SEVERANCE PAY AND THE SHADOW OF THE LAW: EVIDENCE FOR WEST GERMANY

LASZLO GOERKE
MARKUS PANNENBERG

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Abstract

Due to the complexity of employment protection legislation (EPL) in Germany, there is notable uncertainty about the outcomes of dismissal conflicts. In this study we focus on severance pay and inquire whether its incidence and level varies in a systematic manner with the legal rules as defined by labour as well as tax law. We start with a theoretical model that generates the main observable outcomes of dismissal conflicts as potential equilibrium situations. Using German panel data (GSOEP), we put our theoretical model to an empirical test. Our main result is that the shadow of the law matters. Criteria regarding the validity of dismissals either found in respective legislation or defined by labour courts significantly affect the incidence and magnitude of severance pay. Moreover, restrictive changes in the taxation of severance pay have a negative causal impact on its incidence.

JEL Code: J65, K31, H24, C23, C24.

Keywords: severance pay, labour law, taxation, sample selection, survey data.

Laszlo Goerke
Johannes Gutenberg-University
Department of Economics (FB 03)
55099 Mainz
Germany
Laszlo.Goerke@uni-mainz.de

Markus Pannenberg
University of Applied Sciences
Department of Business and Economics
(FB 05)
Universitätsstr. 25
33615 Bielefeld
Germany
markus.pannenberg@fh-bielefeld.de

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I. Introduction

The outcome of a dismissal conflict in Germany is often argued to be unpredictable. This uncertainty arises since, first, the regulations governing the admissibility of dismissals and the determinants as well as the taxation of severance pay are highly complex. Second, the effective judicial enforcement of employment protection legislation (EPL) is not uniform across the country, because there is remarkable scope for judges to apply their own criteria to assess the admissibility of dismissals and to set the magnitude of severance pay. Given this uncertainty, it comes as no surprise that recent surveys (e.g. Pfarr et. al 2005, pp. 13ff) reveal that employers as well as employees in Germany perceive EPL to be complex and difficult to understand. Private agreements to avoid costly and uncertain legal disputes, therefore, seem to be an obvious alternative to court proceedings for employers and employees. Nevertheless, economic intuition would suggest that the distinctive features of EPL are also discernible in outcomes of private agreements between firm and employee, since filing a law suit represents the employee's fallback position. The shadow of employment protection law should, thus, affect observed outcomes of dismissal conflicts in Germany. The present paper inquires whether this hypothesis is warranted. We focus on the incidence and magnitude of severance pay, since they are an excellent predictor of the actual costs of EPL in Germany. Thus, our analysis also allows us to shed light on the relationship between the legal framework of firing regulations and its actual extent (cf. Bertola et al. 1999).

The paper proceeds as follows: in a first step, the legal framework in Germany is described. In a second step, we provide a short survey of the literature. We then develop a theoretical model of dismissal conflicts which incorporates the key institutional features of German EPL, its enforcement by labour courts and the taxation of severance payments. In a fourth step, we put our theoretical model to an empirical test, using data from the German Socio-Economic Panel (GSOEP) for the period 1991-2003 for West Germany. We find that criteria, as they have been defined by law or developed by labour courts with respect to the entitlement to and the amount of severance payment, as well as a change in tax laws, had a significant impact on the incidence and magnitude of severance pay. We conclude with a brief summary.

II. Legal framework

For the purpose of our study, the most important determinants of severance pay are employment protection legislation and income tax laws. EPL in Germany derives from a multitude of sources. Of foremost importance are the Protection against Dismissal Act and the Works Constitution Act. However, according legal regulations are often vague. Thus, EPL in

Germany is characterised by a greater scope for judicial decisions than other areas of law.[1] The Protection against Dismissal Act (PaDA) ("Kündigungsschutzgesetz") states that a dismissal is "socially unjust" and, hence, invalid if there is no suitable reason (§ 1). A dismissal is socially justified only (1) in cases of personal misconduct, (2) lack of individual capabilities (including sickness) or (3) due to business needs and compelling operational reasons. Moreover, in the third case the PaDA requires that firms select workers or employees – terms we will use interchangeably from now on – to be dismissed in accordance with social criteria such as age, tenure, alimony duties or individual disabilities.[2] Until 2003, the regulations of the PaDA generally applied to all firms with more than a minimum number of five permanent employees.[3]

After notification of his dismissal, a worker can file a suit at the competent labour court. The probability of filing a lawsuit in Germany seems to exceed 10% but fall short of 30%.[4] In labour court, initially a conciliation procedure takes place within two weeks of the suit being filed. During its course the judge usually suggests a mutual agreement. If the conciliation fails, a court meeting will be scheduled. This usually takes place some months after the conciliation procedure and will eventually yield a judgement, unless the parties agree to a compromise beforehand. Each party bears its own costs of legal representation. Only if a judgement is passed, a comparatively small court fee will be imposed.

In general, an unlawful dismissal does not result in a reinstatement to the previous job.[5] This is the case since the PaDA (§ 9) stipulates that the court can dissolve an employment contract if its continuation cannot be expected either of the worker or the firm. Only in such an instance, the court has to award a severance payment. The PaDA provides no detailed rules for its amount. Solely a ceiling of 12 months' gross wages which increases up to 15 (18) months' wages for workers with at least 50 (55) years of age and a minimum of 15 (20) years of tenure is defined. Instead, courts have to take into account the merits of an individual case. Despite this obligation, more than 75% of all labour courts utilise a specific formula to compute the amount of severance pay. Accordingly, severance pay equals the product of a so-

[1] More extensive descriptions of the German EPL in English are contained in Schmidt and Weiss (2000, Part I, chap. 7) and Brown et al. (1997). Heseler and Mückenberger (1999) focus on dismissals.

[2] Age, tenure, and alimony duties have explicitly been mentioned in the PaDA during the period for which we conduct the empirical investigation only from 1996 to 1998. However, labour courts have usually applied similar criteria. Since 2004, the four criteria of age, tenure, maintenance payments, and individual disability are listed explicitly in § 1(3) of the PaDA.

[3] As an exception to this general rule, the threshold increased to ten permanent employees from October 1996 to January 1999, was reduced to five permanent employees afterwards, and has been raised again at the beginning of 2004. See, for example, Bauer et al. (2004) or Verick (2004).

[4] The probability varies according to the data source (cf. Sachverständigenrat 2003, Pfarr et al. 2005, p. 58).

[5] Data on the fraction of reinstatements are scarce. On the basis of data for 1978, i.e. for a period of extremely low unemployment, Falke et al. (1981) find that only 9% of all dismissal suits resulted in reinstatements.

called severance pay factor, tenure (in years) and the last monthly gross wage income. The prevalent severance pay factor seems to be in the range of 0.5 (Hümmerich 1999). The characteristics of each individual case are then incorporated by modifying the amount calculated in line with the formula. In particular, there is evidence that court-awarded severance payments decrease with the reemployment probability of a dismissed worker and rise with age, the extent of pension entitlements forfeited due to the job loss, the number of people for whom maintenance payments have to be made, and also the size of the firm.[6]

The Works Constitution Act (GWCA) ("Betriebsverfassungsgesetz") stipulates that any dismissal of which a works council has not been informed in advance is null and void. In addition, a firm has to continue to employ a worker whose dismissal has been opposed by the works council and who has filed a suit at the labour court until the case is settled (§ 102 GWCA). Moreover, § 112 GWCA defines specific rules for mass dismissals. In principle, employees can enforce a "social plan" which can include severance payments. If this is the case, often similar criteria determining the magnitude of severance pay are applied as in the case of individual dismissals, while future job prospects tend to play a greater role than in the case of individual dismissals (Hoyningen-Huene 2002, p. 371). Since works councils are not pervasive, in 2000 the regulations of the GWCA applied to 16.6% (15.4%) of the firms in West (East) Germany and 54.1% (47.1%) of all employees (Addison et al. 2003).

To summarise, EPL in Germany derives from a number of sources. Dismissed employees can only enforce their entitlements if they file a lawsuit. In general, a justified claim of an unlawful dismissal does not result in a reinstatement but a severance payment. However, severance payments due to court verdicts are rare. In 2003, 328,000 dismissal cases were settled at labour courts in Germany. Since roughly 50% of them resulted in severance payments (Pfarr et al. 2005, p. 71) and because there were roughly 4 Mill transitions from employment to unemployment,[7] the incidence of severance pay due to the involvement of labour courts, though not solely due to verdicts, does not exceed 4%. However, in our sample and also in other studies, a much greater fraction of dismissed employees obtains severance pay. This implies that such transfers often take place without labour courts being involved.

In principle, severance pay is taxed like any other income in Germany.[8] However, special rules are applied to payments resulting from outright dismissals or mutual agreements upon terminations of labour contracts initiated by the firm. The special rules have changed in the

[6] Cf. Hümmerich (1999), Löwisch (2004, p. 302), Spilger (2004, p. 659) and Hergenröder (2005, 1240 ff).

[7] See Statistik der Arbeitsgerichtsbarkeit (http://www.arbeitsgerichtsverband.de/Statistik%20ArbGe.htm) and Bundesagentur für Arbeit, 'Arbeitsmarkt in Zahlen', Inflows into unemployment from employment.

[8] Severance pay is exempted from social security contributions, as long as it is not a substitute for wages.

time period under consideration in the empirical part of our paper (1991-2003). Until the end of 1998, severance payments were exempted from income taxation up to a ceiling of 12,271 € (base category). The exemption level amounted to 15,339 € (18,407 €) for workers with at least 50 (55) years of age and a minimum tenure of 15 (20) years. Severance payments in excess of these exemptions were taxed at 50 % of the individual tax rate, which increases with income in Germany due to the progressive income tax system. Tax exemptions were reduced in 1999 by 33%, i.e. to 8,181 €, 10,226 € and 12, 271 € for the respective categories of employees. Moreover, severance payments are now taxed according to the "fifth-part rule". It stipulates that 20% of the payment in excess of the exemption is added to the income in the year of separation. The additional tax payment due to the inclusion of (20% of) severance pay is then multiplied by 5 to yield the total amount of taxes to be paid on the severance payment. Effectively, the reduction of exemption levels and the "fifth-part rule" raise the tax burden for those employees whose severance payments exceed the (new) exemption level.

III. Literature

There is a small but growing amount of theoretical and empirical literature which investigates the enforcement of EPL. If dismissals can be due to disciplinary and economic reasons, then EPL which differs for the two types of dismissal can affect the incentives of workers to provide effort in order to avoid a disciplinary dismissal. The labour market effects of EPL which restricts dismissals due to economic reasons but may for exogenous reasons be applied erroneously to disciplinary dismissals have been investigated by Levine (1989, 1991) and Carter and De Lancey (1997), for example. Galdón-Sánchez and Güell (2003) allow firms and workers to decide optimally about false declarations with respect to the cause of a dismissal. However, in these papers, the dismissal procedure, including a potential involvement of (labour) courts, is not examined.

