Sticky Wage, Efficiency Wage, and Keynesian Unemployment

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September 2005
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Sticky Wage, Efficiency Wage, and Keynesian Unemployment*

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July 2005

Abstract

This paper provides a model of involuntary unemployment by combining the insights of the sticky wage theory and the efficiency wage theory. It implies that employed workers tend to supply more effort in response to economic downturns. So, a negative shock to an economy has intriguing impacts on the unemployment. The model also shows that a negative demand shock may have a relatively small effect on output since changes in work effort serve to partially mitigate the effects of the shock. Moreover, it yields some implications that complement the existing “work-sharing” literature.

Journal of Economic Literature Classification Number: E24, J64

*Suggested Running Head: Sticky/Efficiency Wage and Unemployment

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“Unemployment, like cancer, is a multifaceted phenomenon that comes in many forms.” (Summers, 1988: 388)

1. Introduction

A fundamental assumption of traditional Keynesian economics is the rigidity of nominal wage rate (e.g. Romer, 2001). Due to the sticky wage rate, a reduction of labor demand in a recession will result in an increase in involuntary unemployment. In recent years, the studies of nominal wage rigidity have experienced a resurgence in the research on business cycle fluctuations.\(^1\) Also, a major development of the “new” Keynesian economics is the efficiency wage theory. An important insight of the efficiency wage theory is that higher real wages and higher unemployment rates elicit more effort from workers and hence make them more productive.\(^2\) As the efficiency wage can be higher than the wage rate that equates labor demand and labor supply, this theory provides an explanation for the phenomena of persistent involuntary unemployment.

This paper attempts to extend the existing literature by combining the insights of the sticky wage theory and the efficiency wage theory. First, based on the efficiency wage theory, firms choose the optimal wage rate that maximizes profits. Then, labor contracts are signed which specify the nominal wage. The contracts may be explicit formal agreements of the type specified in Fischer (1977) and Taylor (1980) or implicit informal agreements of the form described in Malcomson...
(1984). Next, this paper tries to answer the question: what will happen if an unexpected negative shock occurs to the economy after labor contracts are signed? In this case, as the negative shock is completely unexpected, the predetermined efficiency wage may no longer maximize firms’ profits in the new macroeconomic environment. However, as the nominal wage rate is fixed or sticky in the short run, firms can only consider the option of laying off workers.

I begin my analyses by noting that workers will change their efforts endogenously in response to unexpected negative shocks. This argument is based on the fundamental insight of the efficiency wage theory that workers’ effort is determined by the unemployment rate and the real wage rate (For example, see the survey by Romer (2001)). As the unemployment rate may rise and deflation may occur due to a negative shock, employed workers will supply more effort in response to the economic downturn. Also, this paper is motivated by the observations in Hong Kong in recent years. As carefully described in the appendix of the paper, in the recent economic downturns in Hong Kong, workers usually worked overtime with little or no extra compensation. Moreover, few workers were willing to accept a pay cut even if they were overloaded and had to work overtime.

In this model, firms’ employment decisions are related to an increase in workers’ effort in two opposite ways. On one hand, as workers supply more effort, the effective labor supply (i.e. the combination between the number of employed workers and average work effort) will increase. Consequently, according to the law of diminishing returns, firms will tend to lay off more workers. On the other hand, a worker will be more productive and hence more valuable to her firm if she
supplies more effort. Thus, firms will tend to retain/hire more workers if effort increases. The model shows that the net effect of increased effort on employment will depend on the properties of the production technology and the extent to which agents modify their work efforts. Thus, by analyzing sticky wage and the endogeneity of workers’ effort simultaneously, this paper complements the existing literature of unemployment.

This paper is related to Bils and Chang (2003), who investigate the welfare costs of sticky wages when effort can respond. It extends Bils and Chang (2003) in two aspects. Firstly, because Bils and Chang (2003) adopt the approach that labor markets always clear, there is no involuntary unemployment in their model. In contrast, the current paper aims to examine how endogenous effort affects involuntary unemployment when nominal wage is sticky. Secondly, an implicit assumption in Bils and Chang (2003) is that every worker’s individual effort is completely observable so that “...Under sticky wages...(w)orkers must produce enough to merit the specified wage in order to maintain employment” (Page 313). However, in reality, as emphasized by the literature of efficiency wages, a worker’s individual effort is often not completely observable (e.g. in team production), which implies that it is often more appropriate to analyze workers’ endogenous efforts based on the theory of efficiency wages.

