# UNEMPLOYMENT INSURANCE AND BANKRUPTCY

by

Kelvin Chi Fung Lam

B.A., Simon Fraser University, 2005

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the
Department
of
Economics

© Kelvin Lam 2006

SIMON FRASER UNIVERSITY

Spring 2006

# APPROVAL

Name: **Kelvin Lam**

Degree: **M. A. (Economics)**

Title of Project: **Unemployment Insurance And Bankruptcy**

Examining Committee:

**Chair:** **Ken Kasa**

---

**Steeve Mongrain**
Senior Supervisor

---

**Phil Curry**
Supervisor

---

**David Andolfatto**
Internal Examiner

**Date Approved:** Tuesday, April 11, 2006

# SIMON FRASER UNIVERSITY library

# DECLARATION OF
# PARTIAL COPYRIGHT LICENCE

The author, whose copyright is declared on the title page of this work, has granted to Simon Fraser University the right to lend this thesis, project or extended essay to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users.

The author has further granted permission to Simon Fraser University to keep or make a digital copy for use in its circulating collection, and, without changing the content, to translate the thesis/project or extended essays, if technically possible, to any medium or format for the purpose of preservation of the digital work.

The author has further agreed that permission for multiple copying of this work for scholarly purposes may be granted by either the author or the Dean of Graduate Studies.

It is understood that copying or publication of this work for financial gain shall not be allowed without the author's written permission.

Permission for public performance, or limited permission for private scholarly use, of any multimedia materials forming part of this work, may have been granted by the author.   This information may be found on the separately catalogued multimedia material and in the signed Partial Copyright Licence.

The original Partial Copyright Licence attesting to these terms, and signed by this author, may be found in the original bound copy of this work, retained in the Simon Fraser University Archive.

Simon Fraser University Library
Burnaby, BC, Canada

# ABSTRACT

The primary purpose of unemployment insurance is to insure individuals against unpredictable employment shocks but unemployment insurance will affect the layoff decision of firm. The experience rating tax, which requires firms to pay some portion of the unemployment insurance benefit that firms create, reduces the amount of excessive layoffs from firms. This paper explores the effect of experience rating taxes on firms. We show that experience rating taxes can lead to an increase in the number of bankruptcies within the economy. Welfare implications are examined.

# ACKNOWLEDGEMENTS

I offer my enduring gratitude to the faculty, staff and my fellow students at the

SFU Department of Economics, who have combined to create a stimulating synergy for

research in my field. I owe particular thanks to Dr. P. Curry and Dr S. Mongrain, whose

excellent comments on my project.

# TABLE OF CONTENTS

# LIST OF FIGURES

# 1. Introduction

The primary purpose of unemployment insurance is to insure people against employment shocks. It is well known that unemployment insurance can create adverse incentives for workers. In particular, it can lead to moral hazard problem since the insurer cannot observe the behavior of the insured. Specifically, the government cannot monitor workers' employment or job search behavior, a problem of leaving unemployment; and the government cannot monitor employers' layoff decision, a problem of entering unemployment. In order to damp the distortion on leaving unemployment, Shavell and Weiss (1979) argued that the optimal sequence of unemployment insurance payments should be a declining series. As the wealth of an individuals falls, labor income becomes a more important source of income, hence the reservation wage decreases. Therefore, the effort spent on job search will increase. However, most countries that have unemployment insurance offer benefits that do not decline over time. Pissarides (1983) argued that a progressive income tax can be used to reduce the length of unemployment. As the chance of getting a better job increases, people would wait longer for such an offer. By using a progressive income tax, the net wage for high paying jobs decreases more than lower paying jobs, so the variance of the overall distribution of wage offer decreases. Hence the expected return to search decrease and people would lower their reservation wages. This might then explain why a

1

declining payment scheme is not generally observed in unemployment insurance programs.

