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Uschi Backes-Gellner, Donata Bessey, Kerstin Pull, Simone Tuor¹

1. Introduction

Personnel economics as a research field was established in the mid 1990s (see *Lazear* 1995; *Backes-Gellner* 1996; *Lazear* 1998) and has grown rapidly ever since (*Backes-Gellner* 2004; *Lazear/Oyer* 2007). It aims at identifying and analyzing the underlying economic principles of human resource management (HRM) strategies and at investigating the impact of varying institutional and competitive environments on the use and effectiveness of HRM strategies. Personnel economics is not only a promising field of academic research, but also increasingly provides guidelines for HR practitioners. Several factors contributed to the development of the field. *Firstly*, there were the shortcomings of traditional research in HRM resulting from one of its alleged strengths: its precision and love of detail (for an overview of the strengths of HR from an organizational perspective, see *Pfeffer* 2007). Accordingly, while traditional HRM analysis asked interesting questions, the answers given were often vague, tailored to specific applications and theoretically unconvincing. As a result, traditional analysis in HRM provided neither a solid theoretical nor a sound empirical basis.² *Secondly*, there have been important developments and breakthroughs in personnel economics, rendering it increasingly attractive for those interested in analyzing HRM strategies. Advanced microeconomic models and advanced econometric tools have helped to derive new theoretical conclusions and generate path-breaking empirical results. Much in contrast to traditional HR analysis, personnel economics is rigorous in theory and backed up by empirical evidence based on advanced econometric tools. In addition, in very recent years, excellent survey and register data (particularly linked employer-employee data) have become available that increasingly allow for rigorous testing of theories. The newly derived evidence, again, is strongly supportive of the theories in personnel economics and not only reassures researchers but also suggests that practitioners can actually rely on the predictions and prescriptions of personnel economics (*Lazear* 2001).

However, personnel economics today does not stop at simply applying standard microeconomic theory to HRM, as personnel economists are increasingly aware of the shortcomings of standard microeconomic modelling. Due to a number of pioneering findings of behavioural and experimental economics, it has become clear that individuals do not always behave fully rationally: they care about fairness, they are ready to bear individual costs in order to re-install equity, they reciprocate in one-shot games without being able to reap the benefits of their behaviour, and they systematically ignore relevant information and use heuristics to solve complex decision problems, to name only a few of the behavioural anomalies detected and explored by behavioural and experimental economists (for an overview see *Smith* 2006 or *Camerer* 2007). As innumerable laboratory and field experiments have shown all these anomalies to be statistically significant and robust,³ they have been subsequently integrated into microeconomic models of individual behaviour⁴ and have also inspired theory-building by personnel economists (see e.g. on emotions in tournament settings *Grund/Sliwka* 2005 or *Kräkel* (forthcoming)). By inspiring personnel economists to blend “experimental evidence and psychology in a mathematical theory of normal strategic behaviour” (*Camerer* 2003), behavioural economics has opened the field of personnel economics for interactions with other social sciences, in particular with social psychology (*de Cremer* et al. 2006). And, as social psychology has always been a classic

point of reference for traditional HRM analysis, behavioural and experimental economics may indeed help to reconcile traditional HRM analysis and personnel economics, two disciplines that parted company long ago and currently act in almost complete isolation.

Besides inspiring theory-building, the integration of behavioural economics in personnel economics has gone hand in hand with a strengthening of empirical analyses. If even in controlled laboratory experiments individuals do not behave as our most elaborate theoretical models predict, and if our models are only subsequently adapted to the alleged behavioural anomalies, then the empirical validation of theoretical predictions in personnel economics is absolutely crucial and its value must not be underestimated. Fortunately, the incorporation of behavioural economics into personnel economics was strongly assisted by corresponding progress in empirical analysis: Advances in econometrics (including ways of addressing sample selection bias, omitted variable bias and problems of endogeneity) as well as the availability of panel data, linked employer-employee data and linked household panel and experimental data (Fehr et al. 2003) allowed personnel economists to test models in a way that approximated experimental designs (for an overview see Lazear/Shaw 2007). Today then, personnel economics profits from a sophisticated empirical tool box rendering it a highly dynamic field of research that requires increasingly sophisticated methodological competence.

But what are the path-breaking findings of behavioural and experimental economics and how do they apply to the field of personnel economics and HRM strategies? According to DellaVigna (2007), behavioural economics teaches us that individuals deviate from the standard model in three important ways: they have non-standard preferences, they form non-standard beliefs and they are characterized by non-standard decision-making. In the case of non-standard preferences DellaVigna (2007) distinguishes three types of preferences that are all important for the field of personnel economics: time, risk and social preferences. As behavioural economics has shown, time preferences are not always consistent. If they were, decision makers would have the same preferences about future events at different points in time. However, by revealing that discounting is steeper in the immediate future than it is in the far future, laboratory experiments on inter-temporal choice cast doubt on this assumption (see e.g. Loewenstein/Prelec 1992; Frederick et al. 2002): When individuals evaluate outcomes in the far future they make plans, e.g. to exercise, work harder or look for a better job, but as the future approaches, discounting becomes steeper and individuals refrain from working harder or looking for a better job. Such time inconsistencies cause well-known problems of self-control. Examples in the field of personnel economics concern dropping out of apprenticeships (see Bessey/Backes-Gellner 2007) and refraining from taking part in continuing vocational training (Backes-Gellner et al. 2007), both of which are known to increase unemployment risks and to substantially reduce income prospects. With respect to risk preferences, the most important aspect according to DellaVigna (2007) is that the utility function of individuals depends on a reference point, as has for example been shown in insurance decisions. Experimental evidence suggests that utility depends on a reference point, meaning that past experience may change the evaluation of a current decision. Such reference dependence is also important in the context of personnel economics. An example from the field of personnel economics is the reference dependence of individuals' perceptions of performance evaluation results. Hedinger et al. (2008) show that efforts which are taken in response to good or bad performance evaluations depend on the *change* in evaluation results. Individuals withdraw effort if their evaluation is less positive than in the previous year, even though the evaluation might be very positive in absolute terms. Additionally, experimental evidence suggests that individuals have strong *social* preferences and care about other people's payoffs. An obvious application from personnel economics concerns the field of employee compensation (see also section 3), where social preferences have repeatedly been shown to play a role, not only in the laboratory, but in employment situations as well (see e.g. Bandiera et al. 2005 on social preferences among fruit pickers in the UK). A second class of