Galdón-Sánchez and Güell (2004) combine their earlier investigation with an explicit model of the litigation process. They show that various equilibria can exist and analyze the relationship between the number of court cases and their outcomes on the one hand and the difference between the exogenously given levels of severance pay for economic and disciplinary dismissals on the other hand. Ichino et al. (2003) also present an explicit model of the litigation process against the backdrop of the Italian legal situation. They focus solely on disciplinary dismissals and assume that there are divergent expectations of the legal standard which justifies a dismissal for disciplinary reasons. Ichino et al. (2003) show that if the legal

[10] German legal scholars explicitly confirm this evaluation (see Dornbusch and Wolff 2004, p. 401).

standard applied by courts varies with the labour market situation, then court outcomes will reflect this situation, even if firms and workers anticipate the effect. Using data from personnel records of a large Italian bank, Ichino et al. (2003) find that courts are less likely to decide in favour of firms in high unemployment areas, even though misconduct by workers in these regions is more pronounced in their data. Malo (2000) models bargaining about payments in the case of individual dismissals in the context of the Spanish legal situation as a game of incomplete information about the firm's ability to pay.

In none of the above analyses the impact of uncertain court rulings on privately negotiated outcomes has been taken into account. In Germany, though, most dismissal cases are either settled before a lawsuit is filed or a verdict is reached. Thus, a pervading feature of German dismissal conflicts, namely that the level of employment protection is determined in the shadow of the law, is not reflected adequately.[10]

Our analysis is also related to empirical investigations of severance pay and dismissal protection. Grund (2004), for example, analyzes its determinants in Germany for a subgroup of all dismissed workers, also using the German Socio-Economic Panel. His main findings for a pooled data set for West and East Germany[11] are that tenure and firm size influence the incidence and the amount of severance pay (*incidence*: *27%; mean amount*: *9,200 €*) and that a notable fraction of dismissed workers who find an appropriate job afterwards, are "overcompensated" if wage gains in subsequent jobs are taken into account. Moreover, Frick and Schneider (1999) show that more inflows into unemployment raise the number of dismissal suits (see also Bertola et al. 1999). Hemmer (1997), on the basis of questionnaire data on social plans in the context of mass dismissals finds, inter alia, that the average severance payment was around 10,000 € and tended to increase with firm size. Finally, Riphahn (2004) finds a significant decrease in work effort, proxied by illness-related periods of absence, among German public sector employees once they have reached an age and tenure threshold which drastically reduces the likelihood of any kind of dismissal.

IV. Theoretical Model

IV. 1 Framework

EPL in Germany induces at least four outcomes subsequent to a dismissal: first, an employee accepts the dismissal and obtains no severance payment. Second, the employment relationship

[11] In our data set parameter homogeneity for West and East German workers is rejected by means of standard Wald-tests. This indicates that it is essential to analyze the determinants of severance pay in West and East Germany separately.

is terminated by a mutual agreement which can include a severance payment. Third, the employee challenges the acceptability of the dismissal, files a lawsuit and the conciliation proposal by the labour court settles the case. Finally, the employee challenges the acceptability of the dismissal, files a lawsuit and one party insists on a judgement. In order to generate all these situations as equilibrium outcomes, it is assumed that firm and employee - both assumed to be risk-neutral - may have incomplete information when taking a decision.

Initially, the player 'Nature' chooses the firm's costs α of making a voluntary severance payment offer. These costs vary between firms and stem from the interval $\alpha \in [0; \alpha^u]$, so that the costs of identical severance pay offers can differ. Only this interval is public information prior to the revelation of α. The assumption reflects the fact that a firm may derive a benefit from managing dismissals without this becoming publicly known, while another firm may want to build up a reputation of being tough on dismissed employees. Given the (public) knowledge about α, the firm decides whether to dismiss the employee without a severance pay offer or to offer a severance payment D^f, conditional on dissolving the employment relationship by mutual agreement, implying costs of $D^f + \alpha$.

Subsequent to a dismissal, the employee and the firm learn about the employee's costs k of filing a lawsuit, which are distributed on the interval $[0; k^u]$. Only this interval is public information prior to a dismissal. Costs k can include the time and monetary costs of obtaining legal advice and can, furthermore, relate to income losses in future jobs because of court proceedings. Given the costs k of filing a lawsuit, the employee decides whether to accept the employer's decision or to challenge it and file a lawsuit.

The employee, when deciding whether to file a suit, and the firm, when considering whether to offer a severance payment and if so, its magnitude D^f, have to base their decisions on the expected conciliation proposal or verdict of the labour court, since the legal evaluation of the case is not known when the respective decisions have to be taken. The expected value of the court's proposal or verdict is denoted by $E[D^c(x)]$, where E represents the expectations operator. The magnitude of the conciliation offer depends on the legal evidence and - predominantly in the case of business needs and operational reasons - on (a vector of) personal characteristics of the (former) employee. We summarise these individual-specific determinants of court-induced severance payments by a variable x. Expected severance pay $E[D^c(x)]$ stems from the interval $[0; \tilde{D}(x)]$, as it will be zero if the dismissal is socially justified and since it is bounded from above by the age- and tenure-related ceilings discussed in Section II.

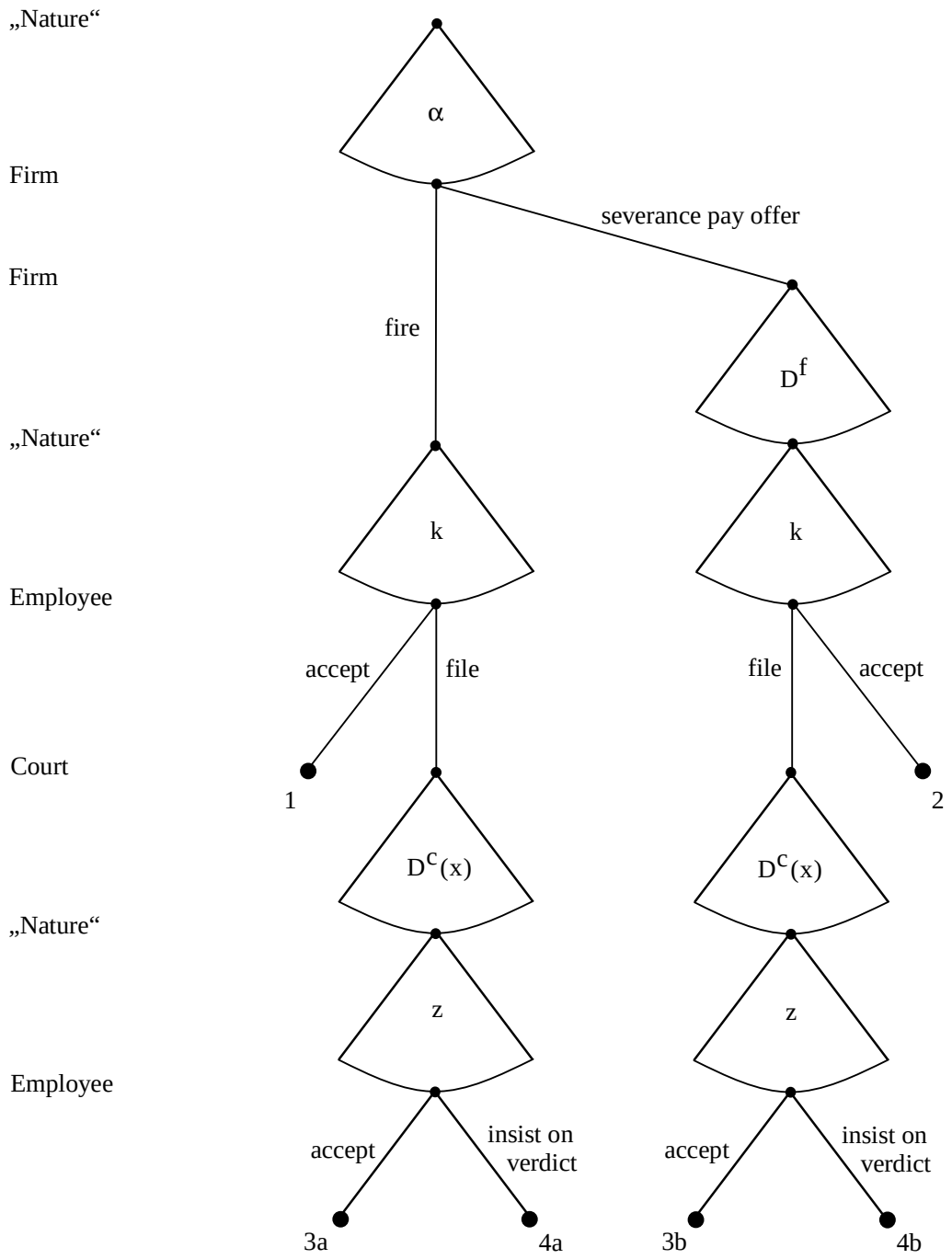
If the employee accepts the dismissal without being offered a severance payment, the respective payoffs for both parties will be (normalized to) zero. If the employee accepts the severance pay offer D^f, the firm's payoff will fall short of the payoff had it made no severance payment by an amount $D^f + \alpha$. Since severance payments will be subject to income taxation if their level exceeds the thresholds outlined in Section II, the employee's payoff exceeds the zero payoff by $D^f - T(D^f)$, where $T(D^f)$ depicts the (additional) tax burden, $0 \leq T(D^f) < D^f$, $0 \leq T' < 1$, $T'' = 0$. These assumptions allow for a non-linear tax system with a positive level of tax exemption and a constant tax rate which is applied to all payments in excess of the exemption level.

The employee's (firm's) costs of the conciliation phase are denoted by c^w (c^f), c^w, $c^f \geq 0$. These costs arise in addition to the employee's costs k of filing the case. For simplicity, we assume that the firm cannot make a further severance pay offer to prevent the lawsuit from taking place. Given the decision to go to court and the fact that courts rarely reinstate dismissed employees, the conciliation proposal is presumed to consist solely of a severance payment denoted by $D^c(x)$. Accordingly, at this stage the uncertainty about the legal evaluation of a dismissal is resolved. We take the court's conciliation proposal as a perfect predictor of an eventual verdict.

To generate court verdicts as equilibrium outcomes, we assume that employees derive a direct, non-monetary benefit from obtaining a judgement. It may result because an employee obtains utility from being confirmed in his/her interpretation of dismissal rules by a court. Alternatively, a verdict may be valuable for a trade union because it can be used as a legal argument in future cases. Any employee who partially internalises this trade union effect, will also derive a payoff from a verdict as such. We imagine that the (former) employee and the firm only learn about the value of a verdict subsequent to the conciliation proposal. The direct benefit is labelled z and varies across employees. It is distributed on the interval $z \in [0; z^u]$. The distributions of z and k are independent. The benefit of a verdict is the greater the more favourable the verdict is to an employee. Hence, the employee's gain from a verdict including a severance payment $D^c(x)$ is given by $D^c(x)(1 + z)$.[12]

[12] Since conciliation procedures usually occur shortly after a lawsuit is filed, while obtaining a verdict may take much longer, firms will have to continue to make wage payments for this time span if the court regards a dismissal as not socially justified and, hence, as void. Insisting on a verdict is, therefore, a potentially costly strategy for employers because wage arrears may be substantial.