While the decision to enter employment can be thought to be made primarily by the worker, the decision to exit employment can be thought of to be made by the employer. If unemployment insurance reduces a firm's layoff cost and if workers value contingent income upon layoff, then the layoff and employment decision is distorted. This is because the firm uses unemployment insurance as a layoff subsidy. One instrument used to eliminate such an effect is an experience rating tax, which requires that employers make contributions depending on their employment history. Using the terminology of Marceau (1993), the "conventional" view is that since experience rating taxes serve as an additional layoff cost to firms, thereby reducing layoffs, or increasing average employment. Hence, Topel and Welch (1980) and Burdett and Wright (1989b) both concluded that layoff distortions can be eliminated by full experience rating, which means that firms have to pay all of the benefits paid out on the unemployment they create. Mongrain and Roberts (2005) also showed that when firms can not fully observe the effort exerted by workers, full experience rating will achieve the optimal level of employment. However, full experience rating taxes are no different from private insurance provided by the firm. Moreover, most countries which have unemployment insurance employ a flat contribution rate. i.e. firm's payments do not depend on its layoff history. Even among countries which use experience rating, the rate is never a hundred percent. The natural question is if experience rating is so efficient, why don't more countries use it and for those that do, why not full experience rating? Gibbons and Katz (1991) showed that when a firm has more information about workers' ability than

potential outsiders, retaining workers provides a signal to outsiders that those workers are high ability. In such an environment, when experience rating is less than full and firms also provide workers with severance payments, Mongrain and Roberts (2005) showed that an increase in unemployment insurance leads to a relatively smaller decrease in the severance payments offered by firms. This is because when a firm retains a worker, it sends a signal to outsiders about that worker's ability. That means that workers face higher wage offers from outsiders. With full experience rating, the firm reduces the severance payment by the exact increase in unemployment insurance benefits because the firm pays for the benefit. However, with less than full experience rating, because firm does not pay the full layoff cost, they must reduce the severance payment by less than the increase of unemployment insurance in order to attract a worker. Hence the total insurance coverage of workers increases. This would then explain why less than full experience rating might be more optimal than full experience rating in some circumstances. Note that, this argument focuses on the worker's point of view. A full model that focuses on the firm's point of view is missing in the literature. This paper develops a model to explain why less than full experience rating might provide some insurance to firms. When firms face productivity shocks, the natural response is to reduce variable costs, usually labour. However, with experience rating, the marginal benefit of retaining a worker increases, hence increase retention. This increases the average variable costs, which decrease profits. For any distribution of shocks, it becomes more like that firm will have less than zero profits, and so shut down. More importantly, when the number of firms in the industry decreases, although the number of workers in each remaining firm is higher, the total number of workers employed in the market might

decrease. (See Burdett and Wright (1989a) and Marceau (1993)). Our model shows that an increase in experience rating tax would increase the bankruptcy rate, hence decrease the number of firms in the market, which might affect the average employment rate.

The organization of this paper is as follow, Section 2 is going to describe the background of unemployment insurance in United States. Section 3 we are going to discuss certain types of bankruptcy in United States with the type of discharge. Section 4 presents the model. Section 5 discusses the implication of experience rating tax on layoff. Section 6 provides the discussion on bankruptcy. Finally, Section 7 provides some concluding remarks.

# 2. Experience Rating Tax Systems in the United States

The concept of social insurance originated from Francis E. Townsend's plan. The Townsend's plan was non-contributory, but it provided monthly income to the elderly, provided that the elder did not have another income source and that he or she spent the entire pension. The first unemployment insurance program in the United States was implemented in Wisconsin in 1932. Following the success of the program, Social Security Act (SSA) was enacted in 1935. The unemployment program is described extensively in Title III and IX of the act. It is not hard to believe the act was a consequence of the Great Depression in 1929 and the projected change in people's income source to wage income. The act was designed to provide partial income replacement to workers who had become involuntarily unemployed. Although the act was enacted half a decade ago, it contained one main principle that still persists in today's system: benefits replace a higher proportion of earnings for low earners[1].

Unemployment Insurance in the United States is financed by two sources of tax revenue, the federal tax and the state tax. Generally, federal tax is used to finance the administration costs and state tax is mainly used to finance the benefits of the program. Under the provision of the Federal Unemployment Tax Act (FUTA), a 6.2% federal tax is levied on employers on wages up to $7000 a year. However, the law provides a credit

---

[1] Although the law does not explicitly state the proportion replaced, since there exists a maximum benefit ranged from $102 to $646 weekly, this represents a lower proportion of income replacement for high income earners.

against federal tax liability of up to 5.4% to employers who pay state taxes timely under an approved state Unemployment Insurance program. This means the effective federal tax rate for employers is 0.8%, which includes a 0.2 % surtax. The federal tax is also used as a "lender of last resource" to the state when the state Unemployment Insurance Trust Fund is insufficient to pay the benefit. Interest will be charged to the state when applicable. Moreover, the federal law requires that all loans from the state to pay Unemployment Insurance benefits must be repaid within two years and that the interest payments from the loan cannot be made from the trust fund.