deviations from the standard economic model inspired by behavioural economics concerns *non-standard beliefs*. Experimental evidence suggests that, among other things, people are often characterized by systematic overconfidence. While this may explain managerial behaviour in many instances (see e.g. *DellaVigna* 2007) and may also account for gender differences (see section 4), a third class of deviations from standard economic models concerns *non-standard decision making* and is equally important. Here, experimental evidence suggests, e.g., that individuals usually do not solve complex maximization problems but instead use individual *heuristics* (see already *Tversky/Kahneman* 1974). In addition to simplifying decision making, behavioural economics has also shown that individuals react to social pressure. A typical application in the field of personnel economics is concerned with how the work attitude of employees is influenced by their peers (see e.g. *Kandel/Lazear* 1992 or *Backes-Gellner et al.* 2006). Furthermore, individuals are affected by emotions and want to be respected, which are both important for workplace behaviour (*Ellingsen/Johannesson* 2007).

All this behavioural research, be it experimental, theoretical or field related, has provided valuable new insights for personnel economics. In order to illustrate in more detail what personnel economics may learn and has already learnt from behavioural economics, we show in the following for one field of HRM applications, i.e. compensation issues, where and how the findings from behavioural economics may be particularly fruitful. In a first step, we concentrate on the role of fairness and reciprocity as a guideline for the general *level* of compensation (section 2), then we are concerned with the *structure* of compensation in fostering competition in rank order tournaments (section 3), and lastly, we focus on gender differences in the process of self-selection into different compensation *regimes*: variable payments based on relative performance in rank-order tournaments versus variable payments based on absolute performance in standard performance pay (section 4). Due to restrictions of space our overview will necessarily remain highly selective, and our explorations brief; the interested reader should therefore refer to the literature cited in the sections below.

2. The Level of Compensation: Fairness & Reciprocity

Concerning the level of employee compensation, numerous relevant experiments have been undertaken, all of them highlighting the potential importance of fairness and reciprocity. Starting with the analysis of the simple ultimatum game (*Güth et al* 1982), experimental economists have repeatedly studied individual behaviour in simple allocation games. In the ultimatum game, e.g., one player (the proposer) is asked to divide a given amount between another person (the responder) and himself, where the responder can decide to accept this division or not (in which event both of them are left with nothing). But instead of offering only a marginal amount to the responder, as non-cooperative game theory would have predicted, proposers offer an average of 30-40% of the amount at stake, with a 50:50 split being the mode (*Camerer/Thaler* 1995, 210). One explanation for the observed behaviour may be that the proposer is led by internalized norms of fairness. The fact that even in the so-called dictator game the proposer passes a positive amount to a second player who acts as a mere “dummy”, hints at the relevance of such “unconditional fairness” (*Fehr et al.* 1996). However, unconditional fairness cannot be the sole explanation for ultimatum game behaviour, as offers in dictator games are usually “not quite as fair” (*Camerer* 1997, 169) as those in the ultimatum game. In addition to being motivated by unconditional fairness, the proposer is obviously also guided by “reciprocal fairness” (*Fehr et al.* 1996), where the fear of negative reciprocity leads him to offer a more generous amount than he otherwise would. The findings of *Güth/Damme* (1998) who introduce a third (dummy) player into the general ultimatum setting, hint at a similar rationale: while the responder, whose veto would leave the

proposer with nothing is offered about 30% of the amount at stake, the dummy player is offered only 5% to 10%.⁵

If it is the fear of being rejected that leads the proposer to offer a “fair” amount, what is it that tells him “*how fair is fair*”? While there are several attempts to theoretically account for the observed ultimatum game behaviour,⁶ *Pull* (1999, 6) and *Selten* (2000, 144) have proposed to analyze this question by assuming that the behaviour is led by what the result of a bargain between the two players would have been: Although they do not actually engage in bargaining, proposer and responder may both be influenced in their decision by what the outcome of a bargain would have been. The two players in the ultimatum game may hence engage in what might be called an “implicit” or “imaginary” bargain. While *Pull* (2003) has shown within a simple bargaining framework that the implicit bargain can indeed account for the effect of responder power on ultimatum game behaviour (and might as well be applied in the wage-setting context, see also *Pull* 1996),⁷ the experimental evidence on the “implicit bargain” is so far mixed: Experiments on so-called W-games (*Fischer et al.* 2006) have shown that participants in fact react invariantly to whether they are confronted with a classical ultimatum or a *Nash* bargaining setting. Seemingly then, it does not matter to the players if they find themselves in an ultimatum game experiment or in a bargaining situation, a finding which strongly supports the “implicit bargain” hypothesis. *Fischer et al.* (2007b) experimentally compare the ultimatum and the *Nash* demand game with varying conflict payoffs, and find that average demands and marginal reactions to changing conflict payoffs both differ significantly between the two games, thus rejecting the “implicit bargain” hypothesis in its “strong” version (i.e., that participants in an ultimatum game behave *exactly* the same as in a bargaining situation). Still, even in this very strong test of the “implicit bargain” hypothesis, 20% of the subjects behaved completely game-invariantly.