Figure 1: Sequence of Decisions



Having learned about the gain from an actual verdict, the dismissed employee decides whether to accept the court's conciliation proposal or to insist on a verdict. If a mutual agreement takes place, the employee's payoff is given by $D^c(x) - T(D^c(x)) - k - c^w$. The employer obtains $-[D^c(x) + c^f]$ ($-[D^c(x) + c^f + \alpha]$), if no (a positive) severance pay offer has

been made (and rejected). Since a verdict raises the costs of a suit, the employee's payoff from rejecting a conciliation proposal is given by $D^c(x)(1 + z) - T(D^c(x)) - k - C^w$, where $c^w < C^w$. While legal costs will be likely to rise for the firm as well if the employee insists on a verdict, such a cost difference does not affect any subsequent result. Thus, the increase in costs is ignored and the firm's payoff amounts to $-(D^c(x) + c^f)$ or $-(D^c(x) + c^f + \alpha)$. The model is depicted in Figure 1.

IV.2 Optimal Behaviour

The model will be solved by backward-induction. Given a court proposal $D^c(x)$, a dismissed employee will require a verdict if $D^c(x)(1 + z) - T(D^c(x)) - k - C^w > D^c(x) - T(D^c(x)) - k - c^w$ holds. Hence, all employees characterised by a gain z from obtaining a verdict which exceeds a critical value z^{crit} will insist on a verdict, where z^{crit} is given by:

$$z^{crit} := \frac{C^w - c^w}{D^c(x)} \tag{1}$$

The probability that an employee is characterised by a direct benefit from a verdict which (weakly) exceeds the critical value is denoted by $P(z^{crit}) := Prob(z \geq z^{crit})$, where $P(z^{crit} \to \infty) = 0$ is presumed. The critical value z^{crit} will fall and, hence, the probability $P(z^{crit})$ of insisting on a judgement will rise, if the severance payment deemed appropriate by the court increases ($\partial P/\partial D^c > 0$).

Given the knowledge about the costs k of filing a lawsuit, but before the uncertainty about the court's evaluation of the case is resolved, an employee has to decide whether to contest the employer's decision or offer. Assuming an employee to be fired, the payoff from accepting the dismissal is zero, while the expected payoff of filing a suit amounts to E(Suit):

$$\begin{aligned} E(Suit) &= P(z^{crit})\left\{E[D^c(x)(1+\tilde{z}) - T(D^c(x))] - C^w - k\right\} \\ &\quad + (1 - P(z^{crit}))\left\{E[D^c(x) - T(D^c(x))] - c^w - k\right\} \\ &= -k + E[D^c(x)] - T(E[D^c(x)]) + P(z^{crit})[E[D^c(x)\tilde{z}(\cdot)] - C^w + c^w] - c^w \end{aligned} \tag{2}$$

Equation (2) utilises the assumption that the tax code is known to employees, implying $E[T(D^c(x))] = T(E[(D^c(x)])$. Given that an employee insists on a verdict, the value of z will

be greater than the critical value z^{crit} but less than its maximum z^u. Its expected value is labelled $\tilde{z}$, $\tilde{z} := E(z \mid z > z^{crit})$, where $\tilde{z}(\cdot) = \tilde{z}(C^w, c^w, D^c(x))$.

An employee will file a suit, given a dismissal without a severance pay offer, if E(Suit) is positive, i.e. if the value of k by which the employee is characterised falls below a critical value defined as:

$$k^{crit,f} := E[D^c(x)] - T(E[D^c(x)]) + P(z^{crit})[E[D^c(x)\tilde{z}(\cdot)] - C^w + c^w] - c^w \qquad (3)$$

We denote the probability that $k < k^{crit,f}$ and that an employee, given a dismissal without a severance pay offer, files a suit at a labour court by $Q^f(k^{crit,f}) := Prob(k < k^{crit,f})$. For $k^{crit,f} \leq 0$, $Q^f(k^{crit,f}) = 0$ is assumed. For given, positive costs C^w and c^w of a trial, the probability Q^f of an employee filing a suit subsequent to a dismissal without a severance pay offer will, thus, be zero if the expected severance payment $E[D^c(x)]$ is sufficiently low. Given $k^{crit,f} \geq 0$, the probability Q^f rises with the critical value of the costs of filing a suit, since it is more likely that k falls below the critical value ($\partial Q^f / \partial k^{crit,f} > 0$).

Assuming an employee to have been offered a severance payment, the payoff from accepting the dismissal amounts to $D^f - T(D^f)$. The expected payoff of filing a suit, given the offer, is E(Suit) (cf. equation (2)). An employee will file a suit, given a severance pay offer, if E(Suit) $> D^f - T(D^f)$, i.e. if the value of k is less than a critical value implicitly defined by:

$$B := k^{crit,s} - E[D^c(x)] + T(E[D^c(x)]) - P(z^{crit})\{E[(D^c(x)\tilde{z}(\cdot)] - C^w + c^w\} + c^w + (D^f - T(D^f)) = 0 \qquad (4)$$

The probability that $k < k^{crit,s}$ and an employee, given a severance pay offer D^f, files a suit at a labour court is denoted by $Q^s(k^{crit,s}) := Prob(k < k^{crit,s})$. For $k^{crit,s} \leq 0$, $Q^s(k^{crit,s}) = 0$ is assumed. Given $k^{crit,s} \geq 0$, the probability Q^s rises with the critical value of the costs of filing ($\partial Q^s / \partial k^{crit,s} > 0$). Moreover, for any given set of individual-specific characteristics x, $k^{crit,s} < k^{crit,f} = k^{crit,s} + (D^f - T(D^f))$ holds. As long as the probabilities Q^s and Q^f are positive, $Q^s < Q^f$ applies since the distribution of k underlying Q^s and Q^f is the same.

The firm when deciding whether to make a severance pay offer or not, compares the expected payoffs resulting from both courses of action. If the firm does not offer a severance payment and the employee refrains from filing a suit, the firm will incur no costs. If the employee files

a suit with probability Q^f, the expected severance payment will have to be made, while legal costs are incurred. The firm's expected payoff is denoted E(fire):

$$E(\text{fire}) = Q^f(k^{crit,f})[P(z^{crit})(-E[D^c(x)] - c^f) + (1 - P(z^{crit}))(-E[D^c(x)] - c^f)] \quad (5)$$

The firm's expected payoff of making a severance pay offer is denoted by E(sev). If the employee refrains from filing a suit, the firm will incur the costs of making the payment, while expected dismissal payments will have to be made if the employee files a suit with probability Q^s. Moreover, the costs of the legal procedure and the costs α of making an offer arise. The firm's expected payoff is, thus, given by:

$$E(\text{sev}) = -Q^s(k^{crit,s})\{E[D^c(x)] + c^f\} - (1 - Q^s(k^{crit,s}))D^f - \alpha \quad (6)$$

Assuming the firm to make a severance pay offer, its optimal value $D^{f*} > 0$ is defined by:

$$G := \frac{\partial E(\text{sev})}{\partial D^f} = \frac{\partial Q^s}{\partial D^f}\left[D^f - E[D^c(x)] - c^f\right] - (1 - Q^s) = 0 \quad (7)$$

Since $\partial Q^s/\partial D^f < 0$ holds from equation (4) and $\partial Q^s/\partial k^{crit,s} > 0$, the term in square brackets in equation (7) is negative. If there are no costs of court proceedings ($c^f = 0$), the optimal severance pay $D^{f*} > 0$ offered by the firm will be less than the expected value of the court's proposal $E[D^c(x)]$. However, $E[D^c(x)] < D^{f*}$ can also not be ruled out, and such a situation will be the more likely to arise, the higher the costs of court proceedings are.

For later use it is helpful to note that the optimal severance pay offer D^{f*} by the firm depends on the critical value $k^{crit,s}$ and vice versa. The second-order condition for a maximum of E(sev) will unambiguously be warranted if $\partial^2 Q^s/\partial(D^f)^2 = (1 - T')^2(\partial^2 Q^s/\partial(k^{crit,s})^2)$ is non-negative. Suppose that equation (7) uniquely defines an optimal, positive severance pay offer D^{f*}. The firm will then make this optimal offer D^{f*} if E(fire) < E(sev) applies, that is if:

$$\alpha < (Q^f - Q^s)\{E[D^c(x)] + c^f\} - (1 - Q^s)D^{f*} := \alpha^{crit} \quad (8)$$

We label the probability that $\alpha < \alpha^{crit}$ and a firm will make a severance pay offer by $A(\alpha^{crit}) := \text{Prob}(\alpha < \alpha^{crit})$. Given $\alpha^{crit} \geq 0$, the probability A rises with the critical value of the costs of making an offer ($\partial A/\partial \alpha^{crit} > 0$).

For particular values of the costs of making a severance pay offer α, the costs of filing a lawsuit k, and the gain from insisting on a verdict z, the game depicted above will have a unique subgame-perfect equilibrium. If there are many firms and employees, characterised by

different values of α, k, and z, all possible equilibria can be observed and interpreted as events which occur with a certain probability.

In Equilibrium 1, which will arise if $\alpha \geq \alpha^{crit}$ and $k \geq k^{crit,f}$ hold, the firm dismisses the employee without making a severance pay offer, while the employee does not contest the dismissal. The ex-ante probability of this equilibrium, i. e. the probability that such an equilibrium arises before the exact values of α, k, and z, or alternatively the fraction of dismissals characterised by this outcome become known, is $(1 - A)(1 - Q^f)$. The respective payoffs have been normalised to zero. If $E[D^c(x)] = 0$, because the dismissal is expected to be legally justified, implying the absence of a severance pay entitlement, the probabilities of filing a suit and of making a positive offer are zero ($Q^s = Q^f = A = 0$). Hence, for $E[D^c(x)] = 0$, only Equilibrium 1 can arise. The various equilibria, the requirements for and the probability of their existence and the resulting payoffs are summarised in Table 1.

Table 1: Equilibrium Outcomes

Equil.	Condition			Payoff for		Probability
	for α	for k	for z	Worker	Firm	
1	$\geq \alpha^{crit}$	$\geq k^{crit,f}$		0	0	$(1 - A)(1 - Q^f)$
2	$< \alpha^{crit}$	$\geq k^{crit,s}$		$D^{f*}-T(D^{f*})$	$-(D^{f*}+\alpha)$	$A(1 - Q^s)$
3a	$\geq \alpha^{crit}$	$< k^{crit,f}$	$< z^{crit}$	$D^c(x)-T(D^c(x))-k-c^w$	$-(D^c(x)+c^f)$	$(1 - A)Q^f(1 - P)$
3b	$< \alpha^{crit}$	$< k^{crit,f}$	$< z^{crit}$	$D^c(x)-T(D^c(x))-k-c^w$	$-(D^c(x)+c^f+\alpha)$	$AQ^s(1 - P)$
4a	$\geq \alpha^{crit}$	$< k^{crit,f}$	$\geq z^{crit}$	$D^c(x)(1+z)-T(D^c(x))-k-C^w$	$-(D^c(x)+c^f)$	$(1 - A)Q^fP$
4b	$< \alpha^{crit}$	$< k^{crit,f}$	$\geq z^{crit}$	$D^c(x)(1+z)-T(D^c(x))-k-C^w$	$-(D^c(x)+c^f+\alpha)$	AQ^sP

IV.3 Comparative Statics

The exogenous variables of greatest interest for our empirical analysis are the tax burden and the individual-specific characteristics which determine the admissibility of a dismissal. Our data does not allow us to distinguish between severance payments which result from an offer made by the firm or which are the outcome of court proceedings. To derive predictions which can be put to an empirical test from the theoretical model we, therefore, investigate whether, first, the probability of any kind of severance payment being made, i. e. the incidence, and second, its magnitude vary in a systematic manner with the exogenous variables.