Employers are usually the only contributor to the state unemployment fund, while only a few numbers of states (Alaska, New Jersey, and Pennsylvania) collect a small portion of payroll from employees for the Unemployment Insurance Trust Fund. The employer's contribution is based on his "experience" of employment. As the amount of unemployment created by a firm increases, the employer's contribution will also increase. FUTA provides a tax credit for employers up to 5.4 percent. In other words, employers who face the most favorable schedule with the minimum state tax rate will have to pay more than 0.8% of federal tax. Although the tax rate to these employers remains the same, the total tax paid may be different. This is because 41 states have a different tax wage base than the federal $7000 wage base. In some states, even those with the same wage base as the federal level, a flexible wage base system is applied. This means when the Unemployment Insurance Trust Fund of the state is under or above a certain predetermined level, the tax wage base will change.

The calculation of the experience rating tax varies from state to state. Generally, most states use the following two methods[2].

- Reserve Ratio: (Benefit paid - contribution) / Total taxable wage. There are 33 states that use this type of experience rating. The reserve ratio is used to determine the size of the balance in terms of the potential liability for benefits inherent in wage payment. This number will determine the schedule that a firm belongs to. A specific rate is assigned to the firm according to the schedule. The balance is carried forward each year under this plan.

- Benefit Ratio: Benefit paid / Total taxable wage. There are 17 states that use this type of experience rating. Some states use this number as the experience rating tax, but some states may add a state adjustment factor to this number to arrive at the actual experience rating tax. The state adjustment factor usually depends on the UI Trust Fund balance or the amount of benefit paid in the prior year. Under this method some states use a minimum 2 year and maximum 3 year time period while some states use a minimum 3 year and maximum 5 year time period.

The main difference between the Benefit Ratio and the Reserve Ratio is the Benefit Ratio does not subtract the contribution in the calculation of the ratio. Moreover, only the last 2-5 years of benefits paid is used to calculate the benefit ratio while the account balance in reserve ratio carries forward. This means that if firms do not lay off any worker for 3-5 years, their benefit ratio would be zero.

A few states use an "array" system where employers with similar benefit ratio or reserve ratio are grouped into one schedule and are annually ranked against each other.

---

[2] There are also two types of experience rating calculations, benefit-wage ratio formula and payroll decline formula. However, only Delaware and Oklahoma use benefit-wage ratio formula and only Alaska use payroll decline formula.

Within each schedule, rather than assigning a predetermined experience level, the one with the highest reserve or benefit ratio would receive the lowest experience rating tax according to the state fund balance.

# 3. Bankruptcy in the United States

Bankruptcy law, first enacted in 1800, is a federal law. After repeals in 1803,

1843 and 1878, the modern bankruptcy law comes into effect in 1898. The Bankruptcy

Act in 1898 is the first to give companies in distress an option of being protected from

creditors. There are several types of bankruptcy situation, which can be separated by the

chapters to file. Chapter 7 is called liquidation, Chapter 11 is referred as "reorganization",

and Chapter 13 is called as "wage earner" chapter[3]. The simplest and the most common

type of bankruptcy is the one in Chapter 7, liquidation. This refers to the debtor sell all

his assets to pay all the debt to creditors. This is the simplest way of bankruptcy. In

2005, around 70% of the bankruptcy cases are file under Chapter 7[4].

Chapter 11 is referred to as "reorganization" bankruptcy. If the applicant files

under Chapter 11, the bankruptcy division of the United States Justice Department will

appoint one or more committees to represent the creditors and stockholders to reorganize

the business. A "reorganization plan" must be accepted by all the creditors and

stockholders. After the plan is confirmed, the debtor must follow the plan and make

payments to the creditors. Chapter 11 is more likely to be applied by businesses which

do not want to liquidize all its assets, while Chapter 13 is a more likely to be applied by

individuals who do not want to liquidize all their assets. Under Chapter 13 the applicant

---

[3] There is an additional type of bankruptcy, which is specified under Chapter 12, mainly for family farmers. Since this type of bankruptcy only represents 0.6% of total filing, we are not going to provide discussion of this type. For more information on this type of bankruptcy, see http://www.bankruptcylawfirms.com/Chapter-Twleve.cfm.
[4] Bankruptcy statistic, US court, (2005)

must have a certain amount of future income and his debt can not be above a certain upper limit. The payment plan must be confirmed by court in order to be implemented. Since this paper focuses on the bankruptcy of firms, Chapter 7 and Chapter 11 are more likely to apply. Here we are going to discuss the discharge under Chapter 7 and Chapter 11.