While the ultimatum game setting is obviously not the closest representation of an employment relationship, there have been numerous advances in setting up experiments that have begun to approach real employment relationships. One of these advances involves taking account of the fact that – unlike in the standard ultimatum setting – in an employment relation *competition* affects both the employer and the employee. For the employer this means that, if his offer is rejected by one potential employee, he is not left with nothing but may find others ready to fill in. *Güth et al.* (1998) show that offers in an ultimatum setting indeed systematically decrease when competition on the side of responders is introduced. A further obvious difference between experimental settings and employment relations is that in a typical experimental setting, players are not allowed to interact. Introducing *social interaction* into a standard ultimatum game setting, *Bohnet/Frey* (1999) show that the 50:50-allocation is chosen more often when the players are allowed to communicate. Even if they are only able to identify each other (“silent identification”), the probability that a 50:50 allocation is chosen significantly increases. A further matter of concern has been the fact that in an ultimatum experiment the roles of the players are typically *assigned arbitrarily* and the amount at stake comes as a gift. When something comes as a gift and a superior bargaining position is the result of „flipping a coin“, the equal distribution result observed may be regarded as a just and fair way of allocation (*Hoffman/Spitzer* 1985; see also the findings of *Hennig-Schmidt* 2000). In wage determination, however, the situation is completely different: the roles are not assigned arbitrarily and the sum to be distributed is not predetermined. As a consequence, fairness conceptions in wage determination may be substantially different from those in the ultimatum game setting. In experimental games, where roles are auctioned off or where the amount at stake is determined by the differing inputs of the players (the inputs representing choice variables), the equal division outcome is much more rarely observed. Still, “equal surplus splitting” taking account of differing inputs as a modified fairness concept remains a good predictor of the resulting allocations (see e.g. *Königstein* 1998, 15).

The closest representation of the employment relationship concerning the question of fairness and reciprocity is undoubtedly the so-called gift exchange game going back to *Fehr et al. (1992)*. Here the responder not only decides on the acceptance of the (wage) offer as in the ultimatum game, but in a second stage decides on his effort level, i.e. on what he gives to the proposer in return. In a typical gift exchange game a higher effort level is associated with a higher cost on the part of the responder (the employee) while it increases the payoff of the proposer (the employer). Surprisingly, even in a one-shot situation, the responder chooses an effort level higher than the minimum prescribed in the game, and the proposer offers a wage over and above the minimum. And – much in line with the predictions of the theory of gift-exchange developed by *Akerlof/Yellen (1990)* – the higher the wage offer, the higher are effort levels on average. Interestingly, introducing competition on the part of the employee in the gift exchange game does *not* change these results. The intuition is quite clear: exploiting the opportunity to reduce the wage offer in the gift exchange game bears the risk of inducing lower effort levels on the part of the employee. While numerous experimental variations of the gift exchange game have shown its results to be quite robust (see e.g. the survey by *Gächter/Fehr 2002*), the fundamental transformation concerning application to the employment relationship is that instead of a one-shot game a repeated game is played. As expected, the gift exchange is even more pronounced in a repeated game situation, with more responders ready to reciprocate generous wage offers by choosing high effort levels (*Gächter/Falk 2002*). Even though these “opportunistic” responders can be distinguished from those that are “truly intrinsically reciprocal” through their last-round behaviour, the results of the repeated gift exchange game hint at reciprocity playing a significant role in long-term employment relationships. One further modification of the gift exchange game that would seem to be of considerable relevance concerning its application to the employment relationship, is the question of effort observability. As *Irlenbusch/Sliwka (2003)* show in a repeated gift exchange game, the less transparent the effort choice of the responder (as a result of exogenous risk in the production function), the weaker is reciprocity. That is, if a “defection” of the responder (choice of low effort level in spite of high wage) cannot be detected by the proposer, reciprocity is much more difficult to enforce.⁸

To sum up, concerning the field of compensation there are numerous experimental studies of relevance that overwhelmingly all point to the relevance of internalized norms of fairness as well as reciprocal behaviour. The field experiments undertaken so far (e.g. *Gneezy/List 2006; Kube/Maréchal/Puppe 2006; Bellemare/ Shearer 2007*)⁹ also point to the importance of reciprocity in the employment relationship; however, it is not yet clear to what extent the effects measured (positive as well as negative reciprocity) are durable or not.

3. The Structure of Compensation: Inequality & Competition

Furthermore, behavioural economics has taught us that it is not only the level of employee compensation that matters, but also its structure that crucially determines employee behaviour. While fairness, reciprocity and equality may also provide helpful guidance in the design of compensation structures, in fostering competition among employees, deliberate inequality may also play a role. While inequality may relate to the prize-spread between those that won or lost a rank-order-tournament (e.g., a bonus payment or a wage increase following a promotion), it may also relate to a potential spread between different prizes awarded to the contestants according to their different ranks in the tournament. According to the seminal tournament model by *Lazear/Rosen (1981)*, the effort of a contestant will depend on his marginal cost of effort and on the expected value of the tournament price, i.e. on its value as well as on the probability of winning the tournament. *Moldovanu/Sela (2001)* show that provided that effort cost functions are convex, awarding more than one prize will lead to a

higher aggregate performance, with the optimal value of prizes depending on the number of contestants, their abilities and effort cost functions. For personnel economics this is an interesting finding because changes in hierarchies are nothing other than changes in the number or value of prizes in a promotion tournament. If a hierarchy is very flat, there is only one promotion position for a very large number of contestants, but the value of the promotion, i.e. the prize, is large because receiving a promotion is a bigger step towards the top of the hierarchy. On the other hand, if a hierarchy becomes steeper, there are more promotion opportunities for the same number of contestants, but the value of the promotion is relatively smaller. So the question is, what do we know empirically about the effect on performance of having a larger or smaller number of prizes as opposed to the effect on performance of changes in the value of prizes?

