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Job Performance Failure and Occupational Carpal Tunnel Claims

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Using a sample of one jab type from onefirm (to hold job tasks and sickleave/dLsability policy constant), we estimate the effect of demographic variables, job performance warnings, and workers' compensation benefits on the propensity to file a carpal tunnel syndrome (CTS) loss work-time claim. We find that disciplinary notices increase the employees' propensity to file a CTS claim. State maximum workers' compensation benefits are also positively related to CTSclairrt frequency, however, the relationship is not statistically significant. CTS claimants respond differently than other sprain/strain claimants to benefits and to gender In particularly, women have relatively more CTS claims, while men have relatively more other sprain/strain claims in our sample. The estimates here underscore the importance of psyehosocial factors in the filing of occupational CTS and sprain injuries claims.

KEY WORDS: occupational carpal tunnel syndrome; job performance warning; disciplinary notice; sprain; strain; workers' compensation benefits.

INTRODUCTION

The cost of occupational carpal tunnel syndrome (CTS), the median nerve compression associated with upper extremity activity in the work place, is high and increasing in industrialized nations. Total lost work time costs for one CTS case can be exorbitant (1). Hence, more attention is being given to the prevention and treatment of CTS. Studies have recently shifted from a strictly physical assessment of CTS to a broader examination of nonphysical or "psychosocial" correlates of CTS claims and CTS treatment outcomes. The psychosocial factors include psychological and environmental variables associated with family, conununity, and work.

Stutts and Kasdan (2) in their study of 83 patients referred for an independent medical examination of the upper extremity concluded that the disabled support systems influenced the duration and extent of the syndrome. They found that about half of the patients had at least one disabled family member, arguing that attitudes of family members toward the

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"disabled" worker may alter the worker's mental and physiologic states. Hence, family "disability culture" may condition the onset of symptoms.

In addition to these family influences, broader societal trends may have increased CTS claims. Barsky and Boris (3) argued that with the accumulated progress made in scientific and biomedical fields, and with the increased public awareness of bodily distress (especially more knowledge about mild and benign infirmities), there appears to be a decline in the public's tolerance for self-limited symptoms. That is, there is less interest in just living with symptoms than there used to be. This sociocultural trend explains the increase in somatization, the reporting of somatic symptom.% that have no pathophysiological explanation. Although carpal tunnel syndromes are not necessarily somatic in nature, this perspective suggests that the rise in reported CTS claims may be linked to society's increased reliance on medicalization.

However, these "disabled support systems" and sociocultural trends are not sufficient to explain why prognosis following surgical treatment is less favorable for occupational CTS than for CTS in general (1). One explanation of the differential outcome for occupational and nonoccupational CTS is the level of job satisfaction. A longitudinal study done by 13igos *et al. (4)* on back pain at work sheds light on the role of job satisfaction and the onset of cumulative trauma symptom. Back disorders are another expensive health care problem, by far the single most expensive musculoskeletal malady (4).

In the ***Bigos et al. (4)*** study of 3020 aircraft employees, individual physical factors (such as isometric lifting strength, flexibility, and cardiovascular fitness), psychosocial factors, and work place factors were collected to identify risk factors for reporting acute back pain at work. Other than a history of current or recent back problems, the factors found to he most predictive of subsequent reports were work perceptions identified by the modified work APGAR questionnaire originally designed to measure a family member's satisfaction with five components of family function including Adaptation, Partnership, Growth, Affection, and Resolve (5) and some traits (for example, readiness to report or deny emotional distress, balance of order/confusion) identified by Minnesota Multiphase Personality Inventory. Workers who "hardly ever" enjoyed their jobs were 2.5 times more likely to report a back injury than workers who "almost always" enjoyed their job. Similarly, a recent study by Faucett *et al.* (6) found that the addition of psychosocial effects like job attitude, supervisor, and coworker support added to the efficacy of a model used to predict active work status after filing a CTS claim. These findings suggest a job that is perceived to be a burden, unenjoyable, unfulfilling may influence the readiness of an employee to report an occupational injury.

Haufler *et al.* (7) examined the survey responses of 124 workers with work-related upper extremity (including hands/wrist, foreman, elbows, shoulders, and neck) pain. They found that their index of job stress, analogous to our measure of job productivity warnings, is positively associated with increases in pain on the job and negatively correlated with funcationality. However, they did not find a statistically significant correlation between job stress and lost time.