The type of debts that can be discharged varies across each chapter of the Bankruptcy Code. A discharge releases individual debtors from personal liability for most debts and prevents the creditors owed those debts from taking any collection actions against the debtor. Under Chapter 7 most of the debts can be discharged unless a party in interest files a complaint objecting to the discharge[5]. Generally speaking, federal and state taxes are not dischargeable. Under the United States Bankruptcy Code, employers are responsible for the experience rating tax that is created three years prior to the date they file bankruptcy, but not after[6]. This means employers are not responsible for the experience rating tax which is created after they file bankruptcy. When firms face an extremely bad shock they may want to decrease the amount of labor they are hiring. With the experience rating tax, for each unit of labor they layoff, firms would have to pay for the unemployment insurance benefits. Therefore, operating cost increases under this system. We are now going to present the model showing that the experience rating tax might have adverse effects on the level of bankruptcy in the economy and the level of employment.

---

[5] Mecham, L. R. "Bankruptcy Basics." Administrative Office of the United States Courts, 2005
[6] Montana Unemployment Insurance, Employer Handbook.

# 4. The model

Consider an economy which consists of $K$ number of firms. Initially, at time = 0, there are $N_i$, $i = 1...K$, number of workers attached to the each firm by a contract $C_i = \{w_i, s_i\}$, where $w_i$ is the wage and $s_i$ is the severance payment. Each firm possesses a production technology $F(\cdot)$, where $F'(\cdot) > 0$ and $F''(\cdot) < 0$. Firms are assumed to be price takers in the output market and the output price is normalized to one. At time = 1, firms realize the productivity shock $\lambda_i \in [0, 1]$ and $\lambda_i$ is assumed to be not observable and not verifiable. When $\lambda_i$ is not observable and is not verifiable, the contract parameter cannot be state contingent. Suppose the contract is state contingent and since the productivity is not verifiable, firms will always have an incentive to claim that they have a low productivity. Here we are going to abstract from the contract bargaining and negotiation and assume the contract is non-renegotiable and hence the contract parameters are exogenous. Once firm realizes the shock, they will choose the number of workers to keep ($n_i$). Each laid-off worker will receive unemployment insurance $b$ and $s_i$. Unemployment insurance is financed by a payroll tax ($t$) and an experience rating tax ($e \leq 1$). In order to have balanced aggregate government budget constraint,

$$t \sum^{K}_{i=1} n_i + eb( \sum^{K}_{i=1} (N_i - n_i)) = b \sum^{K}_{i=1} (N_i - n_i) \qquad (1)$$

Rearranging gives

$$t \sum^{K}_{i=1} n_i - (1 - e) b ( \sum^{K}_{i=1} (N_i - n_i)) = 0 \qquad (2)$$

If $e = 1$, then $t = 0$. This is because the experience rating tax is sufficient to finance the unemployment insurance program.

Once firms have decided the number of workers to keep, workers are then laid off randomly, hence the probability of being unemployed and employed are $(N_i - n_i)/N_i$ and $n_i / N_i$ respectively. Workers are assumed to have a strictly concave utility function, $u(\cdot)$, where $u'(\cdot) > 0$ and $u''(\cdot) < 0$ and once they are laid off, they can not find a job until the next period begin. Since currently workers are employed, that means

$$n_i / (N_i) \, u(w_i) + (N_i - n_i) / (N_i) u(s_i + b + r) \geq \bar{U} \qquad (3)$$

where $\bar{U}$ is the reservation utility of the worker and $r$ is the value of home production.