One of the first experimental studies to analyze the effects of the prize structure in tournaments is that of *Harbring/Irlenbusch* (2003). As a means of measuring contestant effort in their experiment, contestants were asked to choose among a given range of effort levels with given effort costs, i.e. contestants were basically expected to choose a costly level. The authors show that subjects' average effort increases with the ratio of prizes to contestants. Moreover, a larger number of prizes was associated with fewer subjects exerting no or only a very low level of effort. Instead of implementing a given effort cost function, *Freeman/Gelber* (2006) conducted a so-called real effort experiment by having participants perform real tasks. Even though real effort experiments come at the cost of losing control over a highly relevant parameter of the experiment (the costs of effort), other distinct advantages of real effort experiments (as will become clearer below) strongly speak in their favour. *Freeman/Gelber* (2006) sought to test one of the theoretical predictions by *Moldevanu/Sela* (2001), i.e. the hypothesis that the aggregate performance of a group of contestants will be highest for medium levels of inequality in the prizes awarded. A high level of inequality (e.g. only one prize where the winner takes all) as well as a low level of inequality (e.g. in an extreme case, every contestant receives the same prize) will both result in a low aggregate performance. To test this hypothesis they designed their experiment as follows: In groups of six, subjects had to solve paper mazes in two rounds. In a first round, all subjects were rewarded at a piece rate, implying that an individual's reward was independent of the others' performance. Afterwards, in half of the groups members were informed about the distribution of mazes solved by group members. In a second round, three tournament settings were implemented, characterised by different incentive schemes and representing different levels of inequality. In the *no inequality treatment* all group members were paid a fixed amount of money (making payment both independent of the other group members' performance and independent of one's own performance). In the *high inequality treatment* there was one large prize for the tournament winner. In the *intermediate level of inequality treatment* five out of six group members received a prize (where the size of the prize depended on the relative position in the group). Here it must be mentioned that the number of mazes solved depends on ability, effort and the relationship between effort and performance. The results were as follows: In the first round there were no significant differences between participants belonging to the different groups. In the second round the results depended on the information setting. Findings for the *full information treatments* confirmed the existence of an inverted U-shape between inequality and output: Mean output was highest at an *intermediate level of inequality*, i.e. if five out of six group members received a prize. At both high and low levels of inequality the mean output per group member was lower. In the case of high inequality, the result is clearly driven by individuals in the lower half of the ability distribution who exert low effort because their chance of winning the one single prize is almost zero. In contrast, the medium inequality treatment provides an incentive for all group members to make some effort to win a prize. At the same time, the authors find a less clear inverted U-shape in the *no information treatments*. Providing information seems to have a particularly strong impact on subjects in the lower half of the ability distribution, who are discouraged if they know for

certain that they have almost no chance and are obviously less discouraged if they do not have full information. While the focus of the above experiment is on aggregate output, there surely exist situations in which the tournament sponsor wants to maximize the top performance. Interestingly and counter-intuitively, however, *Freeman/Gelber* (2006) find that the high inequality tournament does not generate the highest maximum performance, but that there is again an inverse U-shaped relationship between the maximum score achieved and the level of inequality.

So what do we learn from the experiment of *Freeman/Gelber* (2006)? *Firstly*, the results are in line with the predictions of *Moldovanu/Sela* (2001) and hence provide indirect support for the assumption of a convex effort cost function. *Secondly*, the authors conclude that although it is hard to identify the optimal level of inequality, more inequality is neither generally good nor generally bad. Rather, there seems to exist an optimal level of inequality that lies between the two extremes of no and very high inequality. But why use laboratory experiments if rank order tournaments are so common in the real world? *Falk/Fehr* (2003, 400) point out that a test of theoretical implications requires information that is typically not available in a real-world environment (e.g. information on effort cost function). Due to general data limitations many of the field studies on tournaments are consequently based on data from sports (e.g. *Becker/Huselid* 1992) or aim at rather indirect tests of tournament implications (e.g., searching for convex compensation structures; e.g. *Eriksson* 1999). Direct empirical tests of implications from tournament theory with field data, e.g. concerning the relationship between tournament characteristics and employee performance, are still few and far between (for a notable exception, however, see *Backes-Gellner/Pull* 2008). In the light of the partly questionable external validity of laboratory experiments, the value of additional field studies in personnel economics cannot be underestimated.

4. The Form of Compensation: Gender Differences in Self-Selection

In the last few years, a number of experimental studies on the choice of the form of compensation (fixed wage, variable payment based on absolute performance, variable payment based on relative performance) have been undertaken (see e.g. *Harbring/Irlenbusch* 2003). While many have focused on the choices of those who eventually would have to pay the resulting wages (i.e. the principals in laboratory experiments), the self-selection of different compensation regimes by those being paid (i.e. the agents in laboratory experiments) has increasingly received attention. As many of these studies have highlighted significant gender differences in the self-selection process and as these may indeed help explain the under-representation of women in top-level-jobs, in what follows we will elaborate on the respective experimental findings as well as on their policy implications.

In the literature, *Gneezy* et al. (2003) were the first to focus on gender differences in rank-order-tournaments. Participants of their experiment were recruited on the campus of the Technion in Haifa (Israel), a very competitive institution offering degrees in engineering. One would not expect female students in such an environment to be especially uncompetitive. The task in the experiment was to solve computerized mazes in groups of six. The advantage of this approach is that subjects choose a real effort level and are paid according to their performance, creating a quite realistic environment in the experiment. The subjects then played different versions of the experiment, corresponding to different payment schemes in a firm. The first version was a simple piece rate in which the participants were paid according to their output (i.e. the number of mazes they solved). In this treatment, there were no statistically significant differences between men's and women's performance, implying that both sexes have the same ability in the task of solving mazes. The next treatment was a tournament in groups of six with three male and three female participants. Only the winner

received a payment that was proportional to his/her output. In this setting, only men showed a significant increase in productivity while women did not, compared to the piece rate scheme. As a result, men outperformed women significantly. By contrast, in a single-sex tournament in groups of six, females showed a significantly higher performance than in the piece rate treatment, implying that women only dislike competition against men, but not competition *per se*. The authors investigated various explanations for this surprising result (given the fact that women do not seem to have poorer abilities in maze-solving in general) using different experimental designs. Basically, a tournament differs in two points from a piece rate wage scheme: firstly, the result is uncertain, and secondly, it depends on the performance of others and not only on one's own performance. While uncertainty did not seem to be the relevant explanation for females' lower performance, it seemed to be the case that females are less confident about their own abilities, resulting in different levels of task choice for males and females. When given the possibility to choose a level of difficulty for solving mazes, females chose significantly lower levels of difficulty, meaning that men felt more competent in the task even if there were no statistically significant differences in performance level in the baseline treatment.

