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Recessions and flexible labour markets

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1. Introduction

Mitchell and Muysken (2008a) analysed why inflation fell in Australia in the period leading up to the financial crisis despite sustained and strong employment growth. The question of interest was why wage pressures had been relatively benign? The underlying proposition was that rise in underemployment since the early 1990s has changed the wage setting process in the labour market and employers use this slack as a means of disciplining wages growth and adjusting to the flux and uncertainty of the business cycle. In other words they considered the Phillips curve relationship had altered and within-firm slack was an additional disciplinary force on inflation.

This paper extends that work and argues against the notion that when unemployment is low, additional government expenditures will add to inflationary pressure and hence harm the economy. This fallacy follows from the notion that low unemployment indicates that the economy is close to full capacity: In that case, additional government expenditures will compete for productive resources and drive up prices and wages. This reasoning is consistent with the traditional Phillips curve, where unemployment has a negative impact on inflation – and a natural rate of unemployment is consistent with absence of (accelerating) inflation.

The reasoning above, however, ignores fundamental shifts in the labour market that have been taking place in the last three decades. The way labour markets operate shifted significantly in the early 1980s, in tandem with the rise of Reaganomics and Thatcherism and culminated, in a policy sense with the release of the OECD Jobs Study in 1994. Mitchell and Muysken (2008b) demonstrate that on conceptual and empirical grounds, the OECD Job Study paradigm failed to deliver on its promise to generate full employment and enhanced skill levels. This paradigm underpinned the demise of full employment and changed the focus of most national governments towards active labour market programs, or full employability. The pursuit of full employability has been characterised by a myriad of training programs, coercive welfare-to-work policies and a withdrawal of government responsibility for ensuring enough jobs are generated to match the preferences of the labour force.

The supply-side emphasis of the OECD Jobs Study was associated with strong calls for deregulation of labour market, allegedly to increase the flexibility and efficiency of the process of matching supply and demand. It was erroneously claimed that the persistent unemployment was structural in origin (rather than demand-deficient) and that various rigidities had to be removed as an effective resolution. The claim was that by increasing labour market flexibility, resources could be used more efficiently and hence economic growth and prosperity would be enhanced. As a consequence the nature of relations in the labour market shifted fundamentally.

Prior to the early 1980s, labour market were characterised by a high proportions of well-paid permanent jobs with strong dismissal protection and strong trade union involvement. Since then, labour markets have become more fragmented and union influence has become weaker. Permanent jobs have been replaced by temporary jobs in various guises with working hours within these latter jobs becoming more flexible. Additionally, within part-time employment the trend has been towards increasing casualisation of work and this has led to a widening of pay differentials.

While there has been no formal study that has shown that these tendencies have led to higher economic growth and prosperity, our concern is focused on how these developments have affected the wage determination process. We are specifically
interested in how the labour market trends have undermined the reasoning behind the traditional Phillips curve. By seeking an understanding of the way the labour market impacts on inflation, we aim to provide a framework for considering the impact of additional government expenditures in times of low inflation.

This paper aims to address the first part of this story by analysing increased labour market flexibility in terms of the shift from permanent to temporary work, and the impact on hours worked. We discuss three important aspects of that trend.

First, the relationship between firms and workers has changed fundamentally. Traditionally, the aggregate rate of unemployment could be seen as a threat to workers which is external to the firm - notwithstanding that the threat of unemployment was often hard to implement. However, as a result of the increased flexibility, it is now relatively easy for firms to modify the number of hours worked or to terminate temporary contracts. Therefore firms have gained significant new capacity to adjust to business cycle fluctuations which is internal to their operations and which they can use to discipline wage demands from their workforces. The sharp rise in underemployment in many economies is evidence of this increasing internal slack. In Section 2, we develop a model to explain this phenomenon.

Second, the shift from permanent to temporary work has not been a gradual process, but has proceeded in jumps where these sharp rises have been induced by recessions. After each recession it appears that the increased “flexibility” which occurred during the period of low activity is locked in and the trend continues from this higher level. We hypothesise that recessions facilitate a “paradigm shift”, which allows employers to intensify the underlying shifts that are occurring as a result of decreased union power and increased globalisation. Once the economy is in recession, some critical threshold is passed, after which it is hard to ‘turn the clock back’. As a result an erosion of previously held norms becomes accepted. In this paper, we identify and analyse such shifts for Australia.

Third, it was argued in the OECD Jobs Study and countless supporting documents and research papers that the increased labour market flexibility market would lead to more efficient labour utilisation. Mitchell and Muysken (2008b) show that, in fact, this has not been the case for OECD nations. In this paper we focus on the Australian experience since 1978 which is the period for which detailed employment and hours data is available and covers three major cyclical episodes.