The model can be summarized by the following time line:

| Time = 0 | Time = 1 | Time = 2 |
|---|---|---|
| Workers are attached to the firm by contracts $C_i = \{w_i, s_i\}$. | Firms realize productivity shock and must decide how many workers to keep $(n_i)$ | Payoffs are realized and the game ends. |

12

# 5. Layoff

At time = 0, the number of workers that are attached to firms ( $N_i$ ) is exogenous. As Mongrain and Roberts (2005) argue, under an environment without information asymmetry, firm will fully insure worker against employment shock, which mean workers will be indifferent between employed and unemployed. Since we do not have any information asymmetry in the model, we are going to assume that $w_i = s_i + b + r$. At time = 1, firms realize their particular shock $\lambda_i$, and will have to decide how many workers to keep ($n_i$). The firm's problem is

$$Max \quad \pi_i = \lambda_i F(n_i) - w_i n_i - t n_i - (eb + s_i)(N_i - n_i) \quad (4)$$
$$\{ n_i \}$$

and the corresponding first order condition is:

$$\lambda_i F'(n_i) - w_i - t + (eb + s_i) = 0 \quad (5)$$

When workers receive full insurance, $w_i = s_i + b + r$, equation (5) becomes

$$\lambda_i F'(n_i) - (s_i + b + r) - t + (eb + s_i) = 0$$

$$\rightarrow \quad \lambda_i F'(n_i) = b(1 - e) + t + r \quad (6)$$

If $e = 1$, which means full experience rating, $t = 0$, this implies,

$$\lambda_i F'(n_i) = r \quad (7)$$

The marginal product of labor equals to the worker's value of home production. If $e < 1$, because firms do not have to pay the full cost of layoff, layoff decision will be distorted. This is basically the result from the conventional literature. In order to

13

eliminate the distortion of layoff decision, firms have to pay all of the benefits paid out

on the unemployment they create.

# 6. Bankruptcy

Suppose now there is potential for the firm to default. We are going to assume firms go bankrupt when profits are below a certain threshold which is assumed to be zero. Since $s_i$ and $w_i$ are determined at time = 0 and $e$, and $b$ are determined by the government, the only case for the profit maximizing firm to earn less than zero profit is when the productivity shock is big enough.

**Lemma 1**

*There exist a $\lambda_i^*$ such that if $\lambda_i \geq \lambda_i^*$, $\pi_i^* \geq 0$ and $\lambda_i < \lambda_i^*$, $\pi_i^* < 0$.*

Proof: We know that if $\lambda_i = 0$, then $n_i^* = 0$, which means $\pi_i^* = -(s + e\,b)\,N_i < 0$. If $\lambda_i = 1$, then $n_i = N_i$, and if $n_i^* = N_i$, then $t = 0$, because the government does not need to pay the unemployment insurance benefit, which means

$\pi_i^* = F(N_i) - w_i\,N_i > 0$. Since we know, by the envelope theorem, that

$$((\partial \pi_i^*)/(\partial \lambda_i)) = F(n_i(\lambda_i)) > 0$$

Therefore, there must exist a point for $\lambda_i^*$ such that $\pi_i^* = 0$. Q.E.D

Figure 1 shows the diagram of profit versus $\lambda_i$. The curve is increasing because

$$((\partial \pi_i^*)/(\partial \lambda_i)) = F(n_i(\lambda_i)) > 0$$ and the curve is convex because

$$((\partial^2 \pi_i^*)/(\partial \lambda_i^2)) = F'(n_i(\lambda_i))((\partial n_i(\lambda_i))/(\partial \lambda_i))$$

We know that $F'(n_i(\lambda_i)) \geq 0$ $\qquad \forall n_i \geq 0$

and $((\partial n_i(\lambda_i))/(\partial \lambda_i))$ can be found by differentiate equation (5) with respect to $\lambda_i$, we have

$(( \partial \, n_i \, ( \lambda_i )) \, / \, ( \partial \, \lambda_i )) = -F'(n_i \, ( \lambda_i )) \, / \, F''(n_i \, ( \lambda_i )) \geq 0$

Hence the profit function with respect to $\lambda_i$ is an increasing convex function.