In a first follow-up experiment, *Niederle/Vesterlund (2007)* focus on the self-selection of males and females into various payment schemes. This time, the task was to add 2-digit numbers. The first treatment was a piece rate scheme, the second treatment a tournament. There were no statistically significant differences in performance between male and female subjects in either treatment. As a third treatment, subjects could choose between a piece rate and a tournament. Here, men selected a tournament scheme twice as often as women (73 % against 35 %), and even the best-performing women (ranked in the top performance quartile) showed a lower propensity to enter the tournament than the lowest-performing men (ranked in the bottom performance quartile). These were not the profit-maximizing choices because low-performing participants would have been better off in a piece rate treatment and high-performers in a tournament. The authors then tested various candidate explanations for this result, and reached the conclusion that the different choices were made mainly for two reasons: on the one hand, men were more overconfident than women and on the other hand, there were simply different preferences for competition, with men preferring competition more than women.

In a second follow-up experiment, *Niederle/Yestrumskas (2007)* focus on a closely related topic, namely, on gender differences in choices of task difficulty and on the possibility to change these choices by creating appropriate institutions. Again, participants had the task of solving mazes. In this experiment, payoffs were designed such that low performers were better off choosing the easy task and vice versa. After a first round, subjects were informed if they were high performers or low performers and there were four different institutional settings: in the benchmark setting, subjects had to solve easy mazes in round 2 and hard mazes in round 3. The three other treatments corresponded to different institutional settings: in treatment 1, subjects had to choose the level of difficulty for round 2 and 3 (easy/hard) before entering the round; in treatment 2, subjects first chose the level for round 2 and then (after their performance) for round 3; in treatment 3, subjects received information on the average performance level of high- and low-performers in previous groups and also on which choice would pay them higher earnings. Hence they could decide on the basis of their performance and not only on their subjective evaluation of their own performance. Again, there were no statistically significant gender differences in performance in the benchmark treatment, but from a profit-maximizing point of view, low-performing men chose the hard task too often, while high-performing women chose it too seldom in the baseline treatment. However, two slight institutional changes caused female subjects to choose according to their performance. Treatment 3, which provided perfect feedback (meaning that subjects were informed if their performance was among the top 40 %), caused females significantly more

often to choose the hard task (and low-performing males to choose the easy one). Finally, treatment 2, which could be characterized as allowing a reduced level of commitment and offering the possibility to make choices sequentially, has the same effect on females, but not on males. However, perfect feedback may often not be available and the “less commitment institution” might be easier to implement in a business environment.

These results are only part of a larger literature on gender differences in preferences. Nevertheless, they indicate that there is another possible reason, besides the familiar explanations of discrimination and occupational self-selection, for women being under-represented in leading management positions or why there still are substantial wage differences. Females may simply have different attitudes toward competition and consequently may decide against exposing themselves to rank order tournaments (thereby foregoing relevant career opportunities). The experimental results reported above suggest that women do not show an increased performance in tournament situations because they are not confident enough about their own abilities, even if these abilities are comparable to those of their male colleagues. Firms will hence gain if they are able to create environments where their female employees fully develop their productivity and where they are willing to compete. According to the experimental results, this goal could be achieved, e.g., by the implementation of mentoring programs in order to increase the self-confidence of female employees and, consequently, alter their career choices according to their ability level. Another instrument that may increase the appropriateness of female career choices is to offer more flexible career paths. The experimental results suggest that if women can first test their own ability and make their choice afterwards, they are more likely to end up in an environment that matches their aptitude. Companies who do not offer that opportunity lose valuable resources, or on the other hand, if they do offer such opportunities they gain competitive advantage by using their resources more efficiently. Also, the results highlight the importance of feedback about their own performance in comparison to that of others for female employees. Regular assessments and feedback rounds could provide just this opportunity.

5. Conclusions

Personnel economics started with applying standard microeconomic theory to labor relations and has provided a large set of new insights which are very valuable for HRM. However, new developments in personnel economics also take into consideration what is known from experimental economics to make economic theory even more applicable to the analysis of problems and solutions that are effectively used to make human beings work together or individually more effectively. Individuals do not always behave like standard economic theory suggests. Thanks to innumerable experimental results it is well-known that individuals do not always behave fully rationally, care about fairness and equity, bear individual costs to avoid inequity, fail to collect important information and often use simple heuristics to solve complex problems (*Gabaix et al. 2006*). As has been shown in our examples in the previous sections, personnel economics has used these results to further develop the economic analysis of HRM policies. In these and many other examples behavioural economics has served a powerful tool for further developing personnel economics and analyzing human resource management strategies. Compensation, promotion and career incentives, team problems and even gender problems have been analyzed successfully with a combination of behavioural and personnel economics theories. The implications have frequently been tested empirically and many are borne out well in the data. In doing so, behavioural economics contributes to better interaction of personnel economists with other social sciences, in particular with social psychology. Behavioural Economics

therefore is a wonderful chance to make two disciplines grow together, both of which have long analyzed HRM policies but from a very different angle and in almost total isolation. Personnel economics started with a restricted perspective on HRM topics; it purposely disregarded and disregards many details in order to get a clearer picture of causalities and interdependencies, but it has broadened its perspective due to results from experimental economics. In recent years laboratory experiments have also been complemented by a growing number of field experiments and by a combination of survey data with laboratory experiments, both of which are designed to overcome the specific disadvantages of laboratory experiments and provide some insights into the external validity of laboratory experiments for real world behaviour. These new types of data will most likely produce more interesting results for HRM in the future. A second major development of experimental economics is the increasing usage of neuroeconomics (such as brain imaging or functional magnetic resonance imaging) which now also helps to lay a micro-micro-foundation for what is found in behavioural economics (*Singer/Fehr 2005; Villeval 2007*). Although the applications to personnel economics may be far from clear at this stage, it can be expected that future results will provide more fruitful insights for personnel economics. How this type of research may be integrated into traditional fields of HRM becomes imaginable by looking at the far reaching applications to human capital formation introduced in *Camerer (2007)* or *Heckman (2007)*.

