Do Bonuses **Do the Trick?**

Management bonuses that provide the wrong incentives are regarded as one of the causes of the recent financial crisis. At the **Max Planck Institute for Research on Collective Goods** in Bonn, **Carsten Burhop** is studying how bonuses affect corporate success – except he has chosen historical examples to work on. After all, rewards designed to motivate managers, as well as inventors, were used as far back as the late 19th century.

TEXT **BIRGIT FENZEL**

Not very long ago, a daily paper in southern Germany ran a lead in its business section entitled "Bonus greed sparks first legal probe." The gist of it was that bank managers could find themselves in court to explain their dubious bonus practices. Apparently two stockbrokers at Westdeutsche Landesbank (WestLB) were likely to face charges for covering up high-risk transactions in order to not jeopardize their bonuses. This would be the first case of its kind to come to court in Germany.

This news marked the culmination to date of the debate surrounding the compensation system for top business managers in general and bankers in particular. Was this another case of men in high places sweetening their annual salaries with juicy extra payments despite recession and economic crisis? There has been widespread anger worldwide that the very people who are now blamed for causing the global economy to falter are lining their own pockets.

ACCIDENTAL DISCOVERY AROUSES CURIOSITY

Sitting in his office at the Max Planck Institute for Research on Collective Goods in Bonn, Carsten Burhop glances through the paper. The 36-year-old economist has an eye for the reports on management salaries and bonuses that are currently resurfacing on the business pages. His interest in the subject, however, predates the financial crisis by a long way. "While I was working on my doctorate in the archives, I accidentally came across some bank directors' employment contracts. That would have been in 2001, when the same subject was also being talked about – you remember the Enron case. Since then, I have taken things a little further," he explains.

In practice, "a little further" means that Burhop and his colleague Thorsten Lübbers have been delving into the archives of libraries, banks and major companies all over Germany. He has lost count of the hours he has spent poring over dusty piles of old stock market reports, balance sheets, patent specifications and salary agreements. But he clearly remembers stumbling across the odd fact here and there that is likely to be highly relevant to the current debate on the sense and nonsense of the bonus culture. The purpose of his project is to establish whether bonuses and performance payments genuinely lend themselves to heightening the discipline and motivation of managers.

As an economist, Burhop is particularly interested in how the additional pecuniary compensation impacts a phenomenon known to economics as the principal-agent problem. In simple terms, this refers to a serious conflict of

Dietmar Grosse

interest, for example between employer and employee, or between shareholder and corporate executive. In the case of non-standardized activities, such as managing a corporation in the interests of the shareholders, the principal is unable to perceive the actions performed by the agent or, as in our example, the shareholder is unable to perceive the work of the executive and its impact on profits and share prices. Besides, it would be far too costly for the principal to meticulously track the activities of the agent. The interests of both parties must thus be made to converge. One possibility for this lies in the structure of the employment contract.

THE DANGLING CARROT

"If shareholders want to see a rising share price, they should make the salaries of senior executives dependent on the share price moving in the right direction," says Burhop. On the other hand, there is also the consideration that the attraction of money lessens when you already have a lot of it. In other words, the more a manager earns, the more he or she must be incentivized. There is also the question of whether such behavior patterns can be controlled through external incentives. But if a donkey performs better with a carrot dangled in front its nose, why should the principle not be transferable?

In fact, there is nothing new about using rewards to enhance motivation. It happened in ancient Rome, says Burhop. "In his correspondence with Trajan, Pliny the Younger wrote that workmen can be induced to work harder if they are rewarded for it." It was not until the end of the 19th century, however, that bonuses as we know them became widespread in German commerce, as Burhop has discovered in his archive research.

It was no coincidence that his project focuses on the late 19th and early 20th centuries. That was a period of dramatic technological and institutional change and rapid economic growth, and thus promised a wealth of insightful material. This was a time at which faster communication by rail and telegraph made it possible to administer larger business undertakings, many of which took the form of stock corporations. These new big businesses also fostered the creation of new internal functions, for example in the field of research and development. Indeed, the whole success story of 19th century industrial expansion and the years that followed was essentially the result of the new technological developments that emerged from corporate research departments.