Figure 1 also shows the case when we have two levels of experience rating tax, $e_L$ and $e_H$. Since when there is no shock to the economy, firms employ the same level of employment regardless of the level of experience rating, the end point when $\lambda = 1$, stays the same. However, it is when the $\lambda = 0$, the tax is higher[7].
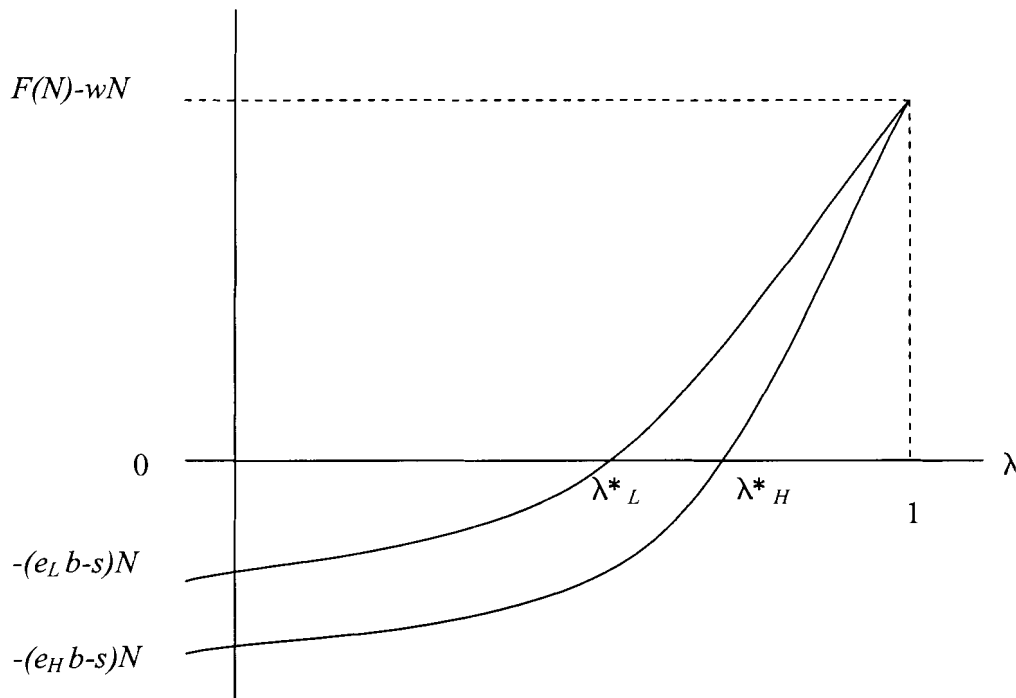


**Figure 1**

---

[7] As mentioned above, the employer does not have to pay tax in cases where they declare bankruptcy. The end points here show the amount of tax they would have to pay if the employers do not have a choice to leave the industry.

The reason why the profit function with $e_L$ is above the profit function with $e_H$ is because $((\partial \pi_i^*)/(\partial \lambda_i)) = F(n_i(\lambda_i))$ and $((\partial n_i^*)/(\partial e)) = -b/\lambda_i F''(n_i^*) > 0$. This means higher experience rating tax will induce firms to keep a large number of workers, which implies $n_{i,L}^* < n_{i,H}^*$. Hence $F(n_{i,L}^*) < F(n_{i,H}^*)$.

The result also shows that $\lambda_i$ is increasing with the experience rating tax and is also increasing with the unemployment benefit when the experience rating tax is positive. When we have no experience rating, $\lambda_i^*$ is not affected by the unemployment insurance benefit. The intuition is that with no experience rating tax, when firms face a shock, they want to reduce the amount of labor they keep. By reducing the amount of labor they are at the same time reducing the total amount of payroll tax they pay. Since there is no experience rating tax, reducing labor does not constitute a higher tax to be paid. Hence this does not affect the threshold point for bankruptcy. However, with a positive amount of experience rating, decreasing labor would lead to a higher experience rating tax, hence it increase the threshold point of bankruptcy. Therefore, higher productivity is necessary to maintain the profit.

**Lemma 2**

*$\lambda_i^*$ is an increasing function with respect to b and e when both b and e are positive.*

Proof: $\lambda_i^* F(n_i(\lambda_i^*)) - w_i n_i(\lambda_i^*) - t n_i(\lambda_i^*) - (e b + s_i)(N_i - n_i(\lambda_i^*)) = 0$. By the implicit function theorem, we know

$((\partial \lambda_i^*)/(\partial e)) = -((\partial \pi_i^*)/(\partial e))/((\partial \pi_i^*)/(\partial \lambda_i^*))$ and

$((\partial \lambda_i^*)/(\partial b)) = -((\partial \pi_i^*)/(\partial b))/((\partial \pi_i^*)/(\partial \lambda_i^*))$, and using the envelope theorem, we have

