

2009

Essays on Optimal Insurance Design: Dissertation Summary

Johannes Spinnewijn
Massachusetts Institute of Technology

Essays on Optimal Insurance Design

Johannes Spinnewijn

This dissertation consists of three chapters that analyze the optimal design of insurance contracts and unemployment insurance in particular. I consider three relevant contexts that change the central trade-off between the provision of insurance and the provision of incentives.

The first chapter examines the role of biased beliefs for the optimal design of static and dynamic insurance contracts. Biased risk perceptions change the perceived value of insurance and the perceived returns to avoiding these risks. I show empirically that unemployed workers overestimate how quickly they will find work, but underestimate the return to their search efforts. I analyze how these biases drive a wedge between social and private insurance, and between naive and optimal policy implementation.

The second chapter considers the role of training for the design of unemployment insurance. A worker's human capital falls upon displacement and depreciates during unemployment. Training counters the decrease in human capital, but also changes the willingness of the unemployed to search. I characterize the optimal unemployment insurance contract and analyze the optimal timing of unemployment benefits and training programs during unemployment.

The third chapter analyzes the role of heterogeneity in risk perceptions for the optimal design of screening contracts in a model with moral hazard and adverse selection. I show how optimists receive less insurance than pessimists, and I contrast the distortions in insurance coverage that arise with competing and monopolistic insurers. Heterogeneity in beliefs strengthens the case for government intervention in insurance markets and can explain the negative correlation between risk occurrence and insurance coverage found in empirical studies.

Introduction

People face risks and dislike the variation in income due to these risks. They are willing to give up consumption in good times to increase their consumption in bad times. Whether times are good or bad often depends on their own behavior. People can mitigate the risk or reduce the probability that a loss occurs by exerting precautionary effort. Moral hazard arises when insured people do not account for the consequences of their behavior on the expected expenditures for the insurer. The insured will exert less precautionary efforts the more insured they are. Insurers thus face a fundamental trade-off between providing insurance against risks and providing incentives to avoid risks. This trade-off is central to the design of optimal insurance contracts.

The trade-off between insurance and incentives also arises for the design of social insurance contracts, like unemployment insurance. Workers may lose their jobs beyond their control. They are willing to pay a tax when employed in order to receive unemployment benefits when they lose their jobs. Unemployed workers do not fully control how rapidly they are employed again, but by exerting search efforts they can increase the probability to find a job. Unemployment insurance insures the unemployed against the loss of their labor earnings, but also reduces the incentives to search for a job.

Chapter 1

Unemployed but Optimistic: Optimal Insurance Design with Biased Beliefs

Insurers face the trade-off between providing insurance against risks and incentives to avoid risks. The risk perceptions of the insured are central to this trade-off. The perceived likelihood of risks determines the perceived value of insurance against these risks. The perceived return to precautionary effort determines the effectiveness of incentives to avoid risks. Both types of perceptions are often subject to systematic biases. Psychological research has shown that people often overestimate the probability of positive events and underestimate the probability of negative events (Slovic 2000; Weinstein 1980, 1982, 1984) and can either be optimistic (Langer 1975) or discouraged (Jahoda, Lazarsfeld, and Zeisel 1971) about the degree to which they control outcomes. These particular biases complement the heuristics and biases in probabilistic thinking documented by Tversky and Kahneman (1974).

The central contribution of this chapter is the theoretical and empirical analysis of unemployment insurance and the biases in beliefs held by the unemployed. On the theoretical side, I analyze how biased beliefs change the optimal design of static and dynamic insurance contracts in the presence of moral hazard. The distinction between the baseline belief about the probability of finding work and the control belief about the extent to which search efforts increase this probability is shown to be essential. The theoretical results generalize to insurance applications with moral hazard, other than unemployment insurance. On the empirical side, I present new evidence that suggests that job seekers are highly optimistic about the probability of finding a job, but pessimistic about their control.

Using data collected by Price et al. (2004), I link the expectations of unemployed job seekers with the actual outcomes of their job searches. The first empirical result is that job seekers largely underestimate the duration of their unemployment spells; on average they expect to remain unemployed for 7 weeks, but actually need 23 weeks to find new

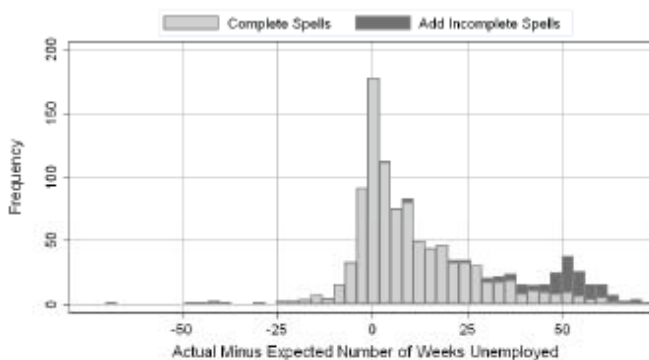
employment. Many more job seekers have underestimated rather than overestimated the length of their unemployment spells, and the forecast errors are much more pronounced for the optimistic than for the pessimistic job seekers, as presented in Figure 1. The second empirical result is that job seekers who report searching more intensively are less optimistic about the length of their unemployment spells. Controlling for heterogeneity and endogeneity, I provide evidence that job seekers underestimate the returns to their search efforts. Job seekers who search harder expect shorter unemployment spells, but the actual reduction in the unemployment spell is larger than expected. This suggests that job seekers are at the same time baseline-optimistic and control-pessimistic; they overestimate the baseline probability of finding work, but underestimate their control over this probability.