The ex-ante (conditional) probability of a severance payment being made, given a positive expected payment suggested by the labour court, $E[D^C(x)] > 0$, is denoted by $\tilde{S}$:

$$\tilde{S} := 1 - (1 - A)(1 - Q^f) = Q^f + A - AQ^f \tag{9}$$

The probability S of obtaining a severance payment consists of the product of the probability of the court awarding a positive severance payment $E[D^C(x)] > 0$ denoted by Ψ, $\Psi :=$ (Prob($E[D^C(x)] > 0$)), and the (conditional) probability $\tilde{S}$, $S = \Psi \tilde{S}$. The impact of a change in any exogenous variable h on the probability S of obtaining a severance payment is given by:

$$\frac{\partial S}{\partial h} = \frac{\partial \Psi}{\partial h}\tilde{S} + \underbrace{\frac{\partial Q^f}{\partial k^{crit,f}}}_{>0}\frac{\partial k^{crit,f}}{\partial h}(1-A)\Psi + \underbrace{\frac{\partial A}{\partial \alpha^{crit}}}_{>0}\frac{\partial \alpha^{crit}}{\partial h}(1-Q^f)\Psi \tag{10}$$

Let the average level of severance pay, given a payment at all, be labelled $\overline{D}$:

$$\overline{D} := D^f * A(1-Q^S) + D^C(x)((1-A)Q^f + AQ^S) \tag{11}$$

Rearranging (11), we can express the impact of a change of an exogenous variable h on $\overline{D}$ as:

$$\frac{\partial \overline{D}}{\partial h} = \left(\frac{\partial D^f *}{\partial h} - \frac{\partial D^C(x)}{\partial h}\right)A(1-Q^S) + (D^f * - D^C(x))\left(\frac{\partial A}{\partial h}(1-Q^S) - A\frac{\partial Q^S}{\partial h}\right)$$

$$+ \frac{\partial D^C(x)}{\partial h}\tilde{S} + D^C(x)\frac{\partial \tilde{S}}{\partial h} \tag{12}$$

Subsequently, the consequences of the tax reforms described above and of different personal characteristics x on the incidence S and average level of severance payments $\overline{D}$ are analyzed.

Taxes (h = T, T ')

The change in tax laws in 1999 reduced the level of tax exemption and thereby increased the tax burden T, for a given marginal tax rate of T'. Moreover, the marginal tax rate T' was raised for most dismissed workers because of the introduction of the "fifth-part rule" (see above Section II). To analyze the impact of this tax reform, suppose that verdicts and conciliation proposals by labour courts are unaffected by tax laws. Moreover, employees and employers correctly expect this to be the case. These assumptions imply $\partial D^C/\partial h = \partial E[D^C]/\partial h = \partial \Psi/\partial h = 0$, for h = T, T', and can be justified insofar as that the PaDA and the legal discussion almost exclusively refers to severance payments as being a function of gross wages. The assumption

of $\partial D^c/\partial h = 0$ entails $\partial z^{crit}/\partial h = 0$ from equation (1) and $\partial P(z^{crit})/\partial h = \partial \tilde{z}(\cdot)/\partial h = 0$. Thus, the expected value $E[D^c(x)\,\tilde{z}(\cdot)]$ is constant.

As a first step to evaluate the change in the critical value α^{crit} which determines the probability of a firm's severance pay offer, the variations in $k^{crit,s}$ and D^{f*} have to be computed, bearing in mind that the two variables are determined jointly. Differentiation of equations (4) and (7) with respect to $k^{crit,s}$ and D^{f*}, taking into account that Q^s is a function of D^{f*} only via $k^{crit,s}$, yields $\partial B/\partial k^{crit,s} = 1$, $\partial B/\partial D^{f*} = 1 - T'$ and:

$$\frac{\partial G}{\partial k^{crit,s}} = -\frac{\partial^2 Q^s}{\partial (k^{crit,s})^2}(1-T')[D^{f*} - E[D^c(x)] - c^f] + \frac{\partial Q^s}{\partial k^{crit,s}}, \qquad (13)$$

since $\partial Q^s/\partial D^{f*} = -(1 - T')\partial Q^s/\partial k^{crit,s}$ and

$$\frac{\partial G}{\partial D^{f*}} = -\frac{\partial Q^s}{\partial k^{crit,s}}(1-T') < 0\,. \qquad (14)$$

The determinant of this system is given by:

$$\det := \frac{\partial B}{\partial k^{crit,s}}\frac{\partial G}{\partial D^{f*}} - \frac{\partial B}{\partial D^{f*}}\frac{\partial G}{\partial k^{crit,s}} = 2\frac{\partial Q^s}{\partial D^f} + \frac{\partial^2 Q^s}{\partial (D^f)^2}[D^{f*} - E[D^c(x)] - c^f] < 0 \qquad (15)$$

Since from (4) and (7) $\partial B/\partial T = \partial G/\partial T = 0$, and using ($\partial E[T(D^c(x)]/\partial T = \partial T(D^{f*})/\partial T = 1$), a higher tax burden does not affect the critical value $k^{crit,s}$ and the optimal severance pay offer D^{f*}, implying $dk^{crit,s}/dT = dD^{f*}/dT = 0$. From equation (3), the impact of a change in T on the probability $Q^f(k^{crit,f})$ of filing a suit, given no offer from the firm, yields:

$$\frac{\partial Q^f}{\partial T} = \frac{\partial Q^f}{\partial k^{crit,f}}\frac{\partial (E[D^c(x)] - T(E[D^c(x)])}{\partial T} = -\frac{\partial Q^f}{\partial k^{crit,f}} < 0 \qquad (16)$$

Piecing the above findings together yields:

$$\frac{\partial \alpha^{crit}}{\partial T} = \frac{\partial Q^f}{\partial T}\left\{E[D^c(x)] + c^f\right\} < 0 \qquad (17)$$

From equations (10), (16), (17) and $\partial \Psi/\partial T = 0$ we obtain:

Proposition 1

An equal increase in the tax burden T for all severance payments reduces their incidence S.

A higher tax on severance payments reduces the probability of an employee filing a suit, given no severance pay offer and, therefore, also lowers the probability that the firm makes an offer at all. The probability that an employee files a suit, having been given an offer, however, is not affected by a variation in the tax burden, because gross payments achieved via court proceedings or due to a firm's offer are reduced by the same amount. In sum, the overall probability of obtaining a severance payment is reduced.

Focussing on the effects of a higher marginal tax rate T', for a given level of taxes T, we obtain $\partial B/\partial T' = 0$ from equation (4). Moreover, the impact of a change in T' on the probability $Q^f(k^{crit,f})$ of filing a suit, given no offer from the firm, is found to be zero, since $k^{crit,f}$ only depends on the level of taxation. Equation (8) then yields $\partial\alpha^{crit}/\partial T' = (\partial D^{f*}/\partial T')G = 0$ and - in conjunction with equation (10) - gives rise to:

Proposition 2

A rise in the marginal tax rate T' for severance payments does not alter their incidence S.

An increase in the marginal tax rate has no level impact. Thus, for a given level of severance payments offered by the firm, the critical values of the costs of filing a lawsuit remain unaffected by such a tax reform. However, a given increase in severance pay will yield a smaller reduction in the probability of a worker accepting this offer than before the tax rate change since the worker's net gain has decreased (at the margin). Therefore, the firm's optimal offer D^{f*} declines. Since the expected severance payment obtained due to a labour court procedure is unaffected, a dismissed worker's incentive to file a suit - given a (reduced) offer - increases. Since the tax reform only alters marginal incentives, the two countervailing effects exactly cancel each other out. The firm's incentives to offer a severance payment remain unaffected.

As to the average level of severance payments, $\partial Q^s/\partial T = \partial D^{f*}/\partial T = 0$, $\partial A/\partial T$, $\partial Q^f/\partial T$, $\partial \tilde{S}/\partial T < 0$ result from the assumption that $\partial D^c/\partial T = 0$, the definition of Q^s, as well as from equations (16) and (17). Making use of these effects in equation (12) yields:

$$\frac{\partial \overline{D}}{\partial T} = (D^{f*} - D^c(x))\frac{\partial A}{\partial T}(1 - Q^s) + D^c(x)\frac{\partial \tilde{S}}{\partial T} \qquad (18)$$

Thus, average severance payments $\overline{D}$ will decline with a higher tax burden T if $D^{f*} \geq D^c(x)$. Otherwise the change in average severance payments is ambiguous. This is summarised in:

Proposition 3

An equal increase in the tax burden T for all severance payments will reduce their average level $\overline{D}$ if $D^{f*} \geq D^{c}(x)$.

The level of severance payments either offered by firms or due to a court procedure is unaffected by the change in the level of taxation. Therefore, the variation in the average amount of severance payments results from a shift in their composition. Rewriting equation (11) yields $\overline{D} = D^{f*}A(1 - Q^{s}) + D^{c}(x)[A + Q^{f} - AQ^{f} - A(1 - Q^{s})]$. The probability that the firm offers a payment ($\partial A/\partial T < 0$) declines, while the probability Q^{s} of filing a suit, given an offer from the firm, remains unaffected by the change in tax laws. Accordingly, the probability $A(1 - Q^{s})$ of receiving a severance payment owing to an offer from the firm shrinks. Furthermore, the probability Q^{f} of filing a suit, given no offer from the firm, decreases (cf. equation (16)). Therefore, the probability of obtaining a court-induced severance payment $[A + Q^{f} - AQ^{f} - A(1 - Q^{s})]$ rises or falls by less than the probability $A(1 - Q^{s})$ of receiving a severance payment owing to an offer from the firm. Accordingly, not only the overall probability of severance payments declines but also a greater fraction of severance payments results from court cases in which workers have contested a dismissal without having been offered a payment previously. If severance payments offered by the firm are not lower than those due to court proceedings ($D^{f*} \geq D^{c}(x)$), the greater (relative) probability of receiving severance pay due to a court's involvement will unambiguously reduce average severance payments. Employees obtain severance payments with a smaller probability and those payments which they receive with a higher (relative) probability are lower.

A higher marginal tax rate T', holding constant the tax level T, raises the critical value of k, thereby increasing the probability Q^{s} of a suit being filed, subsequent to a firm's offer, while it lowers the firm's optimal offer.

$$\frac{dk^{crit,s}}{dT'} = \frac{\frac{\partial G}{\partial T'}\frac{\partial B}{\partial D^{f}*}}{det} = \frac{\frac{\partial Q^{s}}{\partial k^{crit,s}}\left[D^{f} - E[D^{c}(x)] - c^{f}\right](1 - T')}{det} > 0 \qquad (19)$$

$$\frac{dD^{f}*}{dT'} = \frac{-\frac{\partial B}{\partial k^{crit,s}}\frac{\partial G}{\partial T'}}{det} = -\frac{\frac{\partial Q^{s}}{\partial k^{crit,s}}\left[D^{f} - E[D^{c}(x)] - c^{f}\right]}{det} < 0 \qquad (20)$$

Since the probabilities A of an offer being made and Q^{f} of filing a suit will be unaffected if the firm has not made an offer, the change in the average severance payment is given by:

$$\frac{\partial \overline{D}}{\partial T'} = \frac{\partial D^{f*}}{\partial T'} A(1 - Q^{s}) - (D^{f*} - D^{c}(x)) A \frac{\partial Q^{s}}{\partial T'} \tag{21}$$

This yields:

Proposition 4

Average severance payments will decline with the marginal tax rate T' if $D^{f*} \geq D^{c}(x)$.