We broaden the nonphysical CTS risk factors by investigating how job performance variables and workers' compensation disability benefits affect the likelihood of filing a CTS claim, including much larger populations of CTS claimants than, most prior studies. We do not suppose that all, or even necessarily most, workers respond to these additional risk factors. Rather, we examine whether some respond to these forces. We also examine

to what extent CTS claims are like other strain and sprain claims. Johnson *et al.* (8) found for a Canadian sample of severely injured workers that there was no statistical difference between those with back strains and those with CTS injuries. In this paper, we also examine the similarity between CTS and strain injuries for our U.S. sample that include less severely injured workers that would not end up being included in the Johnson *et al.* (8) sample.

JOB PERFORMANCE FAILURE AND CTS CLAIMS

In this sample, job performance warnings are indicated by whether an employee received a disciplinary notice. Disciplinary notices are written or verbal warnings from a supervisor aimed at changing or eliminating an undesirable subordinate behavior (9). Other means of punishment used by firms include transferring *the* employee to *a* different position or holding back a percentage of the employee's merit base (10).

In our sample firm, disciplinary notice is not as harsh a punishment *as* a suspension or termination, but under this company's human resource policy, it is considered significant, a clear indication of unsatisfactory performance with the expectation that if it is not rectified, the employee will be terminated. But it is also the company's policy *that job* performance warnings are not issued just because health problems limited the employee's ability to work. We are interested in how the employee may consciously or unconsciously alter his or her readiness to file a CTS claim after they have received a job performance warning.

Facing a reprimand, an employee may justify their behavior on the basis of a physical disorder. Because of the subjective nature of CTS claiming, it is easy to claim that job-related repetitive motion over the "years" has caused the disease. The employee may attribute his poor performance to overexertion, excessive movement, forceful hand use, low-frequency vibration exposure, static positioning, itnproper'tool design and so on (11). CTS is difficult to independently monitor and confirm (12). For some workers, CTS can provide a justification for their job performance failure.

Alternatively, an employee may file a CTS claim because they feel they should not have been singled out by a job performance warning. In other words, they **are** using CTS claiming as a means of expressing their perception of unfair treatment on the job. Research has provided evidence that affective responses or undesirable side-effects often accompany the use of discipline. For example, Allen and Keaveny (13) found that employees who have filed grievances concerning disciplinary action have less favorable attitudes toward their supervisors than do nongrievants. Other studies indicate that disciplinary action can lead to adverse emotional reactions, perceptions of inappropriate supervisory behavior, and deterioration in the supervisor/subordinate relationship (14). Research in organizational justice also suggests that if outcomes or the process of the punishment is perceived as unfair, workers may experience a wide variety of responses including anxiety, hostility, and aggressive resentment toward the punishing agent (15). The worker may perform passively or engage in other work withdrawal behaviors such as lateness and absenteeism (15). The employee may exclaim his *or* her anger toward the punishment by filing a CTS claim. Such an action may bring the employee not only monetary compensation, but mental satisfaction and reputation remedy as well.

Also there is the economic rationale for filling a CTS claim when workplace interactions are not going well. A worker who senses an impending dismissal (job performance

warnings would be an indication of an increased expected probability of being fired), may file a CTS or other hard to diagnose soft tissue claim that wouldn't be filed in the absence of the anticipated discharge.

Unlike those consciously airing their grievances through a CTS claim or trying to provide far themselves in the face of a pending discharge, some employees also file a CTS claim for unconscious reasons. After receiving one or several disciplinary notices, the employee may feel sad, hostile, anxious, frustrated, and tenacious (the so-called "SHAFT" Syndrome (16)). Because getting an official reprimand sets an employee apart as a less than normally productive member of the team, it may place some pressure on the employee's self-esteem. If the employee feels inferior to others, for example, the SHAFT syndrome may deteriorate and develop into a factitious disorder. A factitious disorder is usually induced by deliberate human actions with or without intention to produce a lesion or disease (1). Friedman *et al.* (17) concluded that the hand is readily accessible and noticeable to others, and is one of the body parts most frequently involved in self-inflicted injuries. Therefore, multiple factitious disorders of the upper extremity exist. Women are reported to be more vulnerable to the SHAFT syndrome (16). This may be because that they are more likely to avoid underlying psychological problems by converting their attention to physical injury or pain. If this is the case, we may expect to find relatively more *females* than males filing CTS claims, as the type of work activity is the same for males and females in our sample.