The theoretical analysis builds on a canonical result for social insurance known as the Baily formula. Optimal insurance equalizes the benefit of smoothing consumption between states and the moral hazard cost at the margin. Baily (1978) formalized this principle for unemployment insurance in a static model with moral hazard. For unemployment insurance to be optimal, the relative difference in marginal utilities of consumption in employment and unemployment has to be equal to the elasticity of the unemployment duration to the unemployment benefit level. I show how this characterization needs to be adjusted when the insured have biased beliefs. I assume that the insurer knows the insured's beliefs and that these beliefs cannot be manipulated by the insurer, nor changed in response to the contract being offered. These assumptions correspond to a setting with different priors where the insurer and the insured "agree to disagree."

I contrast the contracts offered by two extreme types of insurers: a social planner, who is paternalistic and maximizes the insured agent's true expected utility, and competing private insurers, who maximize the insured agent's perceived expected utility. When beliefs are unbiased, the probability weights in the respective expected utility functions are the same. The social optimum and the competitive equilibrium coincide. Moral hazard, in contrast with adverse selection, is no reason for government intervention as long as beliefs are unbiased. When beliefs are biased, the social optimum and the competitive equilibrium diverge. The implied wedge suggests a previously unexplored welfare cost of privatizing insurance.

In the social optimum the smoothing benefit and the moral hazard cost are still equalized at the margin, but with the moral hazard cost corrected for the search internality that arises when the insured agent misperceives the impact of her search on her own true expected utility. An increase in insurance coverage decreases the induced effort level, but when an agent is pessimistic about her control, she already exerts too little effort. Thus, with control-pessimistic insurees, the moral hazard cost of insurance needs to be revised upward because of the search internality. The elasticity of the unemploy-

Figure 1 Histogram of Differences between Actual and Expected Unemployment Duration



SOURCE: Unemployed job seekers in Maryland and Detroit between 1996 and 1998 surveyed by Price et al. (2004).

ment duration to unemployment benefits no longer provides sufficient information to implement the optimal insurance contract. A naive policymaker, who ignores the pessimistic control bias and implements the standard Baily formula, sets the unemployment benefit level suboptimally high.

Private insurers do not correct for the search internality and focus on the insured's perceived value of insurance. In the competitive equilibrium, the moral hazard cost of additional insurance is set equal to the perceived smoothing benefit. When an agent is optimistic about the baseline probability of finding work, she underestimates the value of unemployment insurance. Private insurers respond to this bias by offering less or even no insurance at all. This may explain the puzzle of why unemployment insurance is almost always publicly provided.¹ Competition disciplines insurers to charge actuarially fair prices, but not to correct people's distorted demand for insurance.

I proceed to consider a dynamic extension of the unemployment model along the lines of Hopenhayn and Nicolini (1997). The conventional wisdom in economic policy debates is that unemployment benefits should be decreasing with the length of the unemployment spell. The threat of falling benefits in the future increases the incentives for unemployed workers to search for work (Shavell and Weiss 1979). First, I show, using Baily-type conditions, that the adjustment of the optimal dynamic characterization for the presence of biases in beliefs is very similar, as in the static model; the social planner corrects the moral hazard cost for the search internality, while the private insurers focus on the perceived smoothing benefits. Second, when unemployed agents underestimate the duration of unemployment, the social planner may increase welfare by providing more incentives to the short-term unemployed than to the long-term unemployed. Optimism about the duration of unemployment makes the threat of receiving lower unemployment benefits in the future less effective in inducing search efforts. I show

that in contrast with private insurers, the social planner may prefer to make unemployment benefits more rapidly decreasing at the start of the unemployment spell and more slowly later on.

I calibrate the dynamic model in order to numerically analyze the impact of biased beliefs on the optimal design of unemployment insurance. The calibration exercise also shows that the consumption subsidy required to make the agent insured by private insurers as well off as in the social optimum, increases exponentially in the baseline bias. Although the risk of an unemployment spell seems small within a lifetime, privatizing the insurance provision comes at a very high welfare cost if beliefs are strongly biased.

Related Literature

The empirical and experimental evidence on the misperceptions of probabilities has led to two recent strands of literature. One strand proposes explanations for biases in beliefs and shows how these biases can be sustained in equilibrium. Examples are Bénabou and Tirole (2002 and 2006), Compte and Postlewaite (2004), Glaeser (2004), Van den Steen (2004), Brunnermeier and Parker (2005), Gollier (2005), and Köszegi (2006). These theoretical papers suggest that optimistic beliefs, either about the baseline probability of success or one's control, are more likely to arise and persist than pessimistic beliefs. This corresponds to the empirical evidence that I find for the unemployed's baseline beliefs, but contrasts with the empirical evidence for the unemployed's control beliefs.