The paper is laid out as follows. Section 2 presents the formal model and develops a series of testable hypotheses. Section 3 examines recent trends in the Dutch economy in relation to these hypotheses. Concluding remarks follow.

2. Permanent versus temporary jobs and the implications for hours worked

2.1 Overview

There is ample evidence of an increasing share of temporary jobs relative to permanent jobs following the waves of labour market deregulation in the late 1980’s and 1990’s (OECD, 2002). The motivation for deregulation of working conditions was to promote economic growth and increase employment (see OECD, 1994). Mitchell and Muysken (2008b) show how the supply-side agenda promoted by the OECD has had a huge influence on the policy in many Western economies. The intention was also to enhance
accessibility to the labour market for unemployed individuals and to provide them with better job prospects, through measures such as facilitating temporary work agreements and decreasing firing costs for permanent workers. However, the success of these reforms has been quite limited: an increased incidence of temporary employment, no clear indications that the ‘stepping-stone’ theory from temporary to permanent jobs was validated and no clear employment growth (see Kahn, 2010).

In addition to the lack of empirical support for the policies, several papers also questioned the reform agenda from a theoretical perspective. Both Blanchard and Landier (2002) and Cahuc and Postel-Venay (2002) argue that while making temporary work more feasible will lower the costs of offering jobs, the consequence also is a higher turnover on the labour market. The latter may lead to higher unemployment. In a similar vein, Wasmer (1999: 365) argues that “firms are more willing to use temporary contracts when growth is low. Firms then prefer high turnover workers with low turnover costs.”

However, two aspects that have been largely ignored in both the theoretical work and in the vast amount of empirical literature analysing the reforms are:

1. The cyclical variation in the transition of permanent to temporary jobs – this transition is accelerated during a boom; and
2. That labour market adjustment to demand shocks does not only take place through the shift from permanent to temporary work, but also through an increased flexibility of working hours within temporary jobs. During periods of high activity, employers will tend to increase the number of hours worked per worker, whereas they decrease them during recessions.

The consequence of these cyclical variations, which overlay the trend towards more casual work, is that underemployment provides firms with a significant adjustment capacity, in the same way that unemployment did in the past.

We develop a small conceptual model in order to get a better understanding of the increasing incidence of temporary jobs relative to permanent jobs, the cyclical variation therein, and the pro-cyclical variation in hours worked. However, we choose not to follow the theoretical approach mentioned above, which employs a general equilibrium model in the tradition of Mortensen and Pissarides (1994). Although an advantage of that approach is that a closed model is presented, there are several serious drawbacks of that line of reasoning for the analysis we are interested in (see Mitchell and Muysken, 2008). First, there is no role for demand shocks and it is clear that these play an important role in the type of problems we are analysing. Second, there are many institutional characteristics in the economy which cannot be properly accounted for in such an approach but which are nonetheless important for a proper understanding of the impact of demand shocks. For example, Ohanian et al (2009) identify both institutional aspects and gender differences. Third, employers and workers behaviour are analysed in a symmetrical way, which seems highly implausible to us given the disparate power that each has in the labour market relationship. For that reason, we will construct employers as making decisions about the nature of the job they offer, while workers will be considered to accept any job offer that exceeds their reservation wage. We will use a partial equilibrium approach, focusing on firm behaviour in choosing between permanent and temporary positions and the choice of the number of hours worked in reaction to demand shocks.
In our analysis, we follow the model developed in Kahn (2010), where he explains that employers will be more inclined to choose temporary jobs instead of permanent jobs during a recession than in a boom. The intuition is that workers are on average more productive during a boom compared to a recession. The incidence of workers with productivity below a given wage rate therefore is higher during a recession. This will induce employers to opt more for temporary jobs, since they then can weed out the unproductive workers. Additionally, Kahn models the impact of firing costs on the choice between temporary and permanent jobs, both during recessions and the expansionary phase. In line with the intuition above he finds that these costs are more important during recessions. We summarise Kahn’s analysis in the Section 2.2. In Section 2.3, we then modify the model to include hours worked as a variable that the employer can use in case of temporary employment. We show that employers will cut the amount of hours worked per worker during a recession. The result is that during a recession more temporary jobs will be created relative to permanent jobs than during a boom, and that these temporary jobs will consist of less hours worked compared to a boom.

### 2.2 A simple model of firm behaviour

A crucial assumption in Kahn’s (2010) model is that during an expansion workers’ productivity will be higher on average than during a recession. Surprisingly enough Kahn does not elaborate upon this assertion despite it being crucial for his model. A typical explanation for this phenomenon would be Verdoorn’s Law (for a recent application see Stilianos and Tsagdis, 2009).