Moreover, this analysis generates several other macroeconomic and policy implications. It shows that a negative demand shock may have a relatively small effect on output since changes in work effort serve to partially mitigate the effects of the shock. Also, this paper is related to the “work-sharing” literature, which
investigates whether a reduction of the working time of the employed can lead to an increase or decrease in employment. By considering that labor input includes both working hours and working intensity, the current paper extends this literature. For example, it suggests that the “work-sharing” scheme may not be effective in affecting wage and employment because reduced working hours may be offset by increased working intensity/effort. Further, the model implies that the “work-sharing” scheme will reduce real output even if it can increase employment.

In what follows, Section 2 sets up the basic framework. Section 3 analyzes the impacts of a negative shock on workers’ efforts and involuntary unemployment. Section 4 explores other macroeconomic implications of the model. Section 5 summarizes the paper. The appendix discusses the empirical motivations of this paper.

2. The Basic Analytical Framework

This section is completely based on the standard textbook version of the efficiency wage theory with slight modifications (see Chapter 9, Romer, 2001). There are a large number, N, of identical competitive firms. For simplicity, “N” is assumed to be fixed in the short run. The representative firm seeks to maximize its profits, which are given by

\[ \pi = PQ - WL \] (2.1)

where \( P \) is the price level, \( Q \) is the firm’s quantity of output, \( W \) is the nominal wage, \( L \) is the number of workers it hires.
A firm’s output depends on both the number of workers it employs and their effort. Thus the representative firm’s output is

\[ Q = F(eL), \quad F'(\bullet) > 0, \quad F''(\bullet) < 0 \]  

(2.2) where \( e \) denotes workers’ effort.

The efficiency wage theory posits that workers’ effort increases with the real wage rate and the unemployment rate (e.g. Solow, 1979; Summers, 1988). Namely,

\[ e = e\left(\frac{W}{P}, u\right), \quad e_1 > 0, \quad e_2 > 0 \]  

(2.3) where “\( u \)” denotes the unemployment rate.

Finally, there are \( T \) identical workers, each of whom supplies one unit of labor inelastically.

Based on the above description, the problem facing the representative firm is

\[ \max_{L,W} PF[e\left(\frac{W}{P}, u\right) L] - WL \]  

(2.4) If there are unemployed workers, the firm can choose the wage freely. If unemployment is zero, on the other hand, the firm must pay at least the wage paid by other firms.

Since there are a large number of firms, each individual firm regards “\( u \)” as given. Then, the first order conditions for \( L \) and \( W \) are

\[ \frac{\partial \pi}{\partial L} = PF'[e\left(\frac{W}{P}, u\right)L]e\left(\frac{W}{P}, u\right) - W = 0 \]  

(2.5)

\[ \frac{\partial \pi}{\partial W} = F'[e\left(\frac{W}{P}, u\right)L]e_1\left(\frac{W}{P}, u\right)L - L = 0 \]  

(2.6)
Since firms are identical, each firm chooses the same values of $W$ and $L$. Total labor demand is therefore $NL$. To guarantee an interior solution, I assume $NL < \overline{L}$. In this case, the number of unemployed workers is

$$\overline{L} - NL$$

So,

$$u = \frac{\overline{L} - NL}{\overline{L}}$$

(2.7)

Plugging (2.7) into (2.5) and (2.6), I can get a firm’s optimal choice of $W$ and $L$, which are denoted by $W^*$ and $L^*$ respectively.

3. Sticky Wage, Efficiency Wage, and Unemployment

In this section, I will examine the combined implications of the sticky wage theory and the efficiency wage theory on workers’ effort and unemployment in an economic downturn. First, based on the efficiency wage theory discussed in the last section, firms choose the optimal wage rate that maximizes profits. Then, labor contracts are signed which specify the nominal wage at the level of $W^*$. Next, I assume that after labor contracts are signed, a completely unexpected negative shock occurs to the economy.