The theoretical analysis in this chapter is related to the second strand of literature that takes biases in risk perceptions as given and analyzes the consequences for contract design in the presence of moral hazard or adverse selection. de la Rosa (2007) and Santos-Pinto (2008) analyze how incentive contracts proposed by a profit-maximizing principal change in response to particular optimistic biases. The response depends on the extent to which the considered biases make the agent more baseline-optimistic or control-optimistic as defined here. Also, changes in control beliefs change the price of providing incentives relative to insurance. The effect of changing control beliefs on the induced effort level is unambiguous; the effect on the insurance provision is not. The main focus of this chapter is on the unambiguous comparison, for a given bias in beliefs, between social and private insurance on the one hand and optimal and naive implementation on the other. Jeleva and Villeneuve (2004) and Villeneuve (2005) study the effects of exogenous biased beliefs in models with adverse selection due to heterogeneity in risk. Eliaz and Spiegler (2008), Grubb (forthcoming), and Sandroni and Squintani (2007) study adverse selection due to heterogeneity in risk perceptions. In Chapter 3, I also allow for heterogeneity in risk perceptions by relaxing the assumption made in this chapter that the agent's prior is known to

the principal. I then analyze how agents are screened with contracts providing different levels of insurance coverage depending on the difference in baseline and control beliefs.

The comparison between social and private insurance relates to the policy and welfare analysis in the behavioral public economics literature, studying nonstandard decision makers.² The use of the true probabilities to evaluate welfare is paternalistic, but highlights the contrast with the considerations of profit-maximizing insurers. The comparison also relates to the distinction between a paternalistic and populist government, with the latter catering to its voters' beliefs (Salanié and Treich 2009). The use of the true probabilities also assumes that these are measurable. Bernheim and Rangel (2009) argue that the presence of ancillary conditions, like framing issues, may distort people's choices. To the extent that better informing individuals alleviates ancillary conditions, the perceived probabilities after individuals are informed are more appropriate for evaluating their welfare than the perceived probabilities before they are informed. The empirical estimation of the biases in beliefs in this chapter can help to identify agents' true preferences from their observed choices, as argued by Köszegi and Rabin (2007 and 2008). Finally, the comparison between the implementation of the standard and adjusted Baily formula adds to the recent literature reviewed by Chetty (2009) that analyzes conditions under which sufficient statistic formulas for taxation and social insurance apply or need to be adjusted.

Chapter 2

Training and Search during Unemployment

Optimal unemployment insurance trades off the provision of incentives to search for work and the insurance against the consequences of unemployment. The obvious consequence of unemployment is the foregone wage while unemployed. However, after returning to work, many still have substantially lower wages than before displacement. In the United States, one fourth of the reemployed have wages that were at least 25 percent lower than in their previous jobs (Kling 2006). It has been argued that these future income losses for the unemployed are due to the loss of human capital. Displaced workers lose human capital the moment they lose their jobs, and their human capital continues to depreciate during unemployment. Unemployment insurance should therefore insure the unemployed against both the loss of current earnings and the expected loss of future earnings. At the same time, incentives for search are more important for a given level of human capital if finding a job avoids further depreciation of human capital.

Effective training programs counter the loss of human capital. Many countries are increasing the emphasis on training to reintegrate the unemployed in the workforce. Spending on labor market programs, active and passive, averages

3 percent of GDP in the OECD countries. The proportion of spending on active labor market programs rather than on unemployment benefits has increased to 40–50 percent in most European countries, of which on average 40 percent is spent on training. The impact of training programs has been estimated in the empirical literature. An important conclusion of this literature is the heterogeneity in impact of the different programs (Heckman, Lalonde, and Smith 1999). More recent work supports the positive long-run effect of training programs with a substantial human capital component (Jacobson, LaLonde, and Sullivan 2005; Jespersen, Munch, and Skipper 2004; Lechner, Miquel, and Wunsch 2005; Winter-Ebmer 2006).

This chapter analyzes the role of training for the design of unemployment insurance. I characterize the optimal unemployment insurance contract, specifying both consumption and training contingent on the duration of the unemployment spell. I consider a model in which a worker's human capital decreases during unemployment, but training efforts counter this decrease.³ The training efforts are imposed by the social planner, while the search efforts to find a job are chosen by the unemployed worker. The unemployed worker bears the cost of both the search and training efforts, which are allowed to interact, as in Holmström and Milgrom (1991). More training may increase the marginal cost of search. I assume that the same training technology is not available on the job. One justification is that employers are not willing to provide training that is not specific to their firms.