Since disciplinary *notices may give rise* to several consequences that can influence the employee's readiness to report a CTS claim, it is worthwhile to examine the correlation between job disciplinary warnings and CTS claims. Gardner and Butler (18) reported, using a different sample, that increases in job warnings lead to subsequent increases in the number of workers' compensation claims filed, though they reported no distinctions by the types of claims filed. The descriptive statistics form this sample indicate that employees who have not received any disciplinary notice in the preceding 12 months have a frequency of CTS claiming of 1%. The likelihood of a CTS claim for employee who got one job performance warning increases to 2.2%, (in this sample, three was the maximum number of disciplinary notices issued in the prior 12-month period).

METHOD

Data Description

In order to minimize the influence of other employee benefits that may also influence CTS claims filing (such as variations in employer provided sick leave, short term disability, and Employee Assistance Programs and policies), we draw our sample from full-time workers subject to only one set of employee benefits policies (that is, it is an employee group subject to a homogeneous benefits environment), except for variations in workers compensation generosity due to individual state mandated benefits and waiting periods. The data are also homogeneous in the sense that the sample workers do the same type of labor--they are skilled operators from the service sector-for information available from 1994 to 1997.

The sample means presented in the first, left-hand column of Table I indicate that this company has experienced growth: its workforce is both relatively young (about 37 years old) and with only 8 years of experience with the company on average. Workers are mostly

Table I. Means of Independent Variables by Claim Type (Standard Deviations of Means)

Variable	Whole sample (N= 141,921)	Claim type: No claim (N - 110,584)	CTS claim (N - 1521)	Sprain/strain (N = 20,539)	l.acerationlfncture (N = 1436)	Other (N = 7841)
Male	0.694 (0.46)	0.690 (0.46)	*0.521* (0.50)	0.715 (0.45)	0.740 (0.44)	0.717 (0.45)
Age	37.42 (7.38)	37.58 (7.45)	36.65 (7.19)	36.78 (7.00)	37.25 (7.37)	36.96 (7.26)
Tenure	8.28 (3.97)	8.36(3-99)	7.83 (3.83)	8.04 (3.87)	8.11 (3.99)	7.86(392)
Married	0.635 (0.48)	0.639 (0.48)	0.558 *(0.50)*	0.624 (0.48)	0.626 (0.48)	0.626 (0.48)
5-day wait	0.046 (0.21)	0.047 (0.21)	0.024 (0.15)	0.039 (0.19)	0.049 (0.22)	0.055 (0.23)
Retroactive	15.76 (5.93)	15.77 (5.93)	15.96 (5.75)	15.75(5 .90)	15.82 (5.91)	15.65 (5.93)
Max WC benefit	483.75 (108.89)	482.92 (109.21)	481.19 (104.92)	486.94 (107.01)	489.70 (111.10)	486.49 (109.29)
Warning	0.039 (0.23)	0.030 (020)	0.076 (0.31)	0.077 (033)	0.042 (0.22)	0.059 (0.27)
Northeast region	0.269 (0.44)	0.269 (0.44)	0.201 (0.40)	0.264 (0.44)	0.272 (0.44)	0.293 (0.46)
South region	0.335 (0.47)	0349 (0.48)	0.286 (0.45)	0.284 (0.45)	0.325 (0.47)	0.295 (0.46)
West region	0.219 (0.41)	0,206 (0.4))	0331(0.47)	0.278 (0.45)	0.216 (0.4!)	0.234 (0.23)
YR 94	0.238 (0.43)	0.236 (0.42)	0.258 (0.44)	0.237 (0.43)	0.278 (0.45)	0.254 (0.44)
YR 95	0.248 (0.43)	0.248 (0.48)	0.272 (0.44)	0.246 (0.43)	0.235 (0.42)	0.244 (0.43)
YR 96	0.256 (0.44)	0.254 (0.44)	0.231(0.42)	0.268 (0.44)	0.254 (0.44)	0.253 (0.44)

single and males: 69% of the sample is male, and *64% of the* sample is single. While the workers come from a single employee group, they are located uniformly around the United States as can be seen from means on the regional dummy variables: 27% comes from the Northeast Region of the United States, 34% comes from the South, 22% *from* the West, and the remainder from the Midwest. The means for the year dummy variables also indicate that the sample is uniformly. drawn from the four fiscal years available in this data set.