I assume that the economy here is a small open economy so that firms in this economy take the price of the output, $P$, as given. Hence, the negative shock to the economy here can be simply modelled as a fall of the price of output, $P$.\(^5\) As the negative shock is completely unexpected, the predetermined efficiency wage, $W^*$, may no longer maximize firms’ profit in the new macroeconomic environment.
However, as the nominal wage rate is fixed or sticky in the short run, firms can only consider the option of laying off workers.

I begin my analyses by noting that workers will change their efforts endogenously in response to unexpected negative shocks. Formally, in this case, workers’ endogenous effort, (2.3), can be rewritten as

\[ e = e\left(\frac{W^*}{P}, u\right) \]  

(3.1)

From (3.1), we can see that employed workers tend to work harder in a recession for two reasons. Firstly, when a negative shock to the economy occurs (i.e. \( P \) decreases), the real wage, \( \frac{W^*}{P} \), will increase. Recall that \( e_1 > 0 \), so a worker will exert more effort in response to the negative shock. Secondly, note that we also have \( e_2 > 0 \), so a worker’s effort will increase further when the unemployment rate rises in a recession.

Since the wage rate is fixed in this section, the only choice variable for a firm is “\( L \)”. From (2.5), I can rewrite the first order condition of a firm’s profit maximization problem as

\[ PF'(eL)e - W^* = 0 \]  

(3.2)

In the existing literature on sticky wage and unemployment, workers’ endogenous effort in response to the change of economic environment has usually been ignored. In other words, it has treated workers’ effort as a fixed parameter. In this case, totally differentiating (3.2) with respect to \( L \) and \( P \) (and regarding \( e \)
as a fixed parameter) and rearranging, I get
\[ \frac{\partial L}{\partial P} = -\frac{F'}{ePF''} > 0 \]  

(3.3)

Thus, if workers’ endogenous effort is not considered, the relationship between the change of employment and the change of the macroeconomic environment is characterized by (3.3).

When we consider that \( e \) is an endogenous variable, the easiest way to derive the relationship between \( L \) and \( P \) is through plugging (3.1) and (2.7) into (3.2) and then totally differentiating (3.2) with respect to \( L \) and \( P \). However, it would be difficult to see the economic intuitions from this straightforward derivation. So, to better explain how workers’ endogenous effort affects employment, I will derive the results in the following more indirect way. In this case, noting that \( L \) is a function of both \( e \) and \( P \), we have

\[
\frac{dL}{dP} = \frac{\partial L}{\partial P} + \frac{\partial L}{\partial e} \frac{de}{dP} = \frac{\partial L}{\partial P} + \frac{\partial L}{\partial e} \left( \frac{de}{\partial P} + \frac{de}{\partial u} \frac{du}{dP} \right) = \frac{\partial L}{\partial P} + \frac{\partial L}{\partial e} \left( \frac{de}{\partial P} + \frac{de}{\partial u} \frac{\partial u}{\partial L} \frac{dL}{dP} \right) \]  

(3.4)

Note that (3.1) and (2.7) imply that

\[ \frac{\partial e}{\partial P} = -\frac{W^*e_1}{P^2} < 0 \]  

(3.5)

\[ \frac{\partial e}{\partial u} \frac{\partial u}{\partial L} = -\frac{Ne_2}{L} < 0 \]  

(3.6)
So, the magnitude (or even the sign) of $\frac{dL}{dP}$ depends crucially on the sign of $\frac{\partial L}{\partial e}$, which measures the correlation between workers’ effort and the level of employment. To obtain the expression of $\frac{\partial L}{\partial e}$, I totally differentiate (3.2) with respect to $L$ and $e$ and rearrange, then I get

$$\frac{\partial L}{\partial e} = -\frac{F' + eLF''}{e^2F''}$$  \hspace{1cm} (3.7)