If the training technology is sufficiently effective, the unemployed worker is in one of three states depending on the level of human capital:

- 1) In the training state, the level of human capital is so low that no search is induced. Training efforts are imposed to increase the level of human capital. Since no incentives are needed, the social planner can fully smooth the unemployed's consumption.
- 2) In the training-and-search state, human capital is sufficiently high so that search efforts are induced. The social planner faces the trade-off between providing insurance and incentives. The depreciation of human capital increases both the value of insurance and the need for incentives. By mitigating the depreciation, training efforts relax the trade-off. The design of the optimal contract for an unemployed agent in the training-and-search state will be dependent on the complementarity between search and training in the expected value of finding a job and the rivalry in the cost structure.
- 3) In a stationary state, the social planner makes the unemployed maintain the same level of human capital by following training programs. At the same time they are given incentives to search for a job.

I characterize analytically how consumption during unemployment and upon re-employment depends on the length

of the unemployment spell. As long as search is induced, the introduction of training does not change the result by Shavell and Weiss (1979) that unemployment consumption should be decreasing over time when preferences are additive in consumption and search efforts. However, in the training state, no search is induced and unemployment consumption remains constant. The intuition of Hopenhayn and Nicolini (1997) that taxes upon reemployment should increase with the duration of the unemployment spell does not generalize with the introduction of human capital depreciation and training. The social planner wants to protect the unemployed against human capital losses and may prefer to subsidize employment, even after long unemployment spells.

I perform numerical simulations for CARA preferences with monetary costs of efforts. I show that for such preferences the state space of the recursive problem becomes one-dimensional. The numerical simulations suggest that the human capital of the long-term unemployed converges globally to a unique stationary level. This has two important policy implications. First, if training costs are not too high, it is never optimal to discourage the unemployed worker from search activity, whatever the length of the unemployment spell. This contrasts with Pavoni (2009) and Pavoni and Violante (2007). Without training technology, they show that after a finite number of unsuccessful searches, the social planner switches to social assistance, an absorbent policy characterized by constant unemployment benefits and no active participation. Second, the difference between this unique, stationary level and the level of human capital at the start of the unemployment spell determines the optimal timing of training. If the initial level of human capital is lower, training is more intensive toward the start of unemployment. If the initial level of human capital is higher, training becomes more intensive throughout unemployment.

The human capital level at the start and the stationary level are determined, respectively, by the fall in human capital upon displacement and the depreciation in human capital during unemployment. Although in practice training is more focused toward the long-term unemployed, this is only optimal if the depreciation in human capital is relatively more important than the fall upon displacement. Upon displacement, the unemployed may lose firm-specific human capital. They also lose human capital specific to the industry if they are reemployed in a different industry (Ljungqvist and Sargent 1998; Neal 1995). These losses may become very important in an economy with declining industries or industries shifting production abroad. The depreciation during unemployment can be interpreted as the explicit loss of skills during unemployment or as a process of “unlearning by not doing” (Coles and Masters 2000). If unemployment spells persist for a long time, unemployed workers can get detached from the labor market and lose work habits and confidence in the own skills (Falk, Huffman, and Sunde 2006b). Although the empirical evidence for the decline and depreciation of

human capital is mixed, both have been central in explaining the persistence of unemployment and the European unemployment dilemma (Ljungqvist and Sargent 1998; Machin and Manning 1999; Pissarides 1992), as well as the negative duration dependence of exit rates (Acemoglu 1995; Blanchard and Diamond 1994).

This chapter builds on a recent literature that departs from stationary search models (Hopenhayn and Nicolini 1997; Shavell and Weiss 1979) with the introduction of depreciating human capital. Shimer and Werning (2006) analyze the optimal timing of benefits in a McCall search model, assuming that savings are not observable. Human capital depreciation reduces the arrival rate of job offers or deteriorates the distribution of the wages being paid on the job. Pavoni (2009) analyzes the optimal unemployment insurance contract when the unemployed agent has the binary choice to exert costly search effort or not. The depreciation of human capital reduces the output upon reemployment and the probability to become employed if searching. In this chapter, I assume that human capital only determines the output. Since search is a continuous choice in my model, the decrease in output due to the depreciation reduces the returns to search. The probability to become employed endogenously decreases during the unemployment spell if no training technology is available. Pavoni and Violante (2007) introduce costly job monitoring as an alternative to the provision of incentives and analyze the optimal sequencing of different unemployment policies. Pavoni and Violante (2007) and Wunsch (2008) also introduce a training technology in the numerical simulations of the model in Pavoni and Violante (2007). In contrast with my approach, training efforts cannot be imposed, but they are induced by rewarding the unemployed for high values of human capital with higher unemployment benefits. Training and search efforts are also assumed to be extreme rivals and cannot both be exerted in the same period.

Chapter 3

Insurance and Perceptions: How to Screen Optimists and Pessimists

The perception of risk is inherently subjective.⁴ Financial traders disagree about the risk of investments, mortgage bankers about the risk of defaulting homeowners, homeowners and renters about the risk of flooding, old and young drivers about the risk of a car accident. One person may perceive a risk as very likely, while another may perceive the same risk as unlikely. At the same time, the perception of the extent to which precautionary efforts mitigate the risk may differ as well. Both the perception of the likelihood of the risk and the perception of control are central to the design of insurance contracts. Baseline-pessimistic insurees, who underestimate the baseline likelihood of the risk, are willing

to pay more for insurance. Control-optimistic insurees, who overestimate the marginal return to effort, exert more precautionary efforts and are therefore cheaper to insure.