A higher marginal tax rate induces the firm to lower its offer ($\partial D^{f*}/\partial T' < 0$). Thus, fewer offers are accepted and more are contested at labour courts ($\partial Q^{s}/\partial T' > 0$). If the severance payment $D^{c}(x)$ which an employee possibly gains from rejecting the offer D^{f*} falls short of this offer ($D^{c}(x) < D^{f*}$), the (expected) payment due to a rejection of a firm's offer and a labour court procedure will decline because the expected payment subsequent to not receiving an offer remains constant. This is the case as the probability of filing a suit is solely a function of (tax) level variables. Accordingly, the decline in the firm's offer and the greater probability of obtaining a (lower) court induced payment entail a decline in average severance pay.

Individual-specific Characteristics (h = x)

Whether a dismissal is socially justified under the PaDA may depend on (a vector of) personal characteristics of the employee. Moreover, the magnitude of severance pay which results from a conciliation procedure or a court verdict is commonly argued to be determined by the same or further personal characteristics. In the model under consideration, such personal characteristics can, hence, affect the probability ($1 - \Psi$) that the expected severance pay due to a labour court procedure is zero since a dismissal has been socially justified. In addition, the expected severance payment $E[D^{c}(x)]$ can vary with personal characteristics. Therefore, we assume that the variable x depicts a personal trait of an employee which makes a dismissal less likely to be socially justified and/or raises court-induced severance payments, given that the dismissal is not socially justified, implying $\partial\Psi/\partial x$ and $\partial D^{c}/\partial x > 0$.

Unless further structure is imposed on $\partial E[D^{c}(x)\,\tilde{z}\,)]/\partial x$, the impact of a variation in x on the probabilities Q^{s} and Q^{f} of filing a suit cannot be determined. If, however, the direct gain from a court verdict z is distributed uniformly on the interval $[0; z^{u}]$, it can be shown (see appendix) that a change in the personal characteristics of a (former) employee, which raise the expected severance payment which this worker would obtain in a labour court proceeding, alters the probability A that a firm offers a severance payment in an uncertain manner.

Basically, there are three effects of a rise in x which increase the probability of a positive offer from the firm: first, the probability that a worker contests a dismissal in court will rise more strongly if no severance payment has been offered than in a setting with a positive offer from the firm ($\partial Q^f/\partial x > \partial Q^s/\partial x$). Thus, making a positive offer becomes c. p. more attractive to the firm. Second, the court-induced severance payment $D^c(x)$ will have to be paid with a greater probability if the firm has not made an offer ($Q^f > Q^s$), and refraining from making an offer becomes c. p. less attractive. Third, the increase in costs due to filing a suit will be less if an offer has been made than in a situation in which no offer has been put forward ($E[D^c(x)] + c^f > E[D^c(x)] + c^f - D^{f*}$). This is the case since the optimal offer D^{f*} rises, so that there is also a countervailing influence. Collecting the various effects of a variation in x clarifies that the incidence of severance pay S is likely to rise with x, particularly so, as the probability Ψ that a labour court awards any severance pay at all also increases with x. The finding may be summarised as:

Proposition 5

Assume that the direct gain z from a court verdict is uniformly distributed and that an individual-specific characteristic x raises the probability of a dismissal not being justified or of severance payments being awarded by labour courts. Then the incidence of severance payments will rise with this personal characteristic if the probability of the firm making a positive severance pay offer does not decline.

Proposition 5 implies that while a positive correlation between the incidence of severance pay and, for example, an employee's tenure is likely to exist, there is one repercussion which may prevent such a relationship in the model. If severance payments awarded or suggested by courts rise and become more likely, also the optimal severance pay offer made by the firm increases and such an offer becomes less likely. If the increase in the probability of filing a suit, subsequent to having received no offer, is not high enough, the fraction of employees who are dismissed without severance pay offer and do not contest their dismissal may increase sufficiently to lower the overall probability of obtaining a severance payment.

The average level of severance payments is affected by an alteration of the variable x in a multitude of ways. First, the probability A of obtaining a firm's offer will change. For a uniform distribution of the direct gain from a verdict, moreover, the probability Q^s of rejecting this offer and filing a labour court suit increases (see appendix). Furthermore, the probability Q^f of filing a suit, subsequent to having been dismissed without a severance pay

offer, goes up. Finally, the magnitude of the firm's offer D^{f*} relative to what a court will suggest or award $D^{c}(x)$ cannot be determined. This yields:

Proposition 6

Personal characteristics x which c. p. raise severance payments awarded by labour courts do not necessarily increase their average level.

The comparative static effects of the model outlined in this section may be summarised as follows: the change in tax laws in 1999 reduces the incidence of severance payments and is likely to lower their average level. An employee with a more 'severance pay prone' set of personal characteristics, such as greater tenure, higher age or more extensive alimony duties, is likely to obtain higher severance payments with a greater probability.

V. Data and Empirical Specifications

Data

Our empirical analysis is based on the German Socio-Economic Panel (GSOEP), which is a nationally representative longitudinal data set for Germany (Wagner et al. 1993, SOEP Group 2001). We analyze data for the years 1991 to 2003 for West Germany drawn from survey waves from 1991 up to 2004. Our analysis is restricted to a sample of employees who experienced the following types of separation from their employers: “closure of the firm” (a), “layoffs” (b), “quits” (c) and “mutual agreements” (d). The respective information on the type of job termination has been provided by the employee.[13] Employees who left their jobs for (early) retirement or due to the phasing-out of temporary employment, self-employed as well as civil servants are excluded. Moreover, in the regression analysis, all respondents with missing information on relevant variables are dropped. This leads to a sample of N = 4721 for the descriptive analysis and of N = 2887 for the regression analysis.[14] Weighting factors delivered with the survey are used in all empirical exercises to account for the sampling design of the different subsamples of the GSOEP as well as for panel attrition.

Information on severance pay stems from a time invariant question on the incidence and – conditional on incidence – the amount of severance pay.[15] As mentioned above, it is not

[13] Note that the questionnaire does not include all types of separations in every single year of the survey. In 1991-1998 only data on the categories (a)-(c) was collected, in 1999-2000 only data on the categories (b)-(d) was gathered and in 2001-2004 data on all categories was obtained. Multiple answers are allowed in some years, but are of no relevance in our sample.

[14] Some of the covariates are not available in every single year of the GSOEP. To check the robustness of our results, we also use an empirical specification which relies only on information that is always available.

[15] The CPI is used to calculate real severance payments (base year 2000).

possible to distinguish whether the payment results from a firm's offer (D^{f*}) or a labour court suit ($D^{c}(x)$). To model the impact of EPL, judicial enforcement, and taxation on the incidence and amount of severance pay, we generate information along the criteria derived from the PaDA, used by labour courts, and extracted from tax laws.

The variables included in the regression analysis are the (log of the) previous monthly gross wage, tenure in the last job, three dummies for (i) alimony duties, (ii) children living in the household and (iii) disability, firm size, information on absenteeism, the type of job termination and an indicator of individual future job prospects. The latter is generated from subjective information on their own labour market prospects which employees provide in the year before they actually lost their job. The corresponding question in the survey is "If you lost your job today, would it be easy, difficult, or almost impossible for you to find a new position which is at least as good as your current one?" with the answers "easy", "difficult" and „impossible". Employees who answer "difficult" or "impossible" are more likely to have to face periods of unemployment subsequent to the job termination. Moreover, we utilise the change in taxation in 1999. In particular, we analyze whether the two age/tenure groups with greater tax exemptions exhibit different patterns of the incidence and amount of severance pay over time, compared to the group of employees with the lowest level of tax exemption. Further variables included are regional unemployment rates (at the level of the "Bundesländer" (*federal states*)), age, dummy variables for gender, part-time work, foreigners, white collar workers, variable pay and unpaid overtime, a linear time trend, as well as sets of industry dummies and regional dummies ("Bundesländer").

Empirical Specifications

To assess the impact of the decision criteria defined by law and/or used by labour courts on the incidence of severance pay, we use a weighted linear probability model (LPM). Within the LPM-framework we are able to estimate the causal effect of taxation on the incidence of severance pay by means of a DID specification,[16] making use of the reduction in the level of tax exemptions as well as of the change in the marginal tax rate. To do so, we include a time dummy for the period 1999 – 2003 as well as dummies for the two older age/tenure-groups (≥ 50 years of age/≥ 15 years of tenure, respectively ≥ 55 years of age/≥ 20 years of tenure) in the regression. The parameter estimates of the interactions of the age/tenure-dummies and the time dummy for 1999-2003 indicate whether there is a causal effect of taxation on the

[16] See e.g. Blundell and Costa-Dias (2002) for a discussion of the assumptions of the DID estimator.

incidence of severance payments. To check the robustness of our results we additionally present the estimated parameters of a weighted probit model.

Considering the determinants of the amount of severance payments in West Germany, we employ three different empirical specifications. The first is the so called "two-part" model (e.g. Duan et al. 1983), the second is an “inverse probability weighted” (IPW) estimation approach, and the third is the classical Heckman sample selection approach. The "two-part" model in our case is simply a weighted least square estimator for the subsample of observations with positive amounts of severance pay using the GSOEP weights. If the data are missing completely at random (MCAR), the "two-part" model will lead to consistent parameter estimates as well as to correct inferences.

The “inverse probability weighted“ (IPW) estimation approach (Wooldridge 1999, 2002a/b, 2003, Robins and Rotnitzky 1995)[17] takes into account sample selection as well as panel attrition issues. In particular, considering our pooled sample of employees with job terminations we have to deal with two sample selection problems. The first one is due to the design of the GSOEP. Our observations stem from different samples (A-F) of the GSOEP with design-based varying sampling probabilities. Moreover, the observations exhibit different patterns of participation in the panel. The (estimated) survey weights delivered with the GSOEP take these issues into account within a Horvitz and Thompson (1952) framework (cf. Pannenberg et al. 2004). Essentially, the inverse of the individual weighting factor is the probability of participating in the survey $P(S_T = 1)$ in a given year T:

$$\begin{aligned} P(S_T = 1) &= P(D = 1, R_1 = 1, C_2 = 1, ..., C_T = 1, R_T = 1) \\ &= P(D = 1) * P(R_1 = 1 | D = 1) * \\ &\quad P(C_2 = 1 | R_1 = 1,\ D = 1) * P(R_2 = 1 | C_2 = 1,\ R_1 = 1,\ D = 1) * ..... * \\ &\quad P(R_T = 1 | C_T = 1, ..., C_2 = 1, R_{T-1} = 1, ..., R_1 = 1,\ D = 1) \end{aligned} \tag{22}$$

where $S_T = 1$ indicates selection in year T of the GSOEP, $D = 1$ indicates survey design selection, $C_t = 1$ indicates contact with the interviewer in year t and $R_t = 1$ a response in year t. The probabilities of response and contact in every single year are estimated by means of logit models at the household level, with conditioning variables f_{it}, H_{it-1} focusing on the field work (f_{it}) available for every household, independent of a response in the particular year and on household information in t-1 (H_{it-1}). $P(D = 1)$ is determined by the survey design.