Note that the denominator of (3.7) is negative since $F'' < 0$. So, if $F' + eLF'' > (<)0$, we have

$$\frac{\partial L}{\partial e} > (<)0$$

The intuition of the above result is as follows. On one hand, as workers supply more effort, *ceteris paribus*, the effective labor supply (i.e. $eL$) will increase. As the effective labor supply increases, according to the law of diminishing returns, firms will tend to lay off more workers. On the other hand, as workers’ effort increases, the value of each worker to the firm increases, which implies that firms will tend to retain/hire more workers. From (3.7), we can see that the net effect will depend on the curvature of the production function. If the marginal product of labor decreases little with effective labor supply, $eL$, the absolute value of $F''$ will be small. In this case, firms will choose to retain more workers in response to an increase of workers’ effort. However, if the production function exhibits strong diminishing returns, then firms will choose to lay off more workers as $e$ increases.

Now, to derive the expression of $\frac{dL}{dP}$, I rearrange (3.4) as follows,

$$\frac{dL}{dP} = \frac{\partial L}{\partial P} + \frac{\partial L}{\partial e} \frac{\partial e}{\partial P} + \frac{\partial L}{\partial e} \frac{\partial e}{\partial u} \frac{dL}{dP}$$
namely
\[
\frac{dL}{dP}[1 - \frac{\partial L \partial e \partial u}{\partial e \partial u \partial L}] = \frac{\partial L}{\partial P} + \frac{\partial L \partial e}{\partial e \partial P}
\] (3.8)

Plugging (3.3), (3.5), (3.6) and (3.7) into (3.8) and rearranging, I get

\[
\frac{dL}{dP} = \frac{[\frac{\partial L}{\partial P} + \frac{\partial L \partial e}{\partial e \partial P}]/[1 - \frac{\partial L \partial e \partial u}{\partial e \partial u \partial L}]}{[\frac{-F'}{ePF''} - \frac{F'' + eLF''}{e^2F''}(-\frac{W*e_1}{P^2})]/[1 - (\frac{-F' + eLF''}{e^2F''})(\frac{-Ne e_2}{L})]}
\]

\[
= \frac{\frac{\mathcal{L}(W*e_1 - eP)F' + W*ee_1LF''}{P^2[(Le^2 - Ne e_2 L)F'' - Ne e_2 F']}}{[\frac{-F'}{ePF''} - \frac{F'' + eLF''}{e^2F''}(-\frac{W*e_1}{P^2})]/[1 - (\frac{-F' + eLF''}{e^2F''})(\frac{-Ne e_2}{L})]}
\]

(3.9)

(3.9) and (3.4) imply that there is an intriguing relationship between employment and the change of economic environment when we take workers’ endogenous effort into account. Comparing (3.3) and (3.4), we can see that if the prediction of unemployment is based on the sticky wage theory but it ignores the implications of the efficiency wage theory, then the impact of the negative shock on unemployment will be either overestimated or underestimated. The impact of a negative demand shock on increasing unemployment will be overstated if \( \frac{\partial L}{\partial e} > 0 \) or \( F' + eLF'' > 0 \); it will be understated if \( \frac{\partial L}{\partial e} < 0 \) or \( F' + eLF'' < 0 \). Moreover, comparing (3.3) with (3.4) and noting (3.7), (3.5), (3.6) and (3.9), we can see that the magnitude of this overestimation or underestimation is the absolute value of the following item

\[
\frac{\partial L}{\partial e} \left( \frac{\partial e}{\partial P} + \frac{\partial e \partial u \partial L}{\partial u \partial L \partial dP} \right)
\]
Thus, as firms may either retain or lay off more workers in response to the increase of workers’ effort, the amount of increased unemployment in a recession predicted by the combined insights of both the efficiency wage theory and the sticky wage theory can be significantly different from that predicted by the sticky wage theory alone.

4. Effort, Real Output, and Policy Implications

In this section, I first analyze the impact of endogenous effort on real output. From (2.2), namely $Q = F(eL)$, we know that the real output is determined by the effective labor supply (i.e. $eL$).