This chapter analyzes the role of heterogeneity in risk perceptions for the optimal design of screening contracts. In a model with moral hazard and adverse selection, I show how incentive compatibility imposes a very simple structure on the equilibrium contracts and I contrast the distortions in insurance coverage that arise with competing and monopolistic insurers. On the positive side, heterogeneity in risk perceptions offers an alternative explanation for the negative correlation between risk occurrence and insurance coverage found in empirical studies. On the normative side, the presence of agents with biased beliefs improves or worsens the welfare of agents with unbiased beliefs depending on the market structure and the differences in beliefs.

I consider a simple model with two states. Effort exerted by the insuree decreases the probability that a risk occurs, but insurees can have different perceptions about the probability of the risk as a function of effort. The insurer cannot observe the belief held by the insuree, but perceives her risk as independent of her belief. The insuree does not change her belief in response to the menu of insurance contracts being offered. That is, the insurer and the insurees “agree to disagree” about the true underlying risk. The preferences satisfy a single-crossing property if the one insuree perceives the likelihood of the risk as lower than the other insuree for any given insurance contract. This is conditional on the effort levels chosen by the respective insurees. Optimism can therefore arise for two reasons; first of all, if an insuree is more optimistic about the baseline likelihood of the risk for the same level of effort and, second, if an insuree is more optimistic about the marginal return of effort and therefore exerts higher effort for the same insurance contract. If the single-crossing property is satisfied, the insurer can only separate the (more) optimistic insuree by offering her less insurance coverage than the (more) pessimistic insuree. This monotonicity property is independent of the nature of competition between insurers.

Optimistic agents receive less insurance, but still may be more risky ex-post if they are pessimistic about their control and exert less precautionary effort. This contrasts with the property of positive correlation between insurance coverage and risk occurrence that arises in the standard adverse selection framework (Rothschild and Stiglitz 1976). However, many empirical papers find a correlation that is not significantly positive (Cardon and Hendel 2001; Chiappori and Salanié 1997, 2000) or even negative (Cawley and Philipson 1999; De Meza and Webb 2001; Finkelstein and McGarry 2006). With two types of insurees who only differ in their beliefs, I show that it is sufficient that the one type is more baseline-optimistic and control-optimistic for the equilibrium to satisfy the positive correlation property. For the correla-

tion to be negative, it is necessary that the control-pessimistic type is also more optimistic about the likelihood of the risk.

A prime issue for characterizing optimal contracts with private information is determining which incentive compatibility constraints are binding and thus which types' contracts are distorted compared to the case without private information. I show how this depends on the interaction between the nature of competition and the dimension in which beliefs are biased. Competing insurers distort the contract offered to the insuree who can be insured at lower cost, which depends on the exerted precautionary effort and thus the insuree's control beliefs. A monopolistic insurer distorts the contract offered to the insuree whose willingness to pay is lower, which depends on the insuree's baseline beliefs. Compared to someone who is unbiased, an optimist's willingness to pay is lower for an insurance contract providing more insurance than her outside option, but higher for an incentive contract providing less insurance than her outside option.

The distortions due to the screening of types imply that agents with heterogeneous perceptions impose information externalities on each other. An agent with biased beliefs imposes a negative externality on an agent with unbiased beliefs, when private insurers distort the unbiased agent's contract to discourage the biased agent from taking this contract. The externality is only positive when a monopolistic insurer pays a rent to the unbiased agent not to take the contract offered to the biased type. For agents with biased beliefs, the screening distortions may aggravate the distortion due to the biases in their beliefs, as analyzed in Chapter 1. Hence, heterogeneity in optimistic beliefs may strengthen the case for (paternalistic) government intervention through mandating insurance. This contrasts with the result in Sandroni and Squintani (2007) that heterogeneity in beliefs reduces the scope for government intervention. The heterogeneity in optimistic beliefs they consider implies that some agents with different risks perceive their risk to be the same and are pooled in equilibrium. The heterogeneity I consider implies that agents with the same underlying risk are separated.

Related Literature

This chapter studies the role of biased beliefs in the presence of both moral hazard and adverse selection. In Chapter 1, I consider only moral hazard, assuming that the bias in beliefs is known to the insurer. Jeleva and Villeneuve (2004), Chassagnon and Villeneuve (2005), and Villeneuve (2005) consider only adverse selection. They introduce heterogeneity in risk types, but risk types may misperceive their risk. Sandroni and Squintani (2007) also introduce heterogeneity in risk types, but some agents of the high-risk type may be optimistic about being a low-risk type.

