour predominantly from the short-term unemployment pool. Hence job creation should have a negative impact on the *STUR Gap* and job destruction should have a positive impact to the extent that persons losing jobs in the primary labour market (that is, full-time jobs) are unable to find jobs elsewhere. Since there are no clear relationships between part-time flows and short-term unemployment we omit them from further analysis in this paper.

In Table 3 we report the results from regression of *STUR Gap* and underemployment on the full-time job flows. We also include lagged dependent variables to control for persistence – and to account for the fact that unemployment and underemployment are stock variables. We use simple OLS as a first exploration in this paper. In terms of columns 2 and 3, male job creation and destruction rates have the expected signs on the *STUR Gap*. This is consistent with the interpretation that males with full-time jobs dominate the primary labour market and the wage setting process. The impact of part-time jobs is only significant for job creation and one should remember that only about 15 per cent of males work part time.

Consistent with our intuition that females play a less important role in the primary labour market we find that as far as part-time jobs are concerned, the impact of female job flows are rarely significant. The only exception is that full-time job destruction has a negative effect on the *STUR Gap*, whereas part-time job creation has a weak positive effect. These results can be interpreted in the light of the transition of female full-time jobs to female part-time jobs that we discussed in section 4.2. The negative impact of destruction of full-time female jobs indicates that many women switch from full-time to part-time work, and since more part-time jobs are created than full-time jobs are destroyed this would mean that more women find work. However, the positive impact of part-time job creation is puzzling. It is obvious that the interaction between female job flows requires further research.

Table 3 The impact of job flows on the short-term unemployment rate gap and underemployment, Australia, 1985(1) to 2007(2)

	STUR Gap		*UE*	
	Coefficient	*t*-statistic	Coefficient	*t*-statistic
JCR_M_FT	-85.80	3.60	-62.25	2.87
JDR_M_FT	62.63	2.78	30.75	1.52
JCR_F_FT	-2.48	0.06	19.69	0.65
JDR_F_FT	-83.81	2.34	-45.98	1.34
JCR_M_PT	-104.42	2.56	-17.20	0.46
JDR_M_PT	64.05	1.34	0.97	0.02
JCR_F_PT	43.41	1.81	49.77	2.32
JDR_F_PT	42.55	1.60	-7.05	0.28
STUR Gap(-1)	0.71	11.40		
UE(-1)			0.92	25.33
Adjusted R^2	0.899		0.950	

Constant terms are not reported. M is male, F is female, FT is full-time, and PT is part-time. JCR is the rate of job creation and JDR is the rate of job destruction.

The impact of job flows on underemployment is shown in the last two columns of Table 3. Not surprisingly, male full-time job creation has a significant negative impact. More interesting is the positive impact of part-time female job creation: apparently many women who enter these jobs would like to work more hours. This is consistent with our notion discussed in Sections 2.3 and 3.2 of a "Reserve Army" of workers in the secondary labour market who can easily be mobilised if the economy picks up. A final observation is the high degree of persistence in underemployment. We interpret this as a typical example how hard it is to escape from the secondary labour market. The finding that female job creation does not have a significant negative impact on underemployment is also consistent with that interpretation. It also emphasises the importance of a more careful modelling of the interaction between the various job flows.

5. Conclusion

The title of our paper challenges the claim that low unemployment will always be inflationary. We argue that the traditional Phillips-curve inspired notion that the unemployment rate *per se* disciplines the wage inflation process is no longer valid. Instead, we show by estimating an alternative specification of the Phillips curve that the labour market restraint works both through short-term unemployment rates and via underemployment. The reasoning is that the inflow into short-term unemployment is comprised of mainly primary labour market workers who are active in wage bargaining processes, which therefore will modify wage restraints in a downturn. Further, as underemployment also increases in a downturn, employers can use hours of work as an adjustment in the upturn to meet higher demand which places a further constraint on wage bargaining.

In the second part of our paper we show that by distinguishing between various job flows we gain a better understanding of the movements in short-term unemployment and in underemployment. We find supporting evidence for our story from descriptive data analysis and more formal regression analysis. However, we have exposed issues, such as the relationship between gross flows by gender and employment status and the broader measures of labour underutilisation that have not been fully explored in the literature and which require further analysis. This has in our view a high priority for further research.

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