$((\partial \pi_i^*)/(\partial \lambda_i)) = F(n_i(\lambda_i))$,

$((\partial \pi_i^*)/(\partial b)) = -e\,(N_i - n_i(\lambda_i))$, and

$((\partial \pi_i^*)/(\partial e)) = -b\,(N_i - n_i(\lambda_i))$,

hence $((\partial \lambda_i^*)/(\partial e)) = (b(N_i - n_i(\lambda_i^*)))/F(n_i(\lambda_i^*)) > 0$ and

$((\partial \lambda_i^*)/(\partial b)) = (e(N_i - n_i(\lambda_i^*)))/(F(n_i(\lambda_i^*)) > 0.$   Q.E.D

As the experience rating tax increases, the variable cost during the period of bad

productivity also increases, hence the breakeven point increases.  Therefore, the chances

of bankruptcy increase.  As we can see above, unemployment insurance will distort the

layoff decision, while the use of full experience rating tax will eliminate such a distortion

at the expense of a higher bankruptcy rate.

# 7. Welfare

The above analysis shows that an increase in the experience rating tax will lead to an increase of bankruptcy probabilities. Generally, firms are assumed to be risk-neutral. For a given productivity shock, reducing the probability of bankruptcy through lower experience rating tax increases expected profit.

When firms declare bankruptcy, firms are sheltered partially from paying wages, severance payments and the experience rating tax. Workers will face three situations. They might be employed, they might be unemployed with severance payments, or they might be unemployed and receive severance payments less than the amount that the contract specified. Since firms fully insure workers against an employment shock, workers will be indifferent between situation one and two. However, workers are unprotected when firms declare bankruptcy. Therefore, less than full experience rating tax can be seen as a protection against default by firms and as insurance for workers against income shocks.

# 8. Conclusion

In this article we show that on one hand, less than full experience rating might reduce the bankruptcy rate but the layoff decision will be distorted. On the other hand, full experience rating is going to eliminate the distortion of layoffs at the expense of higher bankruptcy. This means government, when deciding the policy parameters, will have to face a trade off between the level of employment and the insurance of firms. One interesting extension of this paper is to incorporate a "rank-order tournament" into the model as in Lazear and Rosen (1981). They argued that under a "rank-order tournament" system the effort of the players is induced by the spread between the reward and punishment. If the reward and punishment experience rating is set correctly, the efficient level of employment should be able to be achieved. When we look at the "array" system of experience rating, the level of experience rating is determined by the order of the ranking of firms within a particular schedule, therefore, this is very similar to the "rank-order tournament". Once the "rank-order tournament" is incorporated, we can have less than full experience rating with non-distorted employment level.

# Reference

1. Burdett, K., and R. Wright, "Optimal Firm Size, Taxes, and Unemployment." Journal of Public Economics, 39 (1989a), 275-87.

2. Burdett, K., and R. Wright, "Unemployment Insurance and Short-Time Compensation: The Effects on Layoffs, Hours per Worker and Wages." The Journals of Political Economy, 97 (1989b), 1479-1496.

3. Gibbons, R., and L.F. Katz, "Layoffs and Lemons." Journal of Labor Economics, 9 (1991), 351-381

4. Lazear, E. P. and S. Rosen, "Rank-Order Tournaments as Optimum Labor Contracts." The Journals of Political Economy, 89 (1981), 841-864.

5. Marceau, N., "Unemployment Insurance and Market Structure." Journal of Public Economics, 52 (1993), 237-349.

6. Mongrain, S. and J. Roberts, "Unemployment Insurance and Experience Rating: Insurance versus Efficiency," International Economic Review, 46 (2005), 1303-1319.

7. Pissarides, C. A., "Efficiency Aspects of the Financing of Unemployment Insurance and Other Government Expenditure." Review of Economic Studies, (1983), 57-69.

8. Shavel, S. and L. Weiss, "The Optimal Payment of Unemployment Insurance Benefits Over Time." The Journals of Political Economy, 87 (1979), 1347-1362.

9. Topel, R., and F. Welch, "Unemployment Insurance: Survery and Extension." Economica, 47 (1980), 351-379.

10. Mecham, L. R. "Bankruptcy Basics." Administrative Office of the United States Courts, 2005

11. Montana Unemployment Insurance, Employer Handbook.