[17] In the evaluation literature the IPW is called “propensity score weighting” (e.g. Hirano and Imbens 2001).

The second sample selection problem we have to deal with is that of non-random selection into severance pay. We tackle this issue by calculating the probability of receiving severance pay $P(SVP_{it}=1|Z_{it})$, with $SVP_{it}=1$ indicating the receipt of severance pay and Z_{it} the covariate vector used in the estimation from our weighted probit estimation mentioned above. The fitted probabilities $P(SVP_{it}=1|Z_{it})$ are combined with the fitted survey selection probabilities $P(S_T=1)$ to calculate the overall selection probabilities. The inverses of these fitted probabilities are then used in a weighted least squares estimator. Under the key assumption that selection is ignorable, the adopted IPW approach identifies the population parameters of interest. The ignorability assumption[18] required in our specific case is that, conditional on the sets of covariates which are used to estimate the two selection probabilities, selection is ignorable with respect to severance pay (Wooldridge 2002a/b, 2003). Moreover, Wooldridge shows that under the ignorability assumption the IPW estimator is consistent and the estimated standard errors lead to "conservative inference" when we ignore the fact that the probabilities used to calculate the weights are estimated.

The IPW estimator relies on "selection on observables". To take into account the "selection on unobservables", i.e. to allow for correlation of selection and the part of severance pay that cannot be explained by the vector of conditioning variables, we adopt a weighted version of the standard Heckman sample selection model (two-step as well as ML-estimation) in our third empirical specification. Although we do not need an exclusion restriction in the Heckman framework from a technical point of view, since identification is given due to the non-linearity of the inverse Mills ratio, we use information on whether the respondent prefers the Social Democratic Party (SPD) as an exclusion restriction in our empirical specification to identify the parameters of interest. The underlying argument is that partisans of the Social Democrats are more willing to file a lawsuit than supporters of other political parties. Ceteris paribus, they therefore have a higher probability of receiving severance pay because the SPD usually tends to strengthen the rights of employees in law cases. However, political preferences of employees clearly have no impact on the magnitude of severance pay awarded by labour courts. In all three empirical specifications, we include the DID specification to analyze the causal impact of taxation on the amount of severance pay.

[18] The ignorability assumption is basically equivalent to the "conditional independence assumption" (CIA) or "(*weak*) unconfoundedness assumption" in the evaluation literature as well as to the "missing at random assumption" (MAR) in the sample survey literature on nonresponse. [19] A recent survey of labour courts confirms this factor for proceedings in courts of the first instance and reveals a factor of about 0.8 for courts of appeal (Pfarr et al. 2005, p. 74)

VI. Results

Descriptive Evidence

Table 2 reveals that 12 % of all employees with job terminations received severance pay. The incidence of severance pay in the case of closure (27%) is the highest, followed by mutual agreements (25%) and layoffs (21%). If employees quit, severance pay will hardly be observed (1%). The average amount of severance pay is 12,878.76 € (median 6,769.83 €). It is highest in the case of mutual agreements (roughly 18,500 €), followed by closures (roughly 16,900 €) and trailed by quits and layoffs with around 10,000 €.

Table 2: Descriptive Statistics: Severance Pay in West Germany 1991 – 2003

Severance Pay	*All*	*By Type of Job Termination*			
		Closure	*Layoffs*	*Quits*	*Mutual Agreements*
Incidence	0.12	0.27	0.21	0.01	0.25
Amount (*€, mean*)	12878.36 (*median:6769.83*)	16850.76	9520.73	10630.11	18510.92
Severance Pay Factor	0.67	0.78	0.60	0.58	0.76

Source: GSOEP. N=4721. Weights are used. Severance Pay factor (SVP_F) is calculated as SVP_F = {real amount of severance pay / [real monthly gross wage last job * tenure (in years) last job]}.

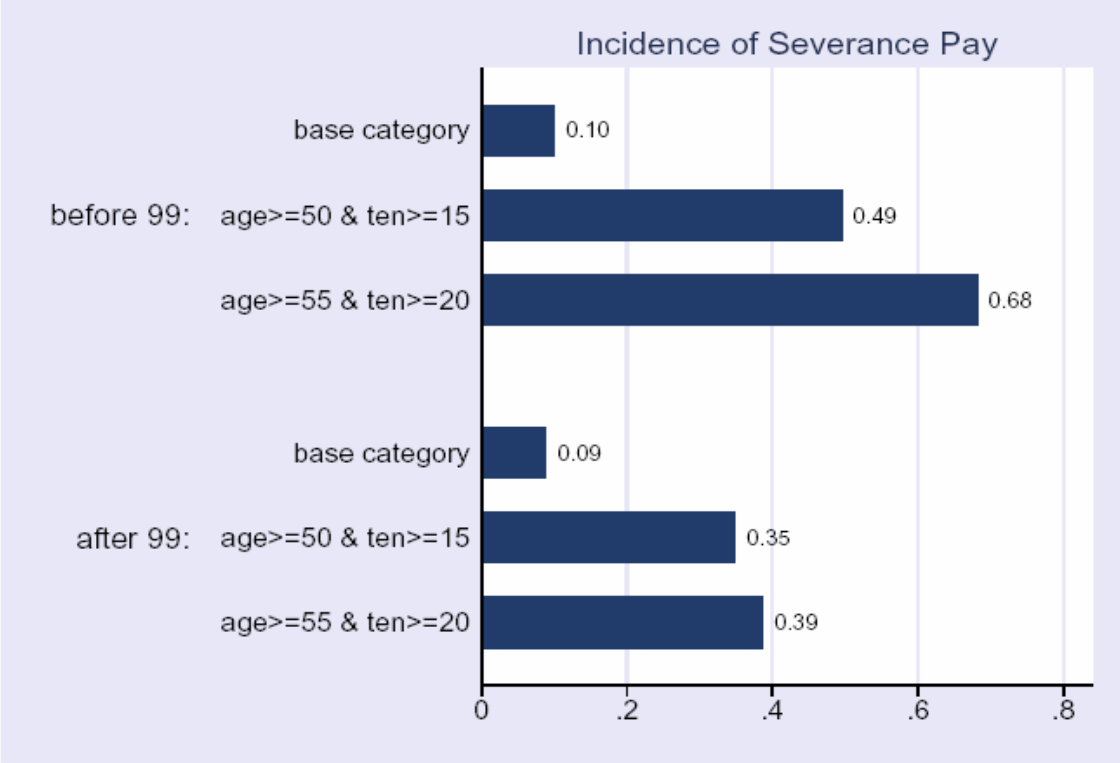
A first descriptive test of whether legal regulations play a role in the determination of severance payments is to calculate the percentiles of severance pay which are just beyond the upper limits defined by the PaDA for the different age groups. If we do so for the group of workers at the age of less than 50 years or the age of more than 50 years but tenure less than 15 years (base category), for whom the PaDA establishes a maximum severance payment of 12 monthly gross wages, we will observe the 94^{th} percentile of p94 = 11. Considering the group of workers with at least 50 years of age and 15 years of tenure (the defined limit by the PaDA equals 15 monthly gross wages), we get the 94^{th} percentile of p94 = 14.81. With respect to the group of workers with at least 55 years of age and 20 years of tenure (the defined limit by the PaDA is 18 monthly gross wages), we obtain a 89^{th} percentile of p89 = 17.58. Hence, there is evidence that the upper limits of severance pay defined by the PaDA have an impact on the overall magnitude of severance pay in West Germany.

Further descriptive insights into whether judicial enforcement of EPL has an impact on the incidence and average amount of severance payments can be obtained by calculating the so-

called severance pay factor. According to the survey by Hümmerich (1999), 75% of labour courts apply the formula "severance pay = 0.5 * tenure in the last job * last monthly gross" wage as a foundation, implying a severance pay factor of 0.5.[19] In our sample we observe a severance pay factor of 0.67 which suggests that bargaining about severance payments takes into account the expected court decision and the costs of a trial (cf. Table 2). Differentiating according to the type of termination, we obtain severance pay factors for closures or mutual agreements in the range of 0.8, while those for layoffs or quits are markedly lower (~ 0.6).

To assess the impact of tax laws on the incidence and the amount of severance pay we use the change in taxation which became effective at the beginning of 1999. Figure 2 displays the incidence of severance pay for the three age groups with different amounts of tax exemptions before and after the change in the law. The decline in the incidence of severance pay for all age groups is striking. Moreover, the reduction is more pronounced for the two older age groups (~ -30% respectively ~ -40%) than for the base category (~ -10%).

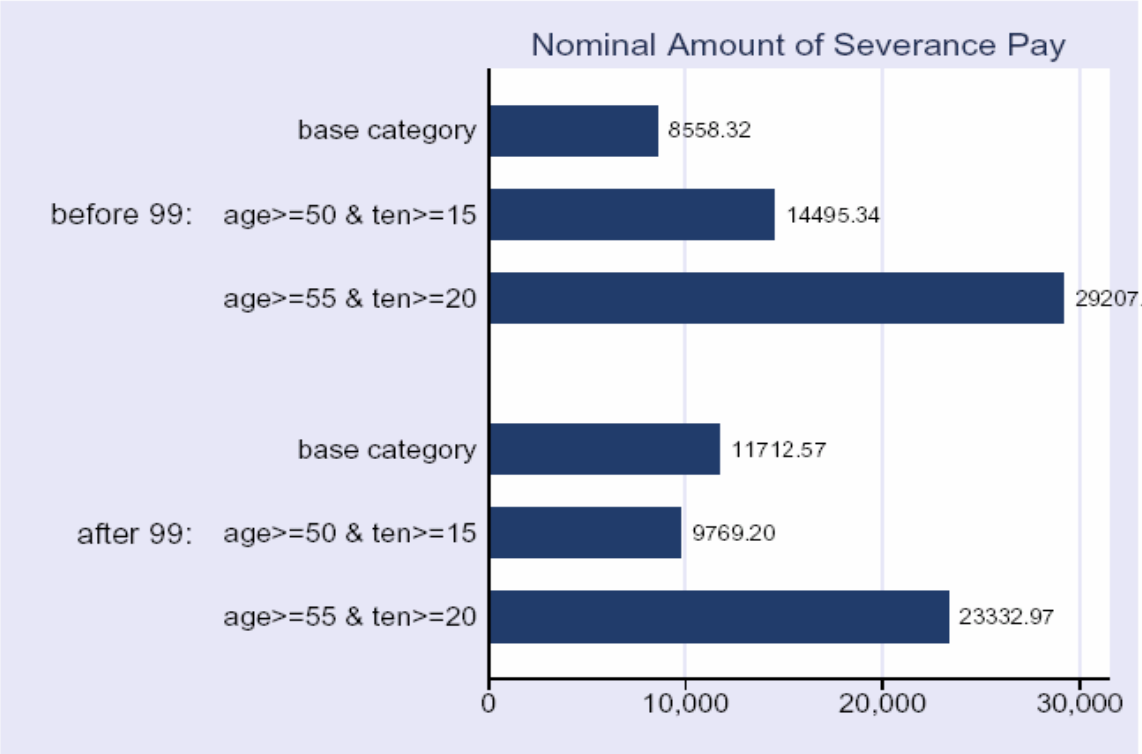
Figure 2: Incidence of Severance Pay



If we look at the amount of nominal severance pay for the three age groups before and after the change in tax law (Figure 3), the picture is slightly different. We observe a sharp reduction

for the two older age groups which experienced a stronger absolute decline in the level of tax exemption, while the base category experienced an increase in nominal severance pay.