A small theoretical literature has suggested explanations for the advantageous selection with heterogeneous types that leads to negative correlation between risk occurrence and in-

surance coverage. Koufopoulos (2008) and Huang, Liu, and Tzeng (2007) assume the presence of one type who exerts no precautionary effort, but is still more optimistic about the likelihood of the risk than the other type who exerts precautionary effort. This chapter generalizes this intuition driven by heterogeneity in perceptions and characterizes how the correlation between risk occurrence and insurance coverage depends on the correlation between baseline and control beliefs. De Meza and Webb (2001) and Jullien, Salanié, and Salanié (2007) explain the presence of advantageous selection by heterogeneity in risk preferences. Chiappori et al. (2006) show that such heterogeneity is not sufficient to explain the negative correlation if the competition in the insurance market is perfect. The correlation results in this chapter are independent of the nature of competition.

This chapter also relates to the literature that explores how firms exploit the bounded rationality of consumers, surveyed in Ellison (2006). In particular, Grubb (forthcoming) and Eliaz and Spiegel (2008) analyze how firms exploit differences in overconfidence and optimism about future demand respectively with a menu of screening contracts. I also consider the externalities that biased agents and unbiased agents impose on each other. In a similar spirit, DellaVigna and Malmendier (2004) and Gabaix and Laibson (2006) analyze how sophisticated and nonsophisticated types affect each others' welfare.

Notes

I would like to thank my advisors, Bengt Holmstrom, Ivan Werning, Jonathan Gruber, and Peter Diamond, for their support and valuable discussions and suggestions.

1. Exceptions are unemployment insurance provided by trade unions or voluntary public unemployment insurance systems in countries like Denmark, Finland, and Sweden, grown out of trade union programs (Parsons, Tranaes, and Lilleor 2003). The latter are heavily subsidized by the government, as expected with baseline-optimistic insurees. The existence of private information and aggregate risk and the government's advantage in coping with moral hazard have been suggested as explanations for the absence of private unemployment insurance (Barr 2001; Chiu and Karni 1998). Acemoglu and Shimer (2000) conclude, "Why unemployment insurance is almost always publicly provided, in contrast to most other insurance contracts, remains an important, unresolved question."
2. For reviews, see Bernheim and Rangel (2007) and Kanbur, Pirttila, and Tuomala (2004).
3. I ignore the use of training programs to screen and target unemployment benefits (Akerlof 1978; Besley and Coate 1992)
4. Slovic (2000) surveys the research documenting the heterogeneity in the perception of risk and its determinants.

References

- Acemoglu, D. 1995. "Public Policy in a Model of Long-Term Unemployment." *Economica* 62: 161–178.
- Acemoglu, D., and R. Shimer. 2000. "Productivity Gains from Unemployment Insurance." *European Economic Review* 44: 1195–1224.
- Akerlof, G. 1978. "The Economics of 'Tagging' as Applied to the Optimal Income Tax, Welfare Programs, and Manpower Planning." *American Economic Review* 68(1): 8–19.
- Baily, M., 1978. "Some Aspects of Optimal Unemployment Insurance." *Journal of Public Economics* 10: 379–402.
- Barr, N. 2001. *The Welfare State as Piggy Bank: Information, Risk, Uncertainty, and the Role of the State*. Oxford; New York: Oxford University Press.
- Bénabou, R., and J. Tirole. 2002. "Self-Confidence and Personal Motivation." *Quarterly Journal of Economics* 117(3): 871–915.
- . 2006. "Belief in a Just World and Redistributive Politics." *Quarterly Journal of Economics* 121(2): 699–746.
- Bernheim, D., and A. Rangel. 2007. "Behavioral Public Economics: Welfare and Policy Analysis with Non-standard Decision Makers." In *Economic Institutions and Behavioral Economics*, P. Diamond and H. Vartiainen, eds. Princeton, NJ: Princeton University Press, pp. 7–77.
- . 2009. "Beyond Revealed Preference: Choice-Theoretic Foundations for Behavioral Welfare Economics." *Quarterly Journal of Economics* 124(1): 51–104.
- Besley, T., and S. Coate. 1992. "Workfare versus Welfare: Incentive Arguments for Work Requirements in Poverty-Alleviation Programs." *American Economic Review* 82(1): 249–261.
- Blanchard, O., and P. Diamond. 1994. "Ranking, Unemployment Duration and Wage Determination." *Review of Economic Studies* 61(3): 417–434.
- Brunnermeier, M., and J. Parker. 2005. "Optimal Expectations." *American Economic Review* 95(4): 1092–1118.
- Card, D., R. Chetty, and A. Weber. 2007. "Cash-on-Hand and Competing Models of Intertemporal Behavior: New Evidence from the Labor Market." *Quarterly Journal of Economics* 122(4): 1511–1560.
- Cardon, J., and I. Hendel. 2001. "Asymmetric Information in Health Insurance: Evidence from the National Medical Expenditure Survey." *Rand Journal of Economics* 32(3): 408–427.
- Cawley, J., and T. Philipson. 1999. "An Empirical Examination of Information Barriers to Trade in Insurance." *American Economic Review* 89(4): 827–846.
- Chassagnon, A., and B. Villeneuve. 2005. "Efficient Risk Sharing under Adverse Selection and Subjective Risk Perception." *Canadian Journal of Economics* 38: 955–978.
- Chetty, R. 2009. "Sufficient Statistics for Welfare Analysis: A Bridge Between Structural and Reduced-Form Methods." *Annual Review in Economics* 1(1): 451–488.
- Chiappori, P., and B. Salanié. 1997. "Empirical Contract Theory: The Case of Insurance Data." *European Economic Review* 41(3): 943–950.
- . 2000. "Testing for Asymmetric Information in Insurance Markets." *Journal of Political Economy* 108(1): 56–78.
- Chiappori, A., B. Jullien, B. Salanié, and F. Salanié. 2006. "Asymmetric Information in Insurance: General Testable Implications." *Rand Journal of Economics* 37(4): 783–798.
- Chiu, H., and E. Karni. 1998. "Endogenous Adverse Selection and Unemployment Insurance." *Journal of Political Economy* 106(4): 806–827.
- Coles, M., and A. Masters. 2000. "Retraining and Long-Term Unemployment in a Model of Unlearning by Not Doing." *European Economic Review* 44(9): 1801–1822.
- Compte, O., and A. Postlewaite. 2004. "Confidence-Enhanced Performance." *American Economic Review* 94: 1536–1557.
- de la Rosa, L. 2007. "Overconfidence and Moral Hazard." Working paper No. 24. Aarhus, Denmark: School of Economics and Management, University of Aarhus.
- DellaVigna, S., and U. Malmendier. 2004. "Contract Design and Self-Control: Theory and Evidence." *Quarterly Journal of Economics* 119(2): 353–402.
- De Meza, D., and D. Webb. 2001. "Advantageous Selection in Insurance Markets." *RAND Journal of Economics* 32: 68–81.
- Eliasz, K., and R. Spiegel. 2008. "Consumer Optimism and Price Discrimination." *Theoretical Economics* 3: 459–497.
- Ellison, G. 2006. "Bounded Rationality in Industrial Organization." In *Advances in Economics and Econometrics: Theory and Applications, Ninth World Congress*. R. Blundell, W. Newey, and T. Persson, eds. Cambridge, MA: Cambridge University Press, pp. 142–174.
- Falk, A., D. Huffman, and U. Sunde. 2006a. "Self-Confidence and Search." IZA discussion paper no. 2525. Bonn, Germany: IZA.
- . 2006b. "Do I Have What It Takes? Equilibrium Search with Type Uncertainty and Non-Participation." IZA discussion paper no. 2531. Bonn, Germany: IZA.
- Finkelstein, Amy, and Kathleen McGarry. 2006. "Private Information and Its Effect on Market Equilibrium: New Evidence from Long-Term Care Insurance." *American Economic Review* 96(4): 938–958.
- Gabaix, X., and D. Laibson. 2006. "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets." *Quarterly Journal of Economics* 121(2): 505–540.
- Glaeser, E.. 2004. "Psychology and the Market." *American Economic Review Papers and Proceedings* 94(2): 408–413.