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² Consequently, HR managers rarely play an important role in top management, despite the fact that firms continuously stress the importance of personnel as a strategic resource for their success. HR managers hardly ever end up as CEOs, who more likely come from finance, marketing, or any other field, but almost never from human resources (*Backes-Gellner/Krings 1997; Lazear 2001*).

³ For overviews see e.g. *Rabin (1998, 2002)*, *Mullainathan/Thaler (2001)*, *Camerer (2005)*, *DellaVigna (2007)*, *Diamond/Vartiainen (2007)*, or *Villeval (2007)*.

⁴ See most prominently *Fehr/Schmidt (1999)* and *Bolton/Ockenfels (2000)* on inequality aversion and relative payoff standing respectively.

⁵ *Suleiman (1996)* who systematically varies the responder's strategic position comes to a similar conclusion: the more far reaching the veto rights, the larger the offer. In a comparable setting, *Güth/Kovács (2000, 163)* also conclude that the degree of veto power assigned to the responder has a decisive influence on the size of the offer.

⁶ See e.g. *Fehr/Schmidt (1999)*, *Bolton/Ockenfels (2000)* or *Falk/Fischbacher (2001)*.

⁷ For indirect evolutionary rationalizations of the underlying behavioural dispositions see *Güth/Pull (2004)* and *Fischer et al. (2007a)*.

⁸ Among the many further experiments that try to depict one particular aspect of the employment relationship and bring it into the laboratory, are those that take account of multi-agent situations. *Alewel et al. (2007)*, e.g., study fairness norms in a situation where there are "hired" as well as "rented hands".

⁹ *Mahuteau (2002)* even presents econometric evidence from a French employer survey.

6. References

- Akerlof, G. A./Yellen J. L.* (1990): Fair wage-effort hypothesis and unemployment, in: *Quarterly Journal of Economics*, 105 Jg., Nr. 2, S. 255-282.
- Alewel, D./Friedrich C./Güth W.* (2007): Fair Wages and Multiple Fairness Standards – A Lab Study of Co-Employment of Hired and Rented Hands, in: *Schmalenbach Business Review (sbr)*, 59 Jg., S. 2-28.
- Backes-Gellner, U.* (1996): Betriebliche Bildungs- und Wettbewerbsstrategien im deutsch-britischen Vergleich, München und Mering.
- Backes-Gellner, U./Krings, A.* (1997): Zur relativen Vorteilhaftigkeit eines personalökonomischen Studienprogramms für die Arbeitsmarktchancen von Personalwirten, in: v. Auer, M./Laske, S. (Hrsg.): Sonderheft der Zeitschrift für Personalforschung „Personalwirtschaftliche Ausbildung an Universitäten“, München und Mering, S. 27-47.
- Backes-Gellner, U.* (2004): Personnel Economics, An Economic Approach to Human Resource Management, in: *Management Revue*, 15 Jg., Nr. 2, S. 215-227.
- Backes-Gellner, U./Werner, A./Mohnen, A.* (2006): Team Size and Effort in Start-Up-Teams – Another Consequence of Free-riding and Peer Pressure in Partnerships, SSRN Working Paper, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=518443.
- Backes-Gellner, U./Mure, J./Tuor S.N.* (2007, forthcoming): The Puzzle of Non-Participation in Continuing Training – An Empirical Study of Chronic vs. Temporary Non-Participation, in: *Zeitschrift für Arbeitsmarktforschung (ZAF)*, Themenheft 2+3: Socio-Economic-Analyses of Apprenticeship and Further Training in Germany and Switzerland.
- Backes-Gellner, U./Pull, K.* (2008): Tournament Incentives and Contestant Heterogeneity: Empirical Evidence from the Organizational Practice, ISU Working Paper Series Nr. 75.
- Bandiera, O./Barankay, I./Rasul, I.* (2005): Social preferences and the response to incentives: Evidence from personnel data, in: *Quarterly Journal of Economics*, 120. Jg., S. 917-962.
- Becker, B.E./Huselid, M.A.* (1992): The Incentive Effects of Tournament Compensation Systems, in: *Administrative Science Quarterly*, 37 Jg., S. 336-350.
- Bellemare, C./Shearer, B.* (2007): Gift Exchange within a Firm: Evidence from a Field Experiment, IZA Discussion Paper No. 2696, Bonn.
- Bessey, D./Backes-Gellner U.* (2007): Premature Apprenticeship Terminations: An Economic Analysis, ISU Economics of Education Working Paper Series Nr. 2.
- Bohnet, I./Frey, B. S.* (1999): The sound of silence in prisoner's dilemma and dictator games, in: *Journal of Economic Behavior & Organization*, 38. Jg., S. 43-57.
- Bolton, G. E./Ockenfels, A.* (2000): ERC: A Theory of Equity, Reciprocity, and Competition, in: *American Economic Review*, 90 Jg., S. 166-193.
- Camerer, C./Thaler, R. H.* (1995): Anomalies: Ultimatums, Dictators and Manners, in: *Journal of Economic Perspectives*, 9 Jg., Nr. 2, S. 209-219.
- Camerer, C. F.* (1997): Progress in Behavioral Game Theory, in: *Journal of Economic Perspectives*, 11 Jg., S. 167-188.
- Camerer, C. F.* (2003): *Behavioral Game Theory: Experiments in Strategic Interaction*, Princeton.
- Camerer, C. F.* (2005): Behavioral Economics, World Congress of the Econometric Society, London, S. 18-24.
- Camerer, C. F.* (2007) Neuroeconomics: Using Neuroscience to Make Economic Predictions, in: *Economic Journal*, 117 Jg., Nr. 519, S. C26-C42.
- de Cremer, D./Murnighan, J.K./Zeelenberg, M.* (2006): *Social Psychology and Economics*, Mahwah.