In line with the above reasoning, we assume that workers’ productivity $e$ is uniformly distributed between 0 and 1 during a recession and between 0 and $a > 1$ during an expansion. The uniform distributions are $L(e)$ and $H(e)$, indicating periods of low and high activity, denoted by $L$ and $H$ respectively.\(^1\)

We will first analyse what this implies for permanent jobs and next compare that to the case of temporary jobs. We assume that the firm is confronted with a central bargained wage $W$, which is invariant over the cycle. Moreover, for sake of simplicity the expected wage is assumed to be equal to $W$ for both permanent and temporary workers. Finally we focus on firm behaviour during one period only. Extending the analysis to a multi-period study will make the conclusions stronger.

#### Permanent jobs

A permanent job is characterised by set-up costs $h_P$ and firing costs $c$. Workers are randomly drawn from the uniform distribution. Given a central bargained wage $W$, we assume that only workers are kept with productivity $e > W - c$. However, upfront payments $M$ have to be made to entice workers to accept the jobs, since they run the risk of being fired.

The profits for the firm on a permanent job $V_{Pi}$, where $i=L,H$ indicates the periods of low and high activity, respectively, are given by:

$$V_{PL} = -h_P - M_{PL} + \int_{W-c}^{1} (e-W) dL(e) - c \int_{0}^{W-c} dL(e)$$  \hspace{1cm} (1a)$$

$$V_{PH} = -h_P - M_{PH} + \int_{W-c}^{a} (e-W) dH(e) - c \int_{0}^{W-c} dH(e)$$  \hspace{1cm} (1b)$$

\(^1\) This implies that $dL(e) = l \cdot de$ and $dH(e) = (1/a) \cdot de$. 

The upfront payments to entice workers to accept the jobs, $M_{PL}$ and $M_{PH}$ respectively, are such that the expected wage of the workers equals $W$:

\[
M_{PL} = W - W \int_{W-c}^{1} dL(e) - b \int_{0}^{W-c} dL(e) = (W - c)(W - b) \quad (2a)
\]
\[
M_{PH} = W - W \int_{W-c}^{a} dH(e) - b \int_{0}^{W-c} dH(e) = \left(\frac{1}{a}\right)(W - c)(W - b) \quad (2b)
\]

One sees that when $c = W$ the firing costs are prohibitive, that is, the contract becomes permanent and there are no upfront costs needed to attract workers. Moreover, the wage compensation is larger during a recession, since the risk of unemployment then is greater.

Substituting Equation (2) in Equation (1) shows that the profits for each permanent job are:

\[
V_{PL} = -h_p + 0.5 - W + 0.5(W - c)[2b - c - W] \quad (3a)
\]
\[
V_{PH} = -h_p + 0.5a - W + \left(\frac{0.5}{a}\right)(W - c)[2b - c - W] \quad (3b)
\]

The gain of being able to fire workers at costs $c < W$ follows from the last part of Equations (3a) and (3b), respectively. These gains are positive as long as $b > (c + W)/2$ – we assume this to be the case. An interesting observation (OBSERVATION 1) is that the gain of firing unproductive workers is larger during a recession, since $a > 1$.

**Temporary jobs**

Initially in a temporary contract the firm can observe the productivity of the worker, but obtains no output. The set-up costs are $h_T$ and $M_{TL}$ and $M_{TP}$ are the upfront payments firms must pay to attract temporary workers. The firm will employ workers only when their productivity is at least the central bargained wage $W$.

The profits on a temporary job then are given by:

\[
V_{TL} = -h_T + \int_{W}^{1}(e - W) dL(e) - M_{TL} = -h_T + 0.5 - W + 0.5W^2 - M_{TL} \quad (4a)
\]
\[
V_{TH} = -h_T + \int_{W}^{a}(e - W) dH(e) - M_{TP} = -h_T + 0.5a - W + \left(\frac{0.5}{a}\right)W^2 - M_{TP} \quad (4b)
\]

The upfront payments $M_{TL}$ and $M_{TP}$ are such that workers obtain the expected wage $W$:

\[
M_{TL} = W - W \int_{W}^{1} dL(e) - b \int_{0}^{W} dL(e) = W(W - b) \quad (5a)
\]
\[
M_{TH} = W - W \int_{W}^{a} dH(e) - b \int_{0}^{W} dH(e) = \left(\frac{1}{a}\right)W(W - b) \quad (5b)
\]

Substituting Equation (5) in Equation (4) shows that a temporary contract is more advantageous for the firm during a recession than during an upswing (OBSERVATION 2). The intuition for this result is that the incidence of low productive workers, which can dismissed without any cost, is higher in a recession.