Figure 3: *Nominal Amount of Severance Pay*



Incidence of Severance Pay

Table 3 displays the results of the estimates of the LPM as well as of the probit model. With respect to the criteria originating from the PaDA, we observe that tenure with the last employer, alimony duties and firm size have a significant effect on the probability of receiving severance pay. If we calculate the marginal effects for tenure and alimony duties in the probit model, we see that 10 years of tenure with the last employer increase the probability of obtaining severance pay by 2 percentage points while the existence of alimony duties increases the probability by 3 percentage points. Moreover, workers of small firms not covered by the PaDA have a 4 percentage points lower probability of receiving severance pay compared to workers in firms with more than 2000 employees (*reference category*). Using Wald-tests, we can reject the hypothesis that this negative firm size effect is equal across size groups for both specifications. Hence, workers of firms which are not covered by the PaDA, c. p. have the lowest probability of receiving severance pay.

Table 3: Incidence of Severance Pay in West Germany 1991 - 2003

	Linear Probability Model (LPM)		*Probit Model*	
	$\hat{\beta}$	*Std.-Err.*	$\hat{\beta}$	*Std.-Err.*
Tenure with last employer	0.008**	0.002	0.040**	0.010
Alimony	0.071*	0.034	0.347*	0.170
Age	0.001	0.001	0.002	0.006
Disabled worker	-0.009	0.030	-0.070	0.171
Household with children	-0.001	0.016	-0.054	0.113
Firm size: X < 5 employees	-0.169**	0.024	-1.947**	0.322
Firm size: 5 <= X < 20 employees	-0.091**	0.023	-0.683**	0.165
Firm size: 20 <= X < 200 employees	-0.058*	0.024	-0.387**	0.148
Firm size: 200 <= X < 2000 employees	-0.001	0.030	0.028	0.156
Monthly Real Wage last job (log)	0.055**	0.020	0.467**	0.156
Years 1999 – 2003 (a)	-0.037	0.037	-0.503+	0.295
Age-Group: >= 50 and tenure >= 15 (b)	-0.211	0.135	-1.177*	0.557
Age-Group: >= 55 and tenure >= 20 (c)	0.275**	0.129	0.689	0.480
Interaction of (a) and (b)	0.221	0.176	1.098	0.668
Interaction of (a) and (c)	-0.350*	0.142	-1.249*	0.510
Hard/Impossible to find a job again	0.011	0.015	0.101	0.133
Regional unemployment rate	0.011*	0.004	0.069*	0.031
Change amount of variable pay last job	0.4-05	0.4-05	0.1-04	0.1-04
Change amount of variable pay * mutual agreement	0.2-04**	0.6-05	0.8-04**	0.2-04
Continuously sick more than 6 weeks	0.055	0.036	0.461**	0.170
Unpaid Overtime	0.053+	0.027	0.388*	0.154
Closure	0.199**	0.031	1.653**	0.171
Layoff	0.171**	0.018	1.631**	0.152
Agreement	0.190**	0.041	1.618**	0.188
Prefers Social Democrats (*SPD*)	0.100**	0.038	0.571**	0.205
Male	-0.042*	0.020	-0.317*	0.131
Foreigner	0.006	0.026	0.026	0.163
Part-time	0.006	0.025	0.003	0.192
White collar worker	0.006	0.018	-0.023	0.141
Apprenticeship	-0.011	0.022	-0.009	0.147
University degree	-0.051	0.036	-0.296	0.236
Linear time trend	0.004	0.005	0.057	0.040
Number of Observations	2887		2887	
Wald_X (dof)	353.76 (*44*)**		325.13 (*44*)**	
(Pseudo)- R2	0.275		0.386	

Source: GSOEP. Weights are used. Standard errors are robust.
Sets of industry dummies and federal state dummies are included.
Wald_X: Wald – Test with H_0: no joint significance of all regressors.

The real monthly wage of the last job, which is used in the severance pay formula, has a significantly positive impact on the likelihood of severance pay. The estimated parameters for the three types of termination "closure", "layoff" and "mutual agreement" are significantly positive (*reference category: "quit"*). Given the test-statistic of a Wald-test, we cannot reject the hypothesis that the estimated parameters are of equal size. Hence, we find evidence for the comparative static properties of our model that important decision criteria provided by law or enforced by courts, like tenure, alimony duties or firm size, have an impact on the incidence of severance pay in Germany. This result indicates the shadow of the law. Furthermore, long periods of sickness, which might represent a crude proxy for the lack of personal capabilities and, therefore, for layoffs due to personal reasons, have a significantly positive impact on the likelihood of severance pay in the probit model. It can also be noted that neither age, nor disability, nor household size, nor the subjective assessments of individual reemployment probabilities have a direct impact on the incidence of severance pay.

Considering the effects of taxation on the incidence of severance pay, we make use of the change in tax law which took place in 1999 by means of a "difference in differences"-estimator (DID). Considering the estimates of the LPM, the estimated parameter of the interaction of a dummy variable for the period 1999-2003 and the oldest age-tenure group (*workers who are at least aged 55 and have at least 20 years of tenure*) indicates that we observe a significant negative causal effect of a more restrictive taxation on the probability of receiving severance payments. This implies that the change in the taxation of severance pay has the most pronounced effects where it is most severe. This confirms the predictions of our theoretical model and indicates again that law indeed matters.

With respect to regional labour market slack we find a significantly positive effect of the regional unemployment rate on the incidence of severance pay in both specifications. This indicates that a higher risk of unemployment increases the likelihood of severance pay. The finding is in line with results from Ichino et al. (2003) for Italy that worse labour market conditions induce judges to be more favourable to workers.

Amount of Severance Pay

Starting with the criteria used by labour courts, we find that the estimated parameters for tenure with the last employer as well as for the monthly real wage in the last job have a significantly positive impact in the "two-part" model, the IPW specification (Table 4A) and in the two variants of the Heckman sample selection model (Table 4B). This indicates that the determinants of the severance pay formula used by the majority of labour courts in Germany

raise the average amount of severance pay in the time period under consideration. The finding confirms the predictions of our theoretical model and points to the shadow of the law.

Table 4A: Amount of Severance Pay in West Germany 1991 – 2003

	Two-part Model		*Inverse Probability Weighting*	
	$\hat{\beta}$	*Std.-Err.*	$\hat{\beta}$	*Std.-Err.*
Tenure with last employer	0.051**	0.013	0.056**	0.013
Monthly Real Wage last job (log)	0.952**	0.217	1.025**	0.198
Alimony	-0.118	0.190	-0.272	0.191
Age	0.008	0.007	0.004	0.007
Disabled worker	0.577	0.189	-0.658*	0.258
Household with children	0.017	0.132	-0.082	0.117
Firm size: X < 5 employees	-1.136**	0.337	-1.410**	0.374
Firm size: 5 <= X < 20 employees	-0.738**	0.242	-0.857**	0.190
Firm size: 20 <= X < 200 employees	-0.028+	0.153	-0.539**	0.174
Firm size: 200 <= X < 2000 employees	-0.002	0.146	-0.202	0.180
Years 99 – 2003 (a)	-0.347	0.335	-0.776*	0.345
Age-Group: >= 50 and tenure >= 15 (b)	-0.207	0.391	0.062	0.395
Age-Group: >= 55 and tenure >= 20 (c)	-0.035	0.313	-0.145	0.345
Interaction of (a) and (b)	0.053	0.454	-0.162	0.411
Interaction of (a) and (c)	-0.382	0.337	-0.364	0.416
Hard/Impossible to find a job again	0.164	0.169	0.317*	0.129
Regional unemployment rate	-0.4 -03	0.028	-0.071*	0.032
Change amount of variable pay last job	-0.2 -04	0.1-04	-0.3-4**	0.7-05
Change amount of variable pay * mutual agreement	0.7-04**	0.2-04	0.7-4**	0.1-04
Continuously sick more than 6 weeks	-0.029	0.177	-0.052	0.190
Unpaid Overtime	0.255+	0.136	0.185	0.138
Closure	0.039	0.233	0.151	0.210
Layoff	-0.214	0.238	0.072	0.160
Agreement	0.195	0.239	0.740**	0.165
Male	0.008	0.007	0.001	0.164
Foreigner	0.397+	0.235	0.573**	0.170
Part-time	0.270	0.270	0.394	0.249
White collar worker	0.130	0.215	-0.163	0.173
Apprenticeship	0.058	0.172	0.234	0.165
University degree	0.079	0.246	0.467+	0.261
Linear time trend	0.025	0.047	0.059	0.048
Number of Observations	313		313	
Wald_X	756.37		3944.39	
(dof)	(*43*)**		(*43*)**	

Source: GSOEP. Weights are used. Standard errors are robust.
Dependent variable: Log of real severance pay.
Sets of industry dummies, federal state dummies and an overall constant are included.
Wald_X: Wald – Test with H_0: no joint significance of all regressors.

Table 4B: Amount of Severance Pay in West Germany 1991 – 2003

	Heckman (two step)		*Heckman (ML)*	
	$\hat{\beta}$	*Std.-Err.*	$\hat{\beta}$	*Std.-Err.*
Tenure with last employer	0.048**	0.013	0.031*	0.014
Monthly Real Wage last job (log)	0.919**	0.186	0.688**	0.235
Alimony	-0.153	0.163	-0.410	0.224
Age	0.007	0.006	0.006	0.008
Disabled worker	0.593**	0.197	0.624**	0.222
Household with children	0.070	0.103	0.052	0.134
Firm size: X < 5 employees	-0.960	0.790	-0.098	0.444
Firm size: 5 <= X < 20 employees	-0.684**	0.238	-0.361	0.242
Firm size: 20 <= X < 200 employees	-0.258	0.164	-0.033	0.190
Firm size: 200 <= X < 2000 employ.	0.002	0.130	-0.004	0.168
Years 99 – 2003 (a)	-0.292	0.340	0.090	0.414
Age-Group: >= 50 and tenure >= 15 (b)	-0.107	0.525	0.632	0.561
Age-Group: >= 55 and tenure >= 20 (c)	-0.077	0.297	-0.449	0.369
Interaction of (a) and (b)	-0.033	0.535	-0.761	0.631
Interaction of (a) and (c)	-0.301	0.393	0.254	0.414
Hard/Impossible to find a job again	0.158	0.132	0.160	0.178
Regional unemployment rate	-0.006	0.031	-0.052	0.164
Change amount of variable pay last job	-0.2-4*	0.6-05	-0.2 -4*	0.9-05
Change amount of variable pay * mutual agreement	0.6-04*	0.2-04	0.7-4*	0.3-04
Continuously sick more than 6 weeks	0.074	0.189	-0.400	0.199
Unpaid Overtime	0.229	0.158	0.048	0.164
Closure	-0.120	0.533	-1.115**	0.323
Layoff	-0.363	0.504	-1.277**	0.319
Agreement	0.047	0.524	-0.880**	0.326
Male	0.177	0.137	0.268	0.199
Foreigner	0.409*	0.163	0.430+	0.225
Part-time	0.279	0.200	0.355	0.291
White collar worker	0.142	0.145	0.115	0.204
Apprenticeship	-0.068	0.131	0.202	0.175
University degree	-0.105	0.224	0.440	0.300
Linear time trend	0.018	0.042	-0.026	0.056
Mills Ratio	-0.125	0.386	-0.960**	0.1909
Number of Observations	313/2887		313/2887	
Wald_X	486.64		201.64	
(dof)	(*44*)**		(43)**	

Source: GSOEP. Weights are used. Standard errors are robust.
Dependent variable: Log of real severance pay.
Sets of industry dummies, federal state dummies and an overall constant are included.
Wald_X: Wald – Test with H_0: no joint significance of all regressors.

