Labour Economics 19 (2012) 27–32

Contents lists available at ScienceDirect

Labour Economics

journal homepage: www.elsevier.com/locate/labeco

The value of life: Real risks and safety-related productivity in the Himalaya

Jeremy Goucher, William C. Horrace *

Department of Economics, Syracuse University, United States

ARTICLE INFO

Article history:
Received 15 March 2010
Received in revised form 18 June 2011
Accepted 24 June 2011
Available online 22 July 2011

JEL classification:
D61
J17
J49

Keywords:
Statistical life
Risk
Cost-benefit
Mountaineering
Internet Wayback Machine

ABSTRACT

This paper estimates the value of a statistical life from commercial Himalayan expeditions. Because deaths occur with a fair amount of regularity, fatality rates are calculated for each mountain trail and are, hence, disaggregated measures of risk. Also, since the marginal product of labor in the industry is (in part) the marginal product of safety, our revenue measures may account for unobserved safety-related productivity of guides. Guide safety is explicitly observed by market participants, and is reflected in higher wages for safer guides. Our VSL estimates are about $5 M.

© 2011 Elsevier B.V. All rights reserved.

"Anything on Everest is dangerous. It's not safe. This is crazy. I mean, you're going into the death zone." — Russell Brice, professional guide, *Everest: Beyond the Limit*, Discovery Channel.

1. Introduction

Society may face choices that involve a tradeoff between physical risk and pecuniary returns, and our decisions reveal our willingness to trade money for the risk of physical harm (Ashenfelter, 2006). Economists have recognized the existence of this tradeoff since the time of Adam Smith (1776), and this tradeoff is often called the value of a "statistical life" or VSL. Econometric estimates of the VSL are used for understanding and informing public policies where risk/reward tradeoffs are important (Kniesner et al., 2006). There is an extremely rich literature on estimating the VSL, and we will not do it justice here. Early modern treatments are Thaler and Rosen (1976) and Viscusi (1978). In-depth surveys are Viscusi (1993) and Viscusi and Aldy (2003). Recent papers are Ashenfelter (2006), Ashenfelter and Greenstone (2004), Kniesner et al. (2006), Kniesner et al. (2010), Schnier et al. (2009), and Viscusi (2009), to name a few.

This research estimates the VSL from detailed risk/reward data collected from recent expeditions into the Himalayan Mountains of Nepal and India. For the majority of the 20th century, climbing in the Himalaya was for scientific purposes, so there is a lasting tradition of detailed record keeping: expedition size, daily accents, injuries, deaths, equipment, Sherpas, peak, trail, etc. Therefore, current data on commercial (for-pay) expeditions are ideally suited for producing a VSL estimate, while avoiding many of the conceptual and econometric problems that have plagued (and perhaps biased) estimates in the past. Using a standard two-stage, hedonic regression of expedition revenues on expedition fatality risk, we find VSLs between $4.05 M and $5.39 M. Our estimates are calculated for paid guides (not paying climbers) from developed countries with the U.S. (35%), U.K. (22%), New Zealand (14%) and Germany (14%) representing the majority of our observations.[1]

Ashenfelter (2006) and Kniesner et al. (2006) discuss several econometric problems related to VSL estimation: endogeneity of risks, omitted safety-related productivity bias, heterogeneity of preferences, and errors in the fatality risk measure. All of these issues are addressed in this research to a greater or lesser extent. For example, the final data set spans 10 years, so lags of fatality risk are valid instruments for today's fatality risk. Also, one of a mountain guide's primary outputs is the

* Corresponding author at: Center for Policy Research, 426 Eggers Hall, Syracuse University, Syracuse, NY 13244, United States. Tel.: +1 315 443 9016.
E-mail address: whorrace@maxwell.syr.edu (W.C. Horrace).

[1] Clearly, mountain guide risk preferences may be different from the general population.

0927-5371/$ – see front matter © 2011 Elsevier B.V. All rights reserved.
doi:10.1016/j.labeco.2011.06.014

production of safety.[2] Insofar as observed revenues capture the marginal product of safety, there is no unobserved safety-related productivity.[3] That is, in risky occupations a worker's wage may reflect a compensating differential, but workers are rarely paid for their safety-related behaviors (be they observed or unobserved by the employer). Therefore, a worker's ability to mitigate risk is neither observed explicitly by the econometrician nor implicitly through a wage adjustment for safe behavior. Once we observe revenues in the mountain guide industry we may implicitly observe safety-related behavior, because the wage is adjusted for this behavior through the market mechanism.[4] Hence, omitted safety-related productivity is not an issue (or at least is less of an issue) for these data.

Measurement error refers to the fact that measured fatality risk may not correspond to the actual risks faced by workers, and this may manifest itself as an aggregation problem. That is, at fairly disaggregate levels there may be few deaths, so fatality rates may be imprecise. Therefore to improve precision fatality rates are often calculated at more aggregate levels to estimate the VSL. Our data allow us to calculate fatality risk at fairly disaggregate levels and still incur a fair number of deaths. Hence, we can calculate fatality rates in different ways: for the entire Himalayan region, particular peaks, particular trails on peaks, and even for particular guides. Even at extremely disaggregate levels, fatalities can be non-zero in this industry.[5] We demonstrate empirically the effect of aggregation on the estimated VSL for these data. (e.g., \$5.39 M for trail deaths vs. \$4.05 M for peak deaths).