While we do not have individual wage data for our sample, these full-time workers are paid well enough that they qualify for the maximum workers' compensation payment in each of their states. Expected benefits can vary also as replacement rates and minimum benefits vary by state, but Butler and Appel (19) show that changes in the statutory maximum payment in recent years effectively account for *all* of the changes in the expected workers' compensation benefits. State weekly maximum benefits in workers' compensation are often based on a percent of the average weekly wages in the preceding year, but this varies from state to state. The sample average of these (location weighted) maximum weekly workers' compensation benefits is $478, which mirrors the average maximum benefit payments in the United States relatively well during this time period.

The job-performance warning variable (i.e., "warning") is the number of disciplinary notices received during the preceding 12 months by those filing a CTS claim. Using disci-*plinary* notices *prior to a workers' compensation (CTS)* claim, along with the company's progressive policy that disciplinary notices will not be issued for health-related reasons, helps ensure that-if a significant relationship is present-the causality will be that prior disciplinary notices *(as* an indication of job productivity failure) lead to subsequent CTS claims. Notice that, on average, only 0.03 disciplinary notices were issued per worker per year. For those not filing a CTS claim, job-performance warning is measured as the number of disciplinary notices received in the fiscal year.

Estimation Model

Two multivariate estimation models examine the determinants of CTS claims, using sample data from this employee group. We begin by estimating the demographic and job-environmental variables associated with likelihood of filing a CTS claim $(Y_i = 1)$, using the traditional logistic regression function:

$$\text{Prob}(Y_i = 1) = \frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)} \quad (1)$$

where "x_i" is a vector of characteristics and "β" is a vector *of* the associated weights that we will estimate from the sample data. Since the probability of not filing a CTS claim ($Y_i = 0$) is

$$\text{Prob}(Y_i = 0) = 1 + \exp(x_i\beta)^{-1} \quad (2)$$

the Maximum Likelihood Estimation function for the logistic regression becomes

$$L_a = \frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)} \sim \frac{1}{1 + \exp(x_i\beta)} \quad (3)$$

where i refers to those *who* file a CTS claim and .j refers to those who *do* not file a claim. Maximizing the above likelihood function with respect to the vector 8, we determine the role of various factors, including prior job performance warnings and potential workers' compensation benefits.

The estimates in the logistic model do not represent responses in probability of CTS claiming to a unit change in an explanatory variable since there is a nonlinear ***relationship*** between the probability of filing a claim and the individual x_i. This probability change is given by the derivative of the probability with respect to each of the variables included in the model, which is

$$\frac{\partial E(Y)}{\partial X_k} = \frac{\exp(x\beta_i)}{(1 + \exp(x\beta_i))^2}\beta_k \qquad (4)$$

or

$$\frac{\partial E(Y)}{\partial x_k} = P(1 - P)\beta_k \qquad (5)$$

where "P" is the probability of filing a claim. We use P, the percentage of people in the sample who actually filed CTS claims, as a proxy to P aid plug it in Eq. (5) to get the marginal ***effect of each*** **explanatory variable on the probability of** ***filing a CTS*** **claim.**

For dichotomous explanatory variables such as gender or region of the country, $P(1 - P)\beta_k$ is the difference in the probability of CTS claiming between the (Xk = 1) group and (Xk = 0) group. A positive sign indicates that the (Xk = 1) group is more likely to file a CTS claim than the $(X_k - 0)$ group. For the continuous explanatory variables (such as age, tenure, or maximum workers' compensation benefits), the ***percentage*** change in probability caused by a unit change in an explanatory variable is equal to $(1 - P)\beta_k$. The sign of the coefficients (which will **also be the sign of** ***the product*** $(1 - P)\beta_k$ indicates the direction of the influence.