As in the last section, the change of macroeconomic environment is again modelled as the change of “$P$”. Then, the relationship between effective labor supply and the change of macroeconomic environment is

$$\frac{d(eL)}{dP} = L \frac{de}{dP} + e \frac{dL}{dP}$$

(4.1)

As $\frac{de}{dP} < 0$, $L \frac{de}{dP} + e \frac{dL}{dP}$ can be much less than $e \frac{dL}{dP}$. In other words, the change of effective labor supply due to a negative shock can be much smaller than what is predicted by a model in which workers’ endogenous efforts are not taken into
account. The intuition of this result is explained earlier: in an economic downturn, while few people work, those who are employed tend to work harder. So, the change of the percentage of effective labor supply may be much smaller than that of employment. More specifically, from (3.5), (3.6) and (3.9), we get

\[
\frac{d(eL)}{dP} = L \frac{de}{dP} + e \frac{dL}{dP} = L \left( \frac{\partial e}{\partial P} + \frac{\partial e}{\partial u} \frac{dL}{dP} \right) + e \frac{dL}{dP} = L \frac{\partial e}{\partial P} + (L \frac{\partial e}{\partial u} + e) \frac{dL}{dP} = -\frac{Lw^*e_1}{P^2} + \left( e - \frac{LN e_2}{\mathcal{T}} \right) \frac{\mathcal{L}[(W^*e_1 - eP')F'' + W^*e_1LF''']}{P^2[(Le^2 - Ne_2L)F'' - Ne_2F']}
\] (4.2)

From (4.2), we can see that under some parameter configurations, the value of \( \frac{d(eL)}{dP} \) can be very small. This result implies that a negative demand shock may have a relatively small effect on output since changes in work effort serve to partially mitigate the effects of the shock. Thus, the decrease in real output caused by a negative shock may be much less than what would be predicted by a model in which workers’ endogenous efforts are not considered.

Next, I discuss the policy implications of the model in relation to the “work-sharing” literature. First, when it is considered that labor input includes not only working hours but also working effort/intensity, the current paper suggests that the “work-sharing” scheme may often be hard to implement because effort is largely unobservable. In an important contribution, Hunt (1999) finds that when the “work-sharing” scheme was implemented in Germany for the period between 1984 and 1994, the hourly wage rose substantially enough that workers were fully
compensated pecuniarily for the declines in actual hours worked.\textsuperscript{6} Hunt (1999) provides several interesting explanations for her findings. This paper suggests that a possible complementary explanation to Hunt (1999) is that when the standard hours of work were reduced, workers might have increased their effort/intensity so that the total labor input might have remained largely unchanged. Therefore, firms were willing to pay the workers with about the same monthly wage as before.

Second, it should be noted that in an abstract sense, we may regard a worker’s effort, “\( e \)”, in the model as the combination of a worker’s working hours and working intensity. Now, I try to answer the following question: Suppose that the “work-sharing” scheme does achieve the goal of reducing “\( e \)” under some circumstances (e.g. workers are not allowed to work overtime and working intensity has reached the maximum), what are the impacts of this policy on employment and real output?

Firstly, as discussed earlier, we will have \( \frac{\partial L}{\partial e} > 0 \) if and only if \( F' + eLF'' > 0 \). In other words, the impact of this policy on employment is theoretically ambiguous. In particular, if \( F' + eLF'' < 0 \), then the “work-sharing” scheme, which reduces “\( e \)”, will lead to a reduction of employment when nominal wage is sticky. This implication is consistent with the empirical finding of Hunt (1999), who shows that the “work-sharing” scheme actually reduced employment in Germany in the period 1984—1994.

Secondly, noting (3.7), we have

\[
\frac{d(eL)}{de} = L + e \frac{d(L)}{de}
\]
\[
\begin{align*}
L - e \frac{F' + eLF''}{e^2 F''} & = - \frac{F'}{eF''} \\
& > 0
\end{align*}
\]

“\(\frac{d(eL)}{de} > 0\)” means that a reduction in hours or/and efforts per worker will result in a decrease in the total effective labor supply. Thus, no matter whether the “work-sharing” scheme succeeds in increasing employment or not, it will result in a decrease in real output.

5. Summary

Both the sticky wage theory and the efficiency wage theory are cornerstone theories of involuntary unemployment in macroeconomics. However, in the existing literature, to my best knowledge no attempt has been made to explore the combined implications of these two theories. This paper intends to help fill this gap.