Kahn (2010) only analysers the case where permanent workers cannot be fired. In our model we show that when we allow for firing costs, similar results are found. So the gains for the firm of employing a temporary person instead of a permanent position are:

\[
V_{TL} - V_{PL} = h_p - h_T + c[b - 0.5c] \quad (6a)
\]
\[
V_{TH} - V_{PH} = h_p - h_T + \left(\frac{1}{a}\right)ac[b - 0.5c] \quad (6b)
\]

One sees from Equation (6) that temporary workers are more profitable for the firm than permanent workers, assuming that set-up costs for permanent workers at least equal
those for temporary workers. We know that \( b \geq 0.5c \) holds because we assumed that \( b > (c + W)/2 \). In this respect one can interpret differences in set-up costs to also reflect productivity differentials between permanent and temporary jobs. Assuming both types of set-up costs to be distributed over the whole range of jobs, this then also explains why some permanent jobs are replaced by temporary jobs and others not.

Another observation from Equation (6) (OBSERVATION 3) is that the gain of replacing permanent by temporal workers is larger during a recession, since \( a > 1 \). This is consistent with both earlier observations.

Also, as a consequence of the possibility to fire workers, the fraction of permanent jobs lost in a recession \((W - c)\), exceeds that lost in an expansion \((1/a)(W - c)\). This is similar to the point made by Blanchard and Landier (2002) and Cahuc and Postel-Venay (2002), albeit for different reasons.

### 2.3 Hours worked

A frequently observed phenomenon is that temporary jobs are also characterised by flexible hours – when there is a slack, the employer can reduce the working hours of the worker. We include that feature in the model by allowing each worker to work a flexible number of hours. Instead of assuming a fixed productivity per worker, we allow productivity to depend on hours worked \( h \). That is, we assume the productivity of a worker who works \( h \) hours to be equal to \( e.g(h) \), while we assume \( e \) to be distributed uniformly, as before. We assume a declining marginal productivity of hours, reaching a maximum total productivity per worker at \( h_{\text{max}} \) hours.

When we introduce these assumptions in the model and interpret \( W \) as wage per hour, we find the profits on a temporary job to be given by:

\[
V_{TL} = -h_T + \int_{Wh/g(h)}^{1} (e.g(h) - W.h)dL(e) - W_{OL} =
\]

\[
- h_T + 0.5g(h) - hW + 0.5 \frac{(hW)^2}{g(h)} - W_{OL}
\]

\[
(7a)
\]

\[
V_{TH} = -h_T + \int_{Wh/g(h)}^{a} (e.g(h) - W.h)dH(e) - W_{OH} =
\]

\[
- h_T + 0.5ag(h) - hW + \frac{0.5 (hW)^2}{a g(h)} - W_{OH}
\]

\[
(8b)
\]

Note that compared to the previous analysis we now require \( e.g(h) > W.h \) instead of \( e > W \). We assume that employers will set the number of hours worked such as to maximize profits per worker. Moreover, to facilitate the analysis, we assume \( g(h) = \alpha[h - h^2/(2h_{\text{max}})] \). This specification is consistent with a declining marginal productivity of hours, together with maximum productivity at \( h_{\text{max}} \).

Then we find:

\[
\frac{dV_{TL}}{dh} = \frac{\alpha}{2} \left[ 1 - \frac{h}{h_{\text{max}}} \right] - W + \frac{W^2}{2\alpha} \left[ \frac{2h_{\text{max}}}{2h_{\text{max}} - h} \right]^2 = 0
\]

\[
(9a)
\]

\[
\frac{dV_{TH}}{dh} = \frac{\alpha a}{2} \left[ 1 - \frac{h}{h_{\text{max}}} \right] - W + \frac{W^2}{2\alpha a} \left[ \frac{2h_{\text{max}}}{2h_{\text{max}} - h} \right]^2 = 0
\]

\[
(9b)
\]

Since \( a > 1 \), this implies that employers will increase the number of hours worked in the temporary job during an expansion. Or, alternatively, decrease the number of hours
worked during a recession (OBSERVATION 4). Also, as one might expect, employers will decrease the working time per job when the wage rate is higher. A formal proof for these statements is provided in the Appendix.

Finally, since the possibility to manipulate hours of work makes temporary jobs even more attractive for employers, these jobs will be even more preferred to permanent jobs than in the previous analysis.