Although not specifically estimating CTS claims, prior research on workers' compensation claims in general (6,12,18,20) finds that claim frequency tends to be lower for males, older workers, and more experienced workers, with mixed results on martial status. Claim frequency tends to rise as the statutory maximum benefit under workers' compensation increases, especially for (back) strain and sprains. We also expect the claim frequency will fall as the length of the waiting period increase, both because longer waiting periods means that more disability benefit claims will be truncated and because lengthening the period a claimant must wait before being paid for a work-related injury lowers the expected benefit of a claim: going from a **3 to** 7 waiting period reduces by 4 days the time over which the claimant is eligible **for** ***benefits.*** Thus, as the waiting *period* increases, potential disability benefits are reduced. The disability payments lost during the waiting period are restored, retroactively, if the claim extends beyond a threshold known as the retroactive period. Hence, the shorter the retroactive period, the greater the expected benefit: higher retroactive periods should reduce benefits, and we would predict that the retroactive variable would have a negative coefficient in the logistic regression.

The hypothesized sign for the explanatory variable "job-performance warning" is positive in the CTS frequency regression, reflecting the psychosocial and economic factors discussed above. In addition to isolating the determinants of CTS claim filing, we also

Table TL Logic Estimates of Claim Frequency (Standard Erin of Estimates)

Variable	CTS claims	Sprain/strain claims
Intercept	-3.95-[11] (0.24)	-1.875"' (0.07)
Male	-0.735"" (0.05)	0.092 (0.02)
Age (years)	-0.010" (0.004)	-0.012" (0.001)
Tenure (years)	-0.015" (0.004)	-0.001 (0.002)
Married	-0.095' (0.05)	-0.024 (0.02)
5-day waiting period	-0.640'll (0.17)	-0.277"' (0.04)
Retroactive period	0.017"' (0.005)	0.012.•• (0.001)
Maximum WC benefit	0.0002 (0.0003)	0.00045"' (0.0001)
Job productivity warning	0.416""' (0.08)	0.569' (0.03)
−2 Log likelihood value	16599.42	116000,14

Note. **Regional dummy variables and year dummy variables also included in the analysis, but are not reported here.**
'p-0.1;""p-0.05;`P =0.01.

explore the extent to which CTS claim filing is similar to other strain and sprain claims. Johnson *et ai.* (18) report in their sample of severely injured workers that CTS claims are statistically equivalent to back strains cases with respect to claim ', filing responses, but both groups differ from other claim types. In Table II we present estimates where the likelihood of filing a CTS claim is analyzed in the left-hand column and the likelihood of filing a sprain/strain (other than CTS) is analyzed in the right-hand column. Unlike the sample of severely injured workers in the Johnson *et al.* (8) study, we find many significant differences between CTS claims and other types of sprain/strain **cases.**

RESULTS

The descriptive means by workers' compensation claimant status, given in the five right-hand side columns of Table I, suggest interesting trends in the data. The most notable feature is that like other strains and sprains CTS claimants experience about twice the rate of prior job performance warnings relative to those with no claims or those with claims for lacerations and fractures. This is consistent with the hypothesis that some of those workers who are less productive, or who are labeled as less productive, will react by filing more CTS claims. The same is also true of those filing (other types of) sprain and strain claims: The average number of job warnings per employee/year is 0.07, while the average number of those filing no claims is only 0.03.

The demographic variables indicate that CTS claimants are different from other workers' compensation claimants and from those who file no claims. Women experience many more CTS claims than do men (there are 1521 CTS claims in our sample) as evidenced by the relatively low value for the male dummy variable in the sample: About 70% of the sample is male, but only about 52% of the CTS claimants are male, consistent with **the notion that *women are more prone* to** SHAFT syndrome (16) than men are. CTS claimants tend to be single more often than other groups. Finally, if CTS claims solely represented the cumulative impact of repetitive work on soft tissues, then the expectation would be the CTS claimants would be older, and would have greater tenure with this firm. In fact, the opposite is the case: Younger workers and workers with less work experience tend to file *more* CTS claims than any other claimants or than the non-claimants.

Logistic Regression: CTS Results

Table II shows that the job-warning variable (number of disciplinary notices received) has the expected *positive sign, and* is significant both for CTS and other types of sprain/strain claims. This confirms our hypothesis that having more disciplinary notices will increase the likelihood of the claim. Specifically, an additional disciplinary notice will increase the likelihood of a CTS claim by 41% (0.416 x 0.989). In other words, one disciplinary notice increases the likelihood of filing a CTS claim from the sample mean of 1.5%.