The basic structure of the model is as follows. First, based on the efficiency wage theory, firms choose the optimal wage rate that maximizes profits. Then, labor contracts are signed which specify the nominal wage. Next, I try to answer the question: what will happen if an unexpected negative shock occurs to an economy after labor contracts are signed?

The model implies that in economic downturns, while few people work, those who are employed tend to work harder. Moreover, it suggests that firms’ employment decisions are related to workers’ effort in a rather complex way. On one hand, as effective labor supply increases with workers’ effort, the law of diminish-
ing returns implies that firms will tend to lay off more workers. On the other hand, as workers’ effort increases, the value of each worker to the firm increases, which implies that firms will tend to retain more workers. The net effect depends on the property of the production function. Thus, it suggests that a negative shock to an economy has intriguing impacts on the unemployment. In other words, the amount of increased unemployment in a recession can be significantly different from the prediction of a model in which workers’ endogenous efforts are not taken into account.

The model also generates other macroeconomic and policy implications. It shows that a negative demand shock may have a relatively small effect on output since changes in work effort serve to partially mitigate the effects of the shock. Also, it suggests that as labor input includes both working hours and working intensity, the “work-sharing” scheme may not be effective in affecting wage and employment if reduced working hours are offset by increased work effort. Further, it implies that the “work-sharing” scheme will reduce real output even if it can increase employment.
6. Appendix: Empirical Motivations

This paper is motivated by the observations in Hong Kong for the past few years. From late 1997 to 2004, the Hong Kong economy had generally been in a state of economic downturn. In particular, from October 1998 to June 2004, Hong Kong consumer prices had fallen for 66 straight months and its unemployment rate had risen drastically. Meanwhile, as Hong Kong had enjoyed very rapid economic growths for several decades before 1997, the prolonged recession was largely unexpected. Also, it should be noted that unions have never had much power or influence in Hong Kong. So, Hong Kong is an ideal place to study the implications of the standard efficiency wage theories.

Why is the unemployment rate in Hong Kong so high? Firstly, a general consensus is that the nominal wage rate in Hong Kong has been sticky, which is related to the currency peg between Hong Kong dollar and American dollar. In fact, for the past five years, the average nominal wage rate in Hong Kong has experienced slight increases despite the continuous deflations and increasing unemployment. Secondly, there are some concerns that the unemployment problem in Hong Kong was worsened by the increasing trend that more and more workers frequently and even voluntarily worked overtime without any extra pay.

In September 2001, the Democratic Alliance for the Betterment of Hong Kong, one of Hong Kong’s political parties, conducted a survey on the working hours of 655 full-time employees. The following are some of the questions of the survey and the corresponding survey results.
Question 1: *How many days do you work overtime per week?*

Answers:

<table>
<thead>
<tr>
<th>number of days</th>
<th>percentage of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>38.1%</td>
</tr>
<tr>
<td>1 or 2</td>
<td>27.3%</td>
</tr>
<tr>
<td>3 or 4</td>
<td>20.3%</td>
</tr>
<tr>
<td>5 or more</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

Question 2: *On average, how many hours do you work overtime every day?*

Answers:

<table>
<thead>
<tr>
<th>number of hours</th>
<th>percentage of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 1</td>
<td>23%</td>
</tr>
<tr>
<td>1 to 2</td>
<td>51.3%</td>
</tr>
<tr>
<td>3 to 4</td>
<td>19.6%</td>
</tr>
<tr>
<td>5 or more</td>
<td>6%</td>
</tr>
</tbody>
</table>

Question 3: *Do you receive any extra pay for your working overtime?*

Answers:

<table>
<thead>
<tr>
<th>Answers</th>
<th>percentage of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21.9%</td>
</tr>
<tr>
<td>No</td>
<td>78.1%</td>
</tr>
</tbody>
</table>

Question 4: *Do you think your company hires enough workers/staff to do all the required jobs?*

Answers:

(1) 12.2% of the respondents: “No. My company hires so few workers/staff that my workload is almost too much to bear.”
(2) 45.8% of the respondents: “No. My company does not hire enough workers/staff and my workload is very high. But I can still manage to handle all the required jobs by working very hard.”