2.4 Summary of model

The previous analysis was based on the behaviour of a typical firm. Aggregate behaviour follows when we allow for a distribution of firms over set-up costs $h_T$ and $h_P$. When that distribution is given, our model shows that a declining trend in firing costs will lead towards a rising trend in temporary jobs: this is consistent with our first stylised fact. The presence of demand shocks will also lead to more temporary jobs being created relative to permanent jobs during a recession than during a boom (second stylised fact). Further, these temporary jobs consist of less hours worked compared to the situation that would be found at the top of the cycle (third stylised fact).

An element of the analysis which we have not elaborated is that the net employment gains of these developments are not necessarily positive. As is shown by others, the increased turnover on the labour market implied by the transformation of permanent into temporary jobs has a negative employment impact. The net-result is unclear.

The model thus provides several testable hypotheses about the way the labour market responds to the business cycle. We consider these implications as a precursor to a following paper which analyses the impact of broader labour market slack for the inflation generating process.

By way of summary, the hypotheses of interest that we examine in Section 3 are:

- Firms shed full-time jobs to adjust their activity levels during a major cyclical downturn. Recessions reinforce the trend away from full-time employment.
- Part-time employment resists the cyclical decline in economic activity associated with recessions. Firms use part-time employment to maintain activity while gaining adjustments (in terms of hours and persons) via full-time job shedding.
- Flexible employment and short-hours employment is used during recessions by firms as an hours-buffer to meet the flux and uncertainty of aggregate demand.

3. Employment and hours worked in the Australia, 1978 – 2010

3.1 Data

The data used in the empirical section of the paper is taken from the Australian Bureau of Statistics (ABS) Labour Force Survey. The ABS make available the following data cube: E01_may01 - Persons employed part-time by Sex, Whether preferred to work more hours, State, Age, Hours worked. This breaks down the part-time workers into hours per week bands (0, 1-15, 16-29 and 30-34) and decomposes further by preference for more hours of work. Previous data releases allow us to create a continuous time series for each of the series from February 1978. The data was seasonally-adjusted before use.
3.2 Trends in the Australian labour market

Figure 1 shows that the annual number of hours worked per person has decreased steadily over the sample period (1978-2010) with marked declines around the periods of recession – the latter are consistent with the predictions of our model. The shaded areas are the peak-trough periods of the respective recessions although the 2009 episode never was technically declared a recession (see Mitchell, 2001 for the peak-trough dating). There has been a marked decline in the number of hours per full-time job, since the early 2000s. It is clear that the 2001 recession was associated with the step-drop in this time series. The structural decline in hours worked per person is due to the increasing incidence of part-time work.

Figure 1 Average quarterly hours worked per person and per full-time job, Australia, 1978-2010


Figure 2 shows the ratio of part-time employment to total employment for the Australia from 1978 to 2010. While the trend has clearly been upwards with some slowdown in the last years of the most recent growth cycle, there is also clear indication that the recessions pushed the trend growth upwards. The ratio has doubled over the sample period.
Figure 2 Part-time employment as a percent of total employment, Australia, 1978-2010


Figure 3 shows the evolution of unemployment and underemployment in Australia from 1979. The impact of the three major downturns in that sample period (1982, 1991, and 2009) is clearly evident.

Figure 3 Unemployment and underemployment, Australia, 1978-2010, per cent

While underemployment rose in the 1982 recession, it was the 1991 recession that led to a sharp increase and a new attractor level. The growth period after the 1991 recession led to reductions in the unemployment rate but only very modest reductions in the rate of underemployment. In the current economic downturn, the rise in both measures of labour underutilisation was sharp but smaller than the 1991 recession.

As a result it is unlikely that a persistent new level will be established in these series. But the striking trend since the 1991 recession has been that underemployment is now a significant issue and that as jobs have been created and absorbing the unemployed, a strong percentage of those jobs have not been providing enough working hours to satisfy the preferences of the labour force.

Figure 4 shows the number part-time workers who preferred more hours of work per week as a percentage of total part-time workers by three hours bands: 1-15, 16-29 and 30-34. It is clear that the problem of underemployment is usually dominated by the workers who are in the 1-15 hours per week band, although workers in the 16-29 hours per week band are now approaching the level of the 1-15 hours per week group. We cannot tell if these were new jobs created as the full-time work collapsed or further hours rations on existing part-time jobs. The cyclical nature of these series is very striking. As growth collapsed in early 1991, underemployment rose sharply (see Figure 3) and this was spread over all the hour-bands shown but concentrated at the lower end (1-15 hours). Once growth resumed the proportion of part-time workers in the higher hour bands (16-29 and 30-34) barely altered but underemployed in the 1-15 fell.