- DellaVigna, S.* (2007): Psychology and Economics: Evidence from the Field, NBER Working Paper No. W13420, Massachusetts.
- Diamond, P./Vartiainen H.* (2007): Behavioral Economics and Its Applications, Princeton.
- Ellingsen, T./Johannesson, M.* (2007): Paying Respect, in: Journal of Economic Perspectives, 21 Jg., Nr. 4, S. 135-149.
- Eriksson, T.* (1999): Executive Compensation and Tournament Theory: Empirical Tests on Danish Data, in: Journal of Labor Economics, 17 Jg., Nr. 2, S. 262-280.
- Falk, A./Fischbacher, U.* (2001): A Theory of Reciprocity, CESifo Working Paper No. 457, München.
- Falk, A./Fehr, E.* (2003): Why Labour Market Experiments?, in: Labour Economics, 10 Jg., S. 399-406.
- Fehr, E./Kirchsteiger, G./Riedl, A.* (1992): Involuntary Unemployment in the Laboratory – An Experimental Investigation of the Efficiency Wage Hypothesis, University of Vienna: Discussion paper.
- Fehr, E./Gächter, S./Kirchsteiger, G.* (1996): Reciprocal Fairness and Noncompensating Wage Differentials, in: Journal of Institutional and Theoretical Economics, 152 Jg., S. 608-640.
- Fehr, E./Schmidt, K.* (1999): A Theory of Fairness, Competition, and Cooperation, in: Quarterly Journal of Economics, 114 Jg., S. 817-868.
- Fehr, E./Fischbacher, U./von Rosenblatt, B./Schupp, J./Wagner, G.G.* (2003): A Nation-Wide Laboratory: Examining Trust and Trustworthiness by Integrating Behavioral Experiments into Representative Surveys, CESifo Working Paper No. 715, München.
- Fischer, S./Güth W./Müller W.* (2006): From Ultimatum to Nash Bargaining: Theory and Experimental Evidence, in: Experimental Economics, 9. Jg., S. 17-33.
- Fischer, S./Güth, W./Pull, K.* (2007a): Evolution in Imperfect Commitment Bargaining – Strategic versus Ignorant Types, Metroeconomica, 58. Jg., S. 299-309.
- Fischer, S./Güth, W./Pull, K.* (2007b): Is there As-if-Bargaining? in: The Journal of Socio-Economics, 36 Jg., S. 546–560.
- Frederick, S./Loewenstein G./O'Donoghue T.* (2002): Time Discounting and Time Preference: A Critical Review, in: Journal of Economic Literature, 40 Jg., Nr. 2, S. 351-401.
- Freeman, R.B./Gelber, A.M.* (2006): Optimal Inequality/Optimal Incentives: Evidence From A Tournament, NBER Working Paper No. W12588, Massachusetts.
- Gabaix, X./Laibson, D./Moloché, G./Weinberg, S.* (2006): Information Acquisition: Experimental Analysis of a Boundedly Rational Model, in: American Economic Review, 96 Jg., S. 1449-1476.
- Gächter, S./Falk, A.* (2002): Reputation and Reciprocity: Consequences for the Labour Relation, in: Scandinavian Journal of Economics, 104 Jg., S. 1-26.
- Gächter, S./Fehr, E.* (2002): Fairness in the Labour Market? A Survey of Experimental Results, in: Friedel, B./Lehmann-Waffenschmidt, M. (Hrsg.): Surveys in Experimental Economics, Bargaining, Cooperation and Electronic Stock Markets, Heidelberg, S. 95-132.
- Gneezy, U./Niederle, M./Rustichini, A.* (2003): Performance in Competitive Environments: Gender Differences, in: Quarterly Journal of Economics, 118 Jg., Nr. 3, S. 1049-1074.
- Gneezy, U./List, J. A.* (2006): Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments, NBER Working Paper No. W12063, Massachusetts.
- Grund, C./Sliwka, D.* (2005): Envy and Compassion in Tournaments, in: Journal of Economics and Management Strategy, 14. Jg., Nr. 1, S. 187-207.
- Güth, W./Schmittberger, R./Schwarze, B.* (1982): An experimental analysis of ultimatum bargaining, in: Journal of Economic Behavior and Organization, 27 Jg., S. 367- 388.