A PATENT SOLUTION TO CONFLICT

The patent offices, however, regularly credited the inventions made by salaried researchers to the companies rather than to the actual inventors. Therefore, in this domain, too, employers found it necessary to resolve the conflict between their desire for the maximum of profitable innovations and the interests of their research department employees. As Burhop describes the principal-agent problem of the time, "Why should someone invest work and effort in an invention from which he or she derives no direct benefit?"

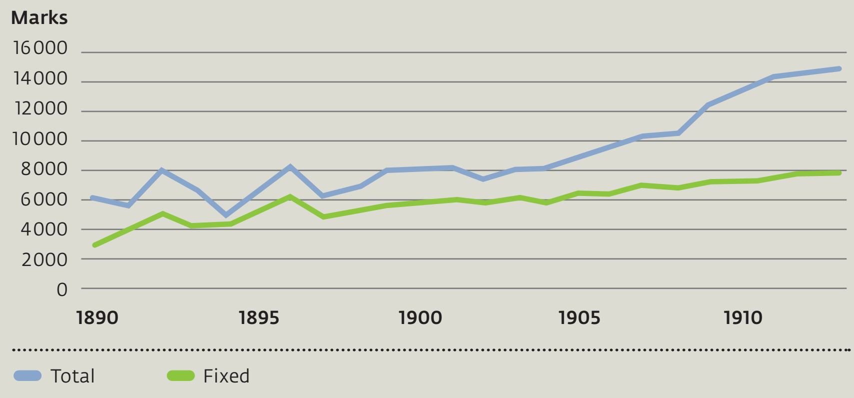
Bayer, BASF, Hoechst, Siemens and Merck – the powerhouses of German industry in the days of the German Empire – all allowed the two econo-

Dietmar Grosse

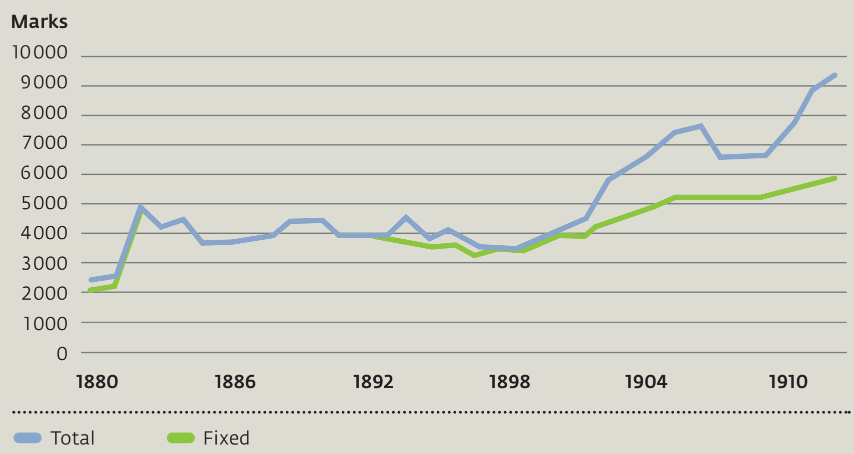
mists from Bonn to view their personnel department archives. Burhop and Lübbers found the employment contracts with research department staff at BASF, Siemens and Bayer particularly revealing. As they were able to reconstruct from the pay records, until the 1890s, there was little or no difference between the employees' fixed salaries and the amounts they actually received. "Of all the companies we studied, Bayer was initially the only one to address the principal-agent problem with the introduction of contractually agreed bonuses. Under specified conditions, the extra money paid was calculated on the basis of the profit that each innovation brought in," says Burhop. Prior to 1890, the bonuses paid by Bayer averaged no more than 1 percent of salary. It was not until after the turn of the century that the proportion of variable compensation paid to research and development staff increased to 17 percent of total income. By contrast, BASF and Siemens had no explicit bonus systems, but paid rewards for creative achievements that promised to yield a profit.

In their analyses of differing incomes and the number of patents the