- Gollier, C. 2005. "Optimal Illusions and Decisions under Risk." CESifo working paper no. 1382. Munich, Germany: CESifo.
- Grubb, M. Forthcoming. "Selling to Overconfident Consumers." *American Economic Review*.
- Heckman, J., R. LaLonde, and J. Smith. 1999. "The Economics and Econometrics of Active Labor Market Programs." In *Handbook of Labour Economics, Vol. 3*, O. Ashenfelter and D. Card, eds. Amsterdam: North-Holland, pp. 1865–2097.
- Holmström, B., and P. Milgrom. 1991. "Multi-Tasking Principal-Agent Analyses: Linear Contracts, Asset Ownership and Job Design." *Journal of Law, Economics & Organization* 7: 24–52.
- Hopenhayn, H., and J. Nicolini. 1997. "Optimal Unemployment Insurance." *Journal of Political Economy* 105(2): 412–438.
- Huang, R., Y. Liu, and L. Tzeng. 2007. "Hidden Overconfidence and Advantageous Selection." Working paper. Taipei, Taiwan: Chuan Ming University.
- Jacobson, L., R. LaLonde, and D. Sullivan. 2005. "Estimating the Returns to Community College Schooling for Displaced Workers." *Journal of Econometrics* 125(1–2): 271–304.
- Jahoda, M., P. Lazarsfeld, and H. Zeisel. 1971. *Marienthal: The Sociography of an Unemployed Community*. Chicago: Aldine-Atherton.
- Jeleva, M., and B. Villeneuve. 2004. "Insurance Contracts with Imprecise Probabilities and Adverse Selection." *Economic Theory* 23: 777–794.
- Jespersen, S., J. Munch, and L. Skipper. 2004. "Costs and Benefits of Danish Active Labour Market Programmes." Danish Economic Council working paper. Denmark: Danish Economic Council.
- Jullien, B., B. Salanié, and F. Salanié. 2007. "Screening Risk-Averse Agents under Moral Hazard: Single-Crossing and the CARA Case." *Economic Theory* 30(1): 151–169.
- Kanbur, R., J. Pirttila, and M. Tuomala. 2004. "Non-Welfarist Optimal Taxation and Behavioral Public Economics." CESifo Working Paper No. 1291. Munich, Germany: CESifo.
- Kling, J. 2006. "Fundamentally Restructuring Unemployment Insurance: Wage-Loss Insurance and Temporary Earnings Replacement Accounts." Hamilton Project Discussion Paper No. 2006-05. Washington, DC: Brookings Institution.
- Köszegi, B. 2006. "Ego Utility, Overconfidence, and Task Choice." *Journal of the European Economic Association* 4(4): 673–707.
- Köszegi, B., and M. Rabin. 2007. "Mistakes in Choice-Based Welfare Analysis." *American Economic Review* 97(2): 477–481.
- . 2008. "Revealed Mistakes and Revealed Preferences." In *The Foundations of Positive and Normative Economics*, A. Caplin and A. Schotter, eds. New York: Oxford University Press, pp. 193–209.
- Koufopoulos, K. 2008. "Asymmetric Information, Heterogeneity in Risk Perceptions and Insurances: An Explanation to a Puzzle." Discussion paper no. 402. London: Financial Markets Group, London School of Economics and Political Science.
- Langer, E. 1975. "The Illusion of Control." *Journal of Personality and Social Psychology* 32: 311–328.
- Lechner, M., R. Miquel, and C. Wunsch. 2005. "The Curse and Blessing of Training the Unemployed in a Changing Economy: The Case of East Germany after Unification." *German Economic Review* 8: 468–509.
- Ljungqvist, L., and T. Sargent. 1998. "The European Unemployment Dilemma." *Journal of Political Economy* 106(3): 514–550.
- Machin, S., and A. Manning. 1999. "The Causes and Consequences of Long-Term Unemployment in Europe." In *Handbook of Labour Economics, Vol. 3*. O. Ashenfelter, and D. Card, eds. Amsterdam: North-Holland, pp. 3085–3139.
- Neal, D. 1995. "Industry-Specific Human Capital: Evidence from Displaced Workers." *Journal of Labor Economics* 13(4): 653–677.
- Parsons, D., T. Traanaes, and H. B. Lilleor. 2003. *Voluntary Public Unemployment Insurance*. Copenhagen: Social Forskningsinstituttet.
- Pavoni, N. 2009. "Optimal Unemployment Insurance, with Human Capital Depreciation and Duration Dependence." *International Economic Review* 50(2): 323–362.
- Pavoni, N., and G. Violante. 2007. "Optimal Welfare-to-Work Programs." *Review of Economic Studies* 74(1): 283–318.
- Pissarides, C. 1992. Loss of Skill during Unemployment and the Persistence of Employment Shocks. *Quarterly Journal of Economics* 107: 1371–1391.
- Price, R., A. Vinokur, G. Howe, and D. Caplan. 2004. *Preventing Depression in Couples Facing Job Loss, 1996–1998: Baltimore, Maryland, and Detroit, Michigan*. Ann Arbor, MI: Institute for Social Research, Survey Research Center, and Michigan Prevention Research Center; Washington, DC: George Washington University, Center for Family Research
- Rothschild, M., and J. Stiglitz. 1976. "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information." *Quarterly Journal of Economics* 90: 630–649.
- Salanié, F., and N. Treich. 2009. "Regulation in Happyville." *Economic Journal* 119: 665–679.
- Sandroni, A., and F. Squintani. 2007. "Overconfidence, Insurance and Paternalism." *American Economic Review* 97(5): 1994–2004.
- Santos-Pinto, L. 2008. "Positive Self-Image and Incentives in Organizations." *Economic Journal* 118: 1315–1332.