Figure 4 Underemployed part-time workers as a percent of total part-time work by hour bands, Australia, 1978-2010, per cent

Source: ABS Labour Force Survey. The time series are for part-time workers who preferred more hours of work per week as a percentage of total part-time workers.

Figure 5 presents ‘butterfly’ plots depicting movements in full-time and part-time employment and hours over the 1982, 1991 and 2009 recessions. Each plot begins 4-quarters before the peaks in GDP activity, then traces the behaviour from peak to trough
and then 8-quarters following the trough (dating is explained in Mitchell, 2001). The exception is for the 2009 episode when no technical recession was declared. The dating used for the peak to trough is 2008:1 to 2008:3. The shaded areas indicate the period between peak and trough in each of the cycles. The employment and hours series are index numbers with the base (100) coinciding with the peak GDP quarter.

Several points can be made. First, during each of the recessions there was a switch from full-time work to part-time work resulting in a greater proportion of workers in short-duration jobs. In the period immediately prior to each of the two peaks the full-time/part-time ratio was relatively stable. During the recession and subsequent recovery, the ratio rose rapidly before stabilising at the higher level with the underlying trend towards increased part-time work then reasserting itself.

Second, the behaviour of full-time employment in the recovery was different for the second recession. The passing of the trough in 1983 was marked by an immediate return to full-time employment growth not dissimilar to the rates in the late part of the upswing. The same holds for the 2009 recession. However, this is in sharp contrast to the behaviour in the post-recession growth period in the 1990s. While part-time employment growth recovered quickly, full-time employment continued to decline for many quarters after the trough and only slowly picked up in the late 1990s. The stifled growth in the 1990s clearly led to more part-time jobs with deficient hours of work relative to workers preferences being offered as a result of the continuing demand deficiency.

Third, the tendencies for hours worked are similar to those we sketched for employment above. The differences between the evolution of hours worked and employment are reflected in Figure 1, which we already discussed above.
Figure 5 Full-time and part-time employment and hours, over 3 recessions, Australia, index numbers

(a) 1981:2 to 1985:2

(b) 1989:4 to 1993:2

(b) 2007:1 to 2010:3
In summary, the trends in the Australian labour market are very striking in terms of the movements in levels and the impact of the recessions.

- There has been a decline in hours worked per person overall and more recently for those engaged in full-time employment.
- Part-time employment has risen as a percent of total employment since 1978 and now accounts for nearly 30 per cent of total employment.
- During the major recessions in 1982, 1991 and 2009 there was a switch from full-time work to part-time work resulting in sharp increases in the share of part-time employment.
- Underemployment also rose significantly during each major recession, resulting in persistent higher rates after each recession.
- The increasing underemployment after each major recession manifested itself in a rise in the proportion of workers both employed for 1-15 hours per week, and 16-29 hours a week, who wanted to work more hours per week.

3.3 Cyclical behaviour of the Australian labour market

In Section 3.2 we documented the underlying trends in the Australian labour market. However, the model we developed in Section 2 describes the labour market behaviour during recessions and growth periods. In this section we use more formal econometric methods to consider some of the evidence relating to the cyclical behaviour of the Australian labour market.

In particular we seek to examine:

- The cyclical differences between full-time and part-time employment growth rates;
- The cyclical differences between full-time and part-time hours growth rates;
- The presence of cyclical asymmetries in full-time and part-time employment and hours growth.

We model the business cycle in these regressions using the cyclical component of a Hodrick-Prescott decomposition (filtering) of the real GDP growth series. This can also be interpreted as a series that depicts movements around the trend of real GDP growth.

In addition we constructed three cyclical dummy variables to help us detect the presence of asymmetries during the recessions. The dummies took the value of 1 for quarters when real GDP was negative except for the 2009 episode where it was given the value 1 for the very low growth rate quarters. The dummy variables used were:

- D1982 which took the value 1 between 1982:4 and 1983:2 (inclusive) and zero otherwise.
- D1991 which took the value 1 between 1991:1 and 1991:4 (inclusive) and zero otherwise.
- D2009 which took the value 1 between 2008:1 and 2008:3 (inclusive) and zero otherwise.

In addition to examining movements in total employment and total hours growth we also examined a quarterly data series that the ABS published which decomposes part-
time workers into those who prefer to work more hours and those who do not prefer to work more hours. Clearly the former category comprises a component of the underemployed. Another component not examined in this paper are full-time workers stood down for economic reasons.

Table 1 shows the results of the equations for the annual growth in total employment and total hours for full-time and part-time workers. The impact of GDP growth on full-time employment and hours growth is strongly pro-cyclical as would be expected whereas there is no strong pro-cyclical impact on part-time hours and employment growth.