The positive sign for MAXPAY **(state** maximum) indicates that a higher frequency of CTS claims will result from an increase in the maximum workers' compensation benefits, though the relationship is not statistically significant (p-value equals 0.37). Particularly, raising the maximum payment by 10% will increase the likelihood of CTS claims by 9% (the "benefits elasticity" is 0.9). This is a quantitatively large response, even if it is not statistically significant.

In addition to the job-related factors represented by job performance failure and workers' compensation benefits, other nonphysical factors such as demographic and geographic factors also impact the employee's likelihood *of* filing a CTS claim. Holding all else equal, we find that females are more likely to file a CTS claim than males by 0.8%. Single employees are 0.1 % less likely to file a CTS claim than arc married employees. Age and tenure lower the probability of ***filing*** **a CTS claim:** with each additional year of age, the probability of a CTS claim falls by 0.01 %; for each additional year of tenure, the probability of a CTS claim falls by 0.016%. All these demographic effects are statistically significant.

The other two variables, partial controls for other differences in the workers' compensation generosity between states, are the waiting period and the retroactive period. When going from a 3- to a 5-day waiting period (the time from injury to eligibility for loss pay benefits), claim filing drops as expected. However, in going from a 5- to a 7-day waiting period, claim filing increases, an unexpected result (Formal tests show that there is no difference in response times between the 3- *and* 7-day waiting period, our omitted waiting period categories). The retroactive period *is* the length of time a claim must continue until the benefits "lost" during a waiting period will be reimbursed to the injured worker. The longer the retroactive period, the lower the expected benefits, and hence, the lower the incentive to file a claim. So that on the basis of economic incentives, the expected sign of the coefficient should be negative. But it is significantly positive instead. We have no good explanation for this result.

Logistic Regression: CTS Claims vs. Other Strains/Sprains

Claim filing after a job-performance warning is more responsive in other strains/sprains than it is in CTS claims. While CTS claims rise from 1.1 to 1.5% (a 41% increase in the likelihood), the other sprains and strains increase from 14.5 to 21.5% (a 48% increase in the likelihood).

While differences in the maximum benefits between states do not seem to affect CTS claims, they significantly increase the other types of sprain/strain claims that are filed. The implied impact is relatively large: a 10% increase in benefits leads to a 14.2% increase in the expected likelihood of filing (this is called the "benefits elasticity" in the economics literature). This is consistent with earlier findings from the studies of relationship

between benefit utilization in worker's compensation and frequency ofcompensation claims (20-22).

The influence of demographic variables also significantly changes when going from CTS claims to other sprain/strain claims. Males have a higher likelihood of filing other sprain/strain claims than females, just the opposite of what was found for CTS claims. Marital status, age, and tenure work in the same direction as they did for CTS claims filing, though the magnitude of the martial status effect is three times larger for other sprains/strains than it is for CTS claims. In our sample, CTS claims appear to be different from other types of sprain/strain claims. CTS claims are higher for females (while other sprain claims are higher for males.-see similar findings reported in (23)), and CTS claims are less responsive to benefit changes and job warnings than are other sprain/strain claims.

Multinominal Logistic Regression (MNL): All Claim Types

One potential weakness of the logistic regression model is that it only considers two choices at a time: either the employee filed a CTS claim, or the employee did not file a CTS claim. But "not filing a CTS claim" can mean either "no claim **was** filed at all" or that "a non-CTS claim was filed."" It would be instructive to broaden the statitistical model so that the filing propensities for "all" types of claims were jointly considered. The multinominal logistic regression model (MNL) provides for this type of generalization.

When a variable is statistically significant in the MNL framework, it means that it affected the distribution of claim types, not necessarily any single type of claim. For example, aging may have no impact on whether you file a claim for a laceration or not, but may decrease the likelihood of filing **a CTS** or other sprain claim as the distribution of claims shift from these soft-tissue injuries to no claim filing at all as the employee grows older. Clearly, however, both the impact of these variables on the overall distribution of claim types, and the impact of these variables on specific types of claims are important. The significance of each of the variables on shifting the distribution of claims is *given in* Table III: All the variables in the model (as well as year and regional effects, not reported here) were statistically significant in the model.