(3) 35.9% of the respondents: “Yes. There are just enough workers/staff in my company.”

(4) 6.1% of the respondents: “Yes. Actually there is a surplus of workers/staff in my company.”

Question 5: If your company plans to hire more workers (to reduce your workload) but in the same time cut your salary, would you agree?

Answers:

<table>
<thead>
<tr>
<th>Answers</th>
<th>percentage of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15.9%</td>
</tr>
<tr>
<td>No</td>
<td>84.1%</td>
</tr>
</tbody>
</table>

The above survey results illustrate that in economic downturns, workers usually work overtime with little or no extra compensation. Meanwhile, consistent with the implication of the sticky wage theory, few workers are willing to accept a pay cut even if they are overloaded and have to work overtime.

Finally, from the Quarterly Report on the General Household Survey in Hong Kong, I find the median hours of work in Hong Kong, which is complementary to the above empirical evidence and is presented in the following table.

Table 1 is about here
From 1995 to 1997, Hong Kong economy was in a boom; from 1998 to 2000, it was in a recession. A simple comparison reveals that in each of the four quarters, the median hours of work in Hong Kong is higher in the period between 1998 and 2000 than the period between 1995 and 1997. Moreover, a t-statistic test demonstrates that the null hypothesis that the difference between the average hours in these two periods are the same can be rejected at the 1 percent significance level. Thus, this piece of evidence shows that a typical worker worked for longer hours during recessions than during booms in Hong Kong.
Table 1
The median hours of work in Hong Kong
(hours per week)

<table>
<thead>
<tr>
<th>Year</th>
<th>first quarter</th>
<th>second quarter</th>
<th>third quarter</th>
<th>fourth quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>44</td>
<td>44</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>1996</td>
<td>45</td>
<td>45</td>
<td>48</td>
<td>45</td>
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<tr>
<td>1997</td>
<td>44</td>
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<td>1999</td>
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References


[6] Hong Kong Monthly Digest, Census and Statistics Department, the Government of Hong Kong, Hong Kong, various issues.


Footnotes:

1: See, for example, the literature review in Bils and Chang (2003).


3: In the model, I adopt the assumption of small open economy so that the output of the economy does not affect its price level. But if I relax this assumption, then an increase in output will reduce the price level, which will further reduce employment.

4: In many western countries, “work-sharing” schemes have been proposed as a policy instrument to reduce unemployment. This policy proposal is based on the widespread popular belief that a reduction in hours per worker will spread the available work around and hence increase employment. However, rigorous economic analyses indicate that “work-sharing” schemes often lead to rather complicated outcomes. For example, see Calmfors and Hoel (1989) and Hoel and Vale (1986) for some theoretical analyses, Hunt (1999) for some empirical investigations, and Hunt (1998) for a comprehensive survey of the “work-sharing” literature.

5: Note that the assumption of small open economy implies that prices are not sticky (e.g. Phelps, 1990). This assumption allows us to readily apply the existing theories of efficiency wage, which have not incorporated sticky price. If sticky price
were to be considered, we then could extend the existing efficiency wage theories by assuming that workers’ effort is a decreasing function of firms’ realized profits, which would lead to qualitatively the same results as those obtained in this paper.

6: Specifically, Hunt (1999) finds that when the standard hours in some industries in Germany were reduced by one hour due to the implementation of the “work-sharing” scheme, straight-time real hourly wages rose between 2 and 2.4 percent relative to wages in industries with no reduction in standard hours. As a one-hour fall from forty (standard) hours is equivalent to 2.5 percent, Hunt (1999) infers that workers were almost fully compensated pecuniarily.

7: See Hong Kong Monthly Digest. For example, the unemployment rate in Hong Kong was only 2.2 percent in 1997. But it surged to 7.8 percent in the first quarter of 2003.

8: See Hong Kong Monthly Digest.

9: For example, see “Fearful staffs work longer hours for no reward,” South China Morning Post (Hong Kong’s leading English newspaper), October 29, 2001.


11: It should be noted that in Hong Kong, employees are usually required to work on Saturday mornings so that the standard working days per week are five and half days.