The recession dummies indicate tell an interesting story. For full-time employment growth, the 1982 and 1991 recessions were strongly counter-cyclical reducing employment growth well below that associated with the underlying cyclical effect. The 1991 recession was particularly severe. In the 2009 recession the impact is less defined (10 per cent significance). The cyclical asymmetries for part-time employment growth (where statistically significant) are interesting. The 1991 recession, given its severity reduced part-time employment growth below that associated with the underlying cyclical effect whereas the 2009 recession impact was counter-cyclical. That is, the pro-cyclical reduction in part-time employment growth was attenuated during this period.

The annual growth in full hours was reduced disproportionately in the 1982 recession but in the more recent episodes there is no statistically significant asymmetric effect detected. For annual growth in part-time hours, only the 2009 recession stands out and it supports the employment result – the recent recession disproportionately stimulated growth in part-time hours of work.

Table 1 Regression results, annual growth in total employment and total hours for full-time and part-time workers and Average quarterly hours worked per person and per full-time job, Australia, 1978:3 to 2010:1

<table>
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<th></th>
<th>Full-time employment growth</th>
<th>Part-time employment growth</th>
<th>Full-time hours growth</th>
<th>Part-time hours growth</th>
<th>Average hours worked per person</th>
<th>Ave. hours worked per full-time job</th>
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<td>-0.002</td>
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<tr>
<td></td>
<td>(2.54)</td>
<td>(0.74)</td>
<td>(6.23)</td>
<td>(0.12)</td>
<td>(1.93)</td>
<td>(1.90)</td>
</tr>
<tr>
<td>D1991</td>
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<td>-0.014</td>
<td>0.001</td>
<td>-0.003</td>
<td>-1.134</td>
<td>-0.486</td>
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<td>(2.45)</td>
<td>(2.20)</td>
<td>(0.16)</td>
<td>(0.33)</td>
<td>(1.09)</td>
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</tr>
<tr>
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<td>0.013</td>
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<td>(1.67)</td>
<td>(5.44)</td>
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<tr>
<td>R-sqd</td>
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<td>0.57</td>
<td>0.76</td>
<td>0.46</td>
<td>0.73</td>
<td>0.469</td>
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</table>

T-statistics in parentheses. Other control variables (trend, constant) were included. Full results are available on request. All equations have Newey-West standard errors.
The asymmetric responses of full-time and part-time employment growth to recessions are consistent with the observations made in the previous section and the predictions of our model.

The final two columns in Table 1 examine the cyclical sensitivity of the two time series shown in Figure 1 - Average quarterly hours worked per person and per full-time job. It is clear that average hours worked per person is counter-cyclical (as expected) and there is evidence of asymmetric responses (lower hours than at other points in the cycle) during the 1982 and 2009 recessions. Similarly the 1982 and 2009 recessions were very damaging for hours worked per full-time job (particularly the most recent episode). There is also a cyclical impact on the time series (statistically significant at 7 per cent level). These results are also consistent with the predictions of our model.

Table 2 shows the results of the equations for total employment and total hours for full-time and part-time workers. For the underemployed part-time workers the results support the insights provided by the model. Below-trend GDP growth increases the annual growth of workers in these categories. The specific recession dummy for 1982 is not statistically significant. However, the next two recessions (1991 and 2009) are strongly significant and indicate for workers in the 1-15 hour and 16-29 hour bands that the annual growth increased over and above that driven by the cycle and trend. In other words, the recessions were asymmetric episodes that accelerated the growth of involuntary short-time employment.

<table>
<thead>
<tr>
<th></th>
<th>Preferred more hours</th>
<th>Preferred more hours</th>
<th>Preferred more hours</th>
<th>Prefer no more hours</th>
<th>Prefer no more hours</th>
<th>Prefer no more hours</th>
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</thead>
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<tr>
<td></td>
<td>1-15</td>
<td>16-29</td>
<td>30-34</td>
<td>1-15</td>
<td>16-29</td>
<td>30-34</td>
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<td>GDP gap</td>
<td>-0.027</td>
<td>-0.030</td>
<td>-0.027</td>
<td>0.002</td>
<td>0.005</td>
<td>0.010</td>
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<td></td>
<td>(4.63)</td>
<td>(6.27)</td>
<td>(3.05)</td>
<td>(0.87)</td>
<td>(1.74)</td>
<td>(1.69)</td>
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<td>D1982</td>
<td>0.041</td>
<td>0.013</td>
<td>0.160</td>
<td>-0.045</td>
<td>-0.034</td>
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<tr>
<td></td>
<td>(0.74)</td>
<td>(0.30)</td>
<td>(1.90)</td>
<td>(2.06)</td>
<td>(1.24)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>D1991</td>
<td>0.097</td>
<td>0.132</td>
<td>0.106</td>
<td>-0.078</td>
<td>-0.057</td>
<td>-0.007</td>
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<tr>
<td></td>
<td>(2.02)</td>
<td>(3.42)</td>
<td>(1.45)</td>
<td>(4.08)</td>
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<td>-0.015</td>
<td>-0.027</td>
<td>-0.072</td>
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<tr>
<td></td>
<td>(3.05)</td>
<td>(2.27)</td>
<td>(1.55)</td>
<td>(0.89)</td>
<td>(1.33)</td>
<td>(1.74)</td>
</tr>
<tr>
<td>R-sqd</td>
<td>0.41</td>
<td>0.52</td>
<td>0.29</td>
<td>0.26</td>
<td>0.18</td>
<td>0.09</td>
</tr>
</tbody>
</table>