- Güth, W./Marchand, N./Rulliere, J.-L.* (1998): Équilibration et dépendance du contexte: Une évaluation expérimentale du jeu de négociation sous ultimatum, in: *Revue Économique*, 49 Jg., S. 785-794.
- Güth, W./van Damme, E.* (1998): Information, Strategic Behavior and Fairness in Ultimatum Bargaining: An Experimental Study, in: *Journal of Mathematical Psychology*, 42 Jg., S. 227-247.
- Güth, W./Kovács, J.* (2000): Is more power better? An experimental study of vetoing in ultimatum bargaining. Paper Presented at the IAREP/SABE Conference 2000 in Baden/Vienna.
- Güth, W./Pull, K.* (2004): Will Equity Evolve? An Indirect Evolutionary Approach, in: *European Journal of Political Economy*, 20. Jg., S. 273-282.
- Harbring, C./Irlenbusch, B.* (2003): An Experimental Study on Tournament Design. *Labour Economics*, 10 Jg., S. 443-464.
- Heckman, J.* (2007): The Economics, Technology and Neuroscience of Human Capability Formation, NBER Working Paper No. W13195, Massachusetts.
- Hedinger, B./Götte, L.F./Backes-Gellner, U.* (2008): Reciprocity at Work: Evidence from Matched Experimental and Personnel Data, Working Paper, Zürich.
- Hennig-Schmidt, H.* (2000): Perceptions of Fairness – An Analysis of Different Video Experiments. Paper Presented at the IAREP/SABE Conference 2000 in Baden/Vienna.
- Hoffman, E./Spitzer, M. L.* (1985): Entitlements, Rights, and Fairness: An Experimental Examination of Subjects' Concepts of Distributive Justice, in: *Journal of Legal Studies*, 14 Jg., S. 259-297.
- Irlenbusch, B./Sliwka, D.* (2003): Transparency and Reciprocal Behavior in Employment Relations, IZA Discussion Paper No. 887, Bonn.
- Kandel, E./Lazear, E.P.* (1992): Peer Pressure and Partnerships, in: *Journal of Political Economy*, 100 Jg., S. 801-817.
- Königstein, M.* (1998): Convergence to Equitable Play in the Repeated Ultimatum Game with Advance Production, Economics Department HU-Berlin, Discussion Paper No. 129, Berlin.
- Kräkel, M.* (forthcoming): Emotions in Tournaments, in: *Journal of Economic Behavior and Organization*.
- Kube, S./Maréchal, M. A./Puppe, C.* (2006): Putting Reciprocity to Work – Positive Versus Negative Responses in the Field, University of St. Gallen Economics Discussion Paper No. 2006-27, St. Gallen.
- Lazear, E.P./Rosen, S.* (1981): Rank-Order Tournaments as Optimum Labor Contracts, in: *Journal of Political Economy*, 89 Jg., Nr. 5, S. 841-864.
- Lazear, E.P.* (1995): *Personnel Economics*, Cambridge, MA and London.
- Lazear, E.P.* (1998): *Personnel Economics for managers*, New York et al.
- Lazear, E.P.* (2001): *Personnel Economics for Managers*, Interview in: *CoPers/e-HR Personalarbeit/Personalökonomik*, Jg. 4, Nr. I, S. 33-35.
- Lazear, E.P./Oyer, P.* (2007): *Personnel Economics*, NBER Working Paper No. W13480, Massachusetts.
- Lazear, E.P./Shaw, K.* (2007): *Personnel Economics: The Economist's View of Human Resources*, in: *Journal of Economic Perspectives*, 21 Jg., Nr. 4, S. 91-114.
- Loewenstein, G./Prelec D.* (1992): Anomalies in Intertemporal Choice: Evidence and an Interpretation, in: *Quarterly Journal of Economics*, 107 Jg., Nr. 2, S. 573-597.
- Mahuteau, S.* (2002): Reciprocal Fairness and Gift Exchange Practices in the Labor Contract: Econometric Analysis on a French Firms Survey, <http://ssrn.com/abstract=357140>.
- Moldovanu, B./Sela A.* (2001): The Optimal Allocation of Prizes in Contests, in: *The American Economic Review*, 91 Jg., Nr. 3, S. 542-558.

- Mullainathan, S./Thaler, R.H.* (2001): Behavioral Economics, in: International Encyclopedia of Social Sciences, S. 1094-1100.
- Niederle, M./Vesterlund, L.* (2007) Do Women Shy Away from Competition? Do Men Compete Too Much? In Quarterly Journal of Economics, 122 Jg., Nr. 3, S. 1067-1101.
- Niederle, M./Yestrumskas, A.* (2007): Gender Differences in Seeking Challenges: The Role of Institutions, <http://www.stanford.edu/~niederle/GenderChoice.pdf>.
- Pfeffer, J.* (2007): Human Resources from an Organizational Behavior Perspective: Some Paradoxes Explained, in: Journal of Economic Perspectives, 21 Jg., Nr. 4, S. 115-134.
- Pull, K.* (1996): Übertarifliche Entlohnung: ein Ergebnis vorweggenommener Verhandlungen, in: Mitteilungen aus der Arbeitsmarkt- und Berufsforschung, 26. Jg., S. 607-615.
- Pull, K.* (1999): What is the fair wage? – a model of as-if-cooperation, in: Quint-Essenzen No. 58, Trier.
- Pull, K.* (2003): Firm size, wages, and production technology, in: Small Business Economics, 21. Jg., Nr. 3, S. 285-288.
- Rabin, M.* (1998): Psychology and Economics, in: Journal of Economic Literature, 36 Jg., Nr. 1, S. 11-46.
- Rabin, M.* (2002): A Perspective on Psychology and Economics, in: European Economic Review, 46 Jg., Nr. 4-5, S. 657-685.
- Selten, R.* (2000), Eingeschränkte Rationalität und ökonomische Motivation, in: Zeitschrift für Wirtschafts- und Sozialwissenschaften, special issue no. 9, S. 129-157.
- Singer, T./Fehr, E.* (2005): The Neuroeconomics of Mind Reading and Empathy, in: American Economic Review, 95 Jg., Nr. 2, pp. 340-345.
- Smith, T.* (2006): Reconciling Psychology with Economics: Obesity, Behavioral Biology, and Rational Overeating, SSRN Working Paper, <http://ssrn.com/abstract=906159>.
- Suleiman, R.* (1996), Expectations and fairness in a modified ultimatum game, in: Journal of Economic Psychology, 17 Jg., S. 531-554.
- Tversky, A./Kahneman, D.* (1974): Judgement under uncertainty: Heuristics and biases, in: Science, 125 Jg., S. 1124-1131.
- Villeval, M.C.* (2007) Experimental Economics: Contributions, Recent Developments, and New Challenges, SSRN Working Paper, <http://ssrn.com/abstract=988298>.