Also, because we observe individual guides on different expeditions (a pseudo-panel), any heterogeneity of risk preferences can be controlled with panel data techniques (e.g., fixed effects).[6] Additionally, we observe single agents paid heterogeneous wages in heterogeneous risk environments within the same data, providing another source of variability that helps us confidently pin down our VSL estimates.[7] Lalive (2003) discusses heterogeneity of risk across occupations, and argues that aggregate measures of risk do not uncover (or exploit) this variability, and my lead to biased VSL estimates. Therefore, our ability to observe the same guide in heterogeneous risk environments (e.g., different trails and peaks) also speaks to the aggregation and measurement errors problem. Again, we are able to pin down the real risks at low levels of aggregation and, hence, with high levels of risk heterogeneity.

One drawback of this research is that the electronic data purchased from the Himalaya Database does not contain revenue data. Therefore, we collect "per climber" revenue data from commercial climbing company websites and merge it with the climb data. Internet prices vary by guide and by peak. To capture price variability over time, we used the Internet *Wayback Machine* to record historical prices at each website. Therefore, our left-hand side variable may be measured with error, but we believe the errors are random, as we shall describe. Additionally, our results change very little when we limit the data to only current internet prices (\$3.8 M to \$5.1 M), so we feel that the historical imputation is fairly innocuous.

Another drawback of this study is conceptual: mountain guides may not be central to the distribution of societal risk preferences, so the applicability of the results to policies involving the general public may be questioned. Even if this is a problem, it is not unreasonable to envision public policy geared towards risk-loving individuals. The proliferation of extreme sports and their effect on the environment may be of importance to policy-makers. Also, there are costs and benefits associated with outdoor recreational sports (e.g., white water rafting, skiing, hunting, etc.). Perhaps policy analysis of these endeavors requires a VSL from a subpopulation with proclivities for risk-taking behavior. Finally, it could be argued that combat soldiers are relatively risk-loving, so the VSL of mountain guides may be more useful for calculating the human costs of war than the mean VSL. That being said, our final estimates are not different from typical estimates in the literature. For example, Schnier et al. (2009) estimate a \$4–5 M VSL for crab fishermen, a fairly risky occupation. Kniesner et al. (2006) estimate \$5.5–7.5 M from census labor data, and Ashenfelter and Greenstone (2004) estimate \$1.6 M from policy decisions on highway speed limits. The US DOT uses \$5.8 M per life for traffic fatalities (Viscusi, 2009).

This research confronts and overcomes several other conceptual issues with the VSL. For example, in many studies it is not clear that the decision-makers are even aware of what the true risks may be (Ashenfelter, 2006). Since mountain guides regularly face real life-and-death decisions, they are specifically trained to understand the inherent risks of their occupation, so our data avoid this problem. Also, Ashenfelter (2006) points out that there may be agency issues in the decision process that may distort the VSL. The idea is that the agents at risk may not be in complete control of the decision to engage in the risky behavior. This is particularly relevant when managers (agents) control behavior or when governments control laws that affect the safety of others. Schnier et al. (2009) confront this issue in a meaningful way by examining the decisions of captains on crabbing vessels, but even in their study, the risks to captains in stormy seas are distinctly different from the risk to deck hands. In our empirical framework the risk environment of the decision-maker (the guide) and the people in his/her charge (assistant guides and Sherpas) are identical, and this intimate "physical" link between the guide and his/her charges mitigates agency problems. (Indeed, climbers may literally be linked with ropes on the more dangerous portions of the climb.) Ultimately our analysis measures the marginal rate of substitution between "paid climber" revenues (guides, assistant guides and Sherpas) and expected paid climber deaths, so we are teasing out a compensating differential for paid climbers.[8] Since we are ignoring the lives of the "paying climbers" (unpaid expedition members), agency issues are unimportant to our analysis.

This paper is organized as follows. The next section discusses the industry and our data. Section 3 presents the hedonic revenue model and our two-stage least squares (2SLS) estimates of the VSL. We highlight the sensitivity of our VSL results to levels of fatality risk aggregation. The last section summarizes and concludes.

2. Industry and data

2.1. Industry

The mountain climbing industry consists of small companies, owned and operated by lead guides who are seasoned climbers. A well-established lead guide has anywhere from 10 to 20 assistant guides and manages six to eight trips a year in places such as Ecuador, Tanzania, Argentina, Russia, France, Italy, New Zealand, and, of course, Nepal and

[2] Guides are also paid for their ability to get climbers to the summit of the peak. However, 'getting to the top' implies 'getting to the top *in one piece*,' so climber safety *has* to be an important output for the guide. In fact, guides are paid full wages regardless of getting to the top of the peak. Informal conversations with guides reveal that there are reputational incentives at work in this specialized field. Getting to the top can improve a reputation, but losing climbers on the way to the top can damage a reputation.

[3] In fact, any safety measures that we included in our hedonic wage model (e.g., oxygen and rope) were insignificant.

[4] Taken this way, one could envision the wage as life or injury insurance. However, monitoring on the part of the insurer is perfect, since the guides observe client behavior. There are no reliable measures of injuries in the data.

[5] Even though we cannot produce feasible results with a fatality measure at the guide level, it is interesting to note that there can be deaths associated with a particular guide (a client death), yet he continues to be observed in the data. Death is a production "bad". There can be death without the paid risk-taker leaving the data set.

[6] We actually find that guide-specific fixed-effects are small and do not affect the estimated VSL, so in our analyses fixed-effects (i.e., heterogeneity of risk preferences) are ignored.

[7] Any panel dataset where workers change jobs may possess these features, but our 'workers' change 'jobs' frequently.

[8] In our analyses we cannot distinguish between the wages of the guides and Sherpas, so we cannot estimate a separate VSL for guide and Sherpas.

Download English Version:

https://daneshyari.com/en/article/971858

Download Persian Version:

https://daneshyari.com/article/971858

Daneshyari.com