- Shavell, S., and L. Weiss. 1979. "The Optimal Payment of Unemployment Insurance Benefits over Time." *Journal of Political Economy* 87: 1347–1362.
- Shimer, R., and I. Werning. 2006. On the Optimal Timing of Benefits with Heterogeneous Workers and Human Capital Depreciation. NBER Working Paper No. 12230. Cambridge, MA: National Bureau of Economic Research.
- Slovic, P. 2000. *The Perception of Risk*. London: Earthscan.
- Tversky, A., and D. Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185: 1124–1131.
- Van den Steen, E. 2004. "Rational Overoptimism (and Other Biases)." *American Economic Review* 94(4): 1141–1151.
- Villeneuve, B. 2005. "Competition between Insurers with Superior Information." *European Economic Review* 49: 321–340.
- Weinstein, N. 1980. "Unrealistic Optimism about Future Life Events." *Journal of Personality and Social Psychology* 39(5): 806–820.
- . 1982. "Unrealistic Optimism about Susceptibility to Health Problems." *Journal of Behavioral Medicine* 5(4): 441–460.
- . 1984. "Why It Won't Happen to Me: Perceptions of Risk Factors and Susceptibility." *Health Psychology* 3(5): 431–457.
- Winter-Ebmer, R. 2006. "Coping with a Structural Crisis: Evaluating an Innovative Redundancy-Retraining Project." *International Journal of Manpower* 27(8): 700–721.
- Wunsch, C. 2008. "Optimal Use of Labour Market Policies." University of St. Gallen Working Paper. St. Gallen, Switzerland: University of St. Gallen.