Table N presents the *implied* semielasticities: *the* percentage change in filing that respective claim type when the variable in question increases by one unit. For example,

Tble I17. Significance Levels of the Determinants of Claims 'Filing

Variable	x^2 -tests
Male	**242.13"'**
Age	**112.13"•**
Tenure	**48.78"***
Married	13.42*[0b]
5-Day waiting period	**67.88'"**
Retroactive period	**85.55"**
Maximum WC benefits	**38.75****
Job productivity warning	**616.66"***

***Note Regional dummy variables also included in the* analysis, and were significant at the 1% level.**
****p=0.05;'"=0.01.**

Table 1V Semielaslicity Estimates of Claim Types. Separating CI'S and Strain Cases

Variable	Determinants of claim tiling				
	No claim	CTS	Strain	Laceration/fracture	Other
Intercept	0.481 (0.03)	-3.247 (0.06)	-1.286 (0.03)	-4,221 (0.06)	-2.043 (0.01)
Male	-0.014 (0.02)	--0.726 (0.01)	0,077 (0.01)	0.250 (0.001)	0.097 (0.001)
Age	0.021 (0.001)	-0.009 (0.001)	-0.010 (0.002)	O.OW (0.002)	-0.002 (0.006)
Tenure	0.002 (0.08)	-0.014(0.20)	-0.001(0.11)	-0.007 (0.21)	-0.021 (0.07)
Married	0.010 (0.06)	-0.094 (0.10)	-0.021 (0.07)	-0.091 (0.09)	-0.047 (0.04)
5-Day waiting period	0.042 (0.002)	-0.632 (0.003)	-0.235 (0.003)	0.054 (0,007)	0.126 (0.04)
Retroactive period	-0.002 (0.12)	0.017 (0.20)	0.010 (0.13)	0.002 (0.21)	0.003 (0.08)
Max WC benefits	-0.0001 (0.06)	0.0002 (0.08)	0.0004 (0.06)	0.0004 (0.08)	0.00006 (0.04)
Job productivity warning	-0.125 (0.08)	0.487 (0.03)	0.508 (0.08)	0.078 (0.04)	0.325 (0.08)

Note, **Based on specifications including regional and year dummy variables-whose coefficients arc not reported here. We do not report the significance level for the scmielasticity estimates because the approximation to get these estimates is not always accurate. On the other hand, what really matters is how they affect the joint distribution of claim types, which is given in Table lll.**

in the MNL specification, males have a 72.6% lower likelihood of filing a CTS claim than females but a 7.7% higher likelihood of filing a non-CTS sprain/strain type claim. These results are consistent with the earlier logistic regression findings. *Indeed, all the* earlier findings continue to hold. In particular, greater age and longer tenure lower CTS and sprain/strain claims, and an increase in job productivity warnings increases the likelihood of filing any type of workers' compensation claim relative to filing no claim at all. However, the effect of job productivity warnings is the greatest for the CTS claims, followed by the other sprain/strain claims.

CONCLUSION

There is an increasing amount of literature examining nonphysical risk factors of CTS claims. Using a sample of skilled operators doing the same type of work in many different states, our study is the first one to exploit the possible relationship between job performance failure and CTS claim frequency in an empirical setting where multiple factors are held constant. Since our sample comes from one job type in one firm, there is no variation in the type of work performed and no variation in the structure of other benefits (i.e., all are subject to the same sick leave and short- and long-term disability policies).

Empirical analysis confirms our hypothesis that prior disciplinary notices will increase the employees' propensity to file a CTS claim. This effect of prior disciplinary notices, combined with the company policy in which there are no health-related disciplinary notices, suggests that psychosocial factors play an important role in the filing of occupational CTS and sprain injuries. This helps to explain why cognitive-behavioral therapy and multidisciplinary approaches to treating CTS appear to be effective (24).

State maximum workers' compensation benefits are also positively related to CTS claim frequency; however, the relationship is not statistically significant. Moreover, gender, age, tenure, marital status, and regional differences all influence CTS claims. The study suggests that CTS symptoms are not necessarily always induced by physical working

environment: older workers, and workers with more tenure tend to filing fewer CTS claims rather than more claims.

We also find CTS claims are different from other sprain/strain claims. While they respond almost equally to job productivity warnings, other sprain/strain claims are much more responsive to variations in disability benefits under workers' compensation than are CTS claims. Significant gender responses were also detected..

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