T-statistics in parentheses. Other control variables (trend, constant) were included. Full results are available on request.

For part-time workers who did not prefer more hours of work (that is, they are not counted as underemployed) the results are very different. The growth rate of employment in these categories is not strongly related to the business cycle (a trend component is dominant in each hour band). For the 16-29 and 30-34 hours band workers the annual growth rate is pro-cyclical although only significant at the 10 per cent level.
cent level. But the pro-cyclical nature of growth in these categories is in contradistinction with the counter-cyclical impact for the underemployed. However, the recession dummies tell us that in the cases where the impact is statistically significant the recessions asymmetrically reduce the growth of employment for those who desire to work part-time. For example, the 1982 and 1991 recessions reduced the growth rate of workers who desired 1-15 hours part-time work.

Overall, the results support the main insights of the analytical model presented in Section 2.

4. Conclusion

This paper is a precursor to a more detailed study of the adjustment processes that firms use to deal with major fluctuations in sales. The underlying aim of this research is to investigate how within-firm adjustments lead to underemployment which, in turn, becomes a disciplinary force on the inflation generating process.

In Section 2 we have developed a simple model of within-firm adjustments that helps us understand how firms adjust the different components of employment (focusing on full- and part-time) to meet the flux and uncertainty of the demand conditions they face.

We chose the Australia as a test case because it has experienced some stark shifts in full-time and part-time employment over the last 32 years since the oil shock of the late 1970s. Another reason is that we have good data available for Australia with respect to the employment categories of interest and underemployment. This enables a more detailed econometric study to explore the asymmetries of the cyclical adjustments which is a further feature of the model developed in Section 2.

Both from our explorative investigation of the data and our econometric analysis we found that the recessions in 1981, 1993 and 2008 resulted in a disproportionally strong decline in full-time employment and were times when firms shed full-time employment and replaced this capacity with part-time employment jobs. The latter is confirmed by the observation that there is no disproportionally strong decline in part-time employment during these recessions.

Also each recession induced an increasingly stronger underemployment of labour, manifesting itself in an increasing share of part-time workers wanting to work more hours.

Finally, we observe both expected cyclical impacts and cyclical asymmetries with respect to hours worked per person we observe and per full-time job.

Overall, as far as this paper has gone, the model developed in Section 2 is consistent with the data movements and helps us explain these processes.
References


Appendix

Let \( x = \frac{g(h)}{h} = a[1 - h/(2h_{\text{max}})] \). Then equation (9b) can be rewritten as:

\[
\frac{aa}{2} \left[ \frac{2}{a} x - 1 \right] - W + \frac{aW^2}{2a} \frac{1}{x^2} = 0 \quad \text{hence} \quad [ax - W] - \frac{aa}{2} \left[ 1 - \left( \frac{W}{ax} \right)^2 \right] = 0 \quad \text{or}
\]

\[
a x \left[ 1 - \frac{W}{ax} \right] = \frac{aa}{2} \left[ 1 - \frac{W}{ax} \right] \left[ 1 + \frac{W}{ax} \right]
\]

This can be written as a quadratic function in \( x \): \( \frac{aa}{2} x^2 - ax - W = 0 \) which yields as solution:

\[
x = \frac{a}{4} [1 + \sqrt{1 + \frac{8}{aa} w}]
\]

This solution shows that \( x \) is decreasing in \( a \), and hence \( h \) is increasing in \( a \). Hence, in an expansion, characterised by \( a > 1 \), employers will employ more hours in a temporary job than in a recession. Moreover, since \( x \) is increasing in \( W \), \( h \) is decreasing.

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2 The solution \( x = \frac{a}{4} [1 - \sqrt{1 + \frac{8}{aa} w} \) leads to a negative value of \( x \), which is impossible by definition.