We find contradicting evidence with respect to individual disability in our four specifications. In both Heckman-specifications we observe that the existence of individual disability c. p.

increases the amount of severance pay, while it significantly reduces severance pay in the IPW specification. Therefore, we refrain from interpreting these results along the lines suggested in Proposition 6.

The "two-part" model as well as the IPW-specification (Table 4A) show that employees who have worked in small firms receive a significantly smaller amount of severance pay than employees in firms with more than 2000 employees (*reference category*). Moreover, the significantly negative effect on the amount of severance pay for the group of employees who are not covered by the PaDA over the whole period under consideration (up to 5 employees), is significantly lower than for employees from firms with 20 to 200 employees or with 200-2000 employees, as indicated by results of Wald-tests. However, we cannot reject the hypothesis that the negative firm size effect on the amount of severance pay for employees not previously covered by the PaDA is equal to the one for firms with 5-20 employees in both specifications. One reason might be that from October 1996 to January 1999 employees with a new contract in firms up to 10 employers were not covered by the PaDA.[20]

Considering the regional unemployment rate, we observe a significantly negative parameter estimate in the IPW-specification. Hence, c. p. higher regional unemployment rates increase the incidence but lower the average amount of severance pay. In addition, with respect to the subjective assessment of individual labour market prospects, we find a significantly positive effect on the amount of severance pay for those employees who think that it is “hard” or even “impossible” to find a proper job again in the IPW specification. Since some labour courts explicitly take individual employment prospects into account when determining severance pay (Hümmerich 1999), this result indicates the shadow of the law. The same is true with respect to the significantly positive estimated parameter for foreigners in all specifications.

With respect to the causal effects of taxation, we observe a negative effect for older employees with high tenure (*Age-Group: >= 55 and tenure >= 20*), but it is never significant.

Checks of robustness

In order to pattern the economic and social criteria defined by EPL and/or established by labour courts we have dropped a remarkable number of observations, since not every question is available in every single year of the GSOEP. To check the robustness of our results with respect to the impact of changes in taxation, we have specified a parsimonious empirical specification, where only regressors available in every single year of the GSOEP have been

[20] Note that the estimated parameter for firms with less than 5 employees is not significantly different from zero in the two Heckman specifications.

used in addition to the tax variables. Table 5 displays the results of this exercise for the LPM, the "two-part" and the IPW specification.

Table 5: Checks of Robustness

	Incidence of Severance Pay		*Amount of Severance Pay*			
	Linear Probability Model (LPM)		*Two-Part Model*		*Inverse Probability Weighting*	
	$\hat{\beta}$	*Std.-Err.*	$\hat{\beta}$	*Std.-Err.*	$\hat{\beta}$	*Std.-Err.*
Years 99 – 2003 (a)	-0.011	0.024	-0.131	0.231	-0.412	0.335
Age >= 50 and tenure >= 15 (b)	0.099	0.099	-0.034	0.240	-0.155	0.317
Age >= 55 and tenure >= 20 (c)	0.184*	0.084	-0.305	0.230	-0.423	0.315
Interaction: (a) and (b)	-0.100	0.155	-0.320	0.309	-0.991*	0.402
Interaction: (a) and (c)	-0.269**	0.101	-0.252	0.271	-0.477	0.330
Number of obs.	4323		515		515	
Wald_X (dof)	519.64 (*41*)**		856.40 (		3507.60 (40)**	

Source: GSOEP. Weights are used. Standard errors are robust.
Wald_X: Wald – Test with H_0: no joint significance of all regressors.

Considering the DID estimates, we observe a significantly negative causal impact of the change in taxation on the probability of severance pay for workers with at least 55 years of age and 20 years of tenure, which experienced the strongest absolute decline in the level of tax exemption. Hence, we again have evidence for the predictions of our theoretical model with respect to taxation. As regards the amount of severance pay, the estimates for the two interaction terms are always negative and in the case of the IPW specification significantly different from zero for the group of workers with at least 50 years of age and 15 years of tenure. Thus, in our parsimonious specification based on a larger sample we find some evidence for a negative causal impact of a change in taxation on the amount of severance pay.

VII. Conclusions

On average only 12 % of all employees who experienced a job termination due to either closure of the firm, layoff, quit or mutual agreement obtained severance pay in West Germany from 1991 – 2003. Hence, severance pay is not as widespread in West Germany as often assumed in the public debate on the negative effects of EPL. However, if 12 % of all employees whose permanent contract is terminated obtain severance payments, their absolute

number is significantly higher than the figure of mutual agreements induced by labour courts or verdicts which include severance pay.

In this paper we develop a theoretical model which incorporates the institutional features of German EPL. It explains different outcomes in dismissal conflicts conditional on observed characteristics of the employee, the employer, and the tax treatment of severance payments. Using German panel data, we put our theoretical model to an empirical test. In particular, we find that (a) criteria as they have been defined by the law or developed by labour jurisdiction with respect to the entitlement to and the amount of severance payment, such as alimony duties, firm size or upper limits or legal ceilings for severance pay and (elements of) the well-known severance pay formula, had a significant impact on the incidence and magnitude of severance pay in the period from 1991-2003 and (b) restrictive changes in the taxation of severance pay had a negative causal impact on its incidence.

Since a substantial fraction of severance payments is obtained without court involvement and because it is often claimed that the consequences of according German legislation are highly unpredictable in individual cases, our findings have two important implications: first, there is a substantial amount of bargaining in the shadow of employment protection law in Germany. The outcomes of such negotiations reflect the main legal rules in an identifiable manner. This implies, second, that the costs of EPL in Germany are predictable on average. The variability of effective judicial enforcement of EPL in Germany, hence, affects large firms, for which the unpredictability averages out, to a much lesser extent than it may influence the behaviour of smaller firms. However, the fact that the incidence and amount of severance pay is lower in small firms may compensate such firms for the greater volatility of EPL.

Appendix: The Impact of Variations in x on the Incidence of Severance Payments S

If the direct gain from a court verdict z is distributed uniformly on the interval [0; z^u], the expected value of z, given that an employee has insisted on a verdict, equals $\tilde{z} = (z^u + z^{crit})/2$. Accordingly, the expected value $E[D^c(x)\,\tilde{z}(\cdot))]$ is:

$$E[D^c(x)\tilde{z}(\cdot)] = \frac{1}{2}E\left[D^c(x)\left(z^u + \frac{C^w - c^w}{D^c(x)}\right)\right] = \frac{1}{2}(z^u E[D^c(x)] + C^w - c^w) \qquad (A.1)$$

Given this simplification, equation (3) gives rise to:

$$\frac{\partial k^{crit,f}}{\partial x} = -\frac{\partial B}{\partial x} = E\left[\frac{\partial D^c(x)}{\partial x}\right](1-T') + P(z^{crit})E\left[\frac{\partial D^c(x)}{\partial x}\right]\frac{z^u}{2}$$

$$+ \frac{\partial P(z^{crit})}{\partial z^{crit}}\frac{\partial z^{crit}}{\partial D^c}\frac{\partial D^c(x)}{\partial x}\frac{1}{2}[z^u E[D^c(x)] + C^w - c^w] > 0 \qquad (A.2)$$

In the derivation of (A.2) it has been assumed that the actual change in $D^c(x)$ is (correctly) anticipated, implying $E[\partial D^c/\partial x] = \partial D^c/\partial x > 0$, and use has been made of equation (1) and the definition of $P(z^{crit})$. Using (15), we define the change in the critical value $k^{crit,s}$, owing to a rise in x, as:

$$\frac{dk^{crit,s}}{dx} = \frac{\frac{\partial G}{\partial x}(1-T') - \frac{\partial G}{\partial D^{f*}}\frac{\partial B}{\partial x}}{det} = -\frac{\partial Q^s}{\partial k^{crit,s}}\frac{1-T'}{2}\frac{\partial D^c(x)}{\partial x}\frac{P(z^{crit})z^u}{det}$$

$$-\frac{\partial Q^s}{\partial k^{crit,s}}\frac{1-T'}{2}\frac{\partial D^c(x)}{\partial x}\frac{\partial P(z^{crit})}{\partial z^{crit}}\frac{\partial z^{crit}}{\partial D^c}[z^u E[D^c(x)] + C^w - c^w]\frac{1}{det} > 0 \qquad (A.3)$$

The change in the firm's optimal offer D^{f*} is:

$$\frac{dD^{f*}}{dx} = \frac{\frac{\partial B}{\partial x}\frac{\partial G}{\partial k^{crit,s}} - \frac{\partial G}{\partial x}}{det} \qquad (A.4)$$

Since $\partial B/\partial x < 0$ from (A.2), $\partial G/\partial x > 0$ from (7), and $\partial G/\partial k^{crit,s} > 0$ if $\partial^2 Q^s/\partial(k^{crit,s})^2 \geq 0$, the optimal offer D^{f*} will rise with x. Moreover, $k^{crit,f} = k^{crit,s} + (D^f - T(D^f))$ and $\partial D^f/\partial x > 0$ imply $\partial k^{crit,f}/\partial x = \partial k^{crit,s}/\partial x + (1 - T')\partial D^{f*}/\partial x$. Thus, the (positive) change in $k^{crit,f}$ due to a rise in x is greater than the (positive) variation in $k^{crit,s}$, and an increase in x raises the probability Q^f by more than Q^s. The impact of an increase in x on the critical value α^{crit} is given by:

$$\frac{d\alpha^{crit}}{dx} = \left(\frac{\partial Q^f}{\partial x} - \frac{\partial Q^s}{\partial x}\right)[E[D^c(x)] + c^f] + \frac{\partial Q^s}{\partial x}D^{f*} + (Q^f - Q^s)E\left[\frac{\partial D^c(x)}{\partial x}\right] - (1-Q^s)\frac{\partial D^{f*}}{\partial x} \qquad (A.5)$$

Since the term in the first bracket in (A.5) is positive, while $\partial Q^s/\partial x > 0$ and $Q^f > Q^s$, the variation in α^{crit} is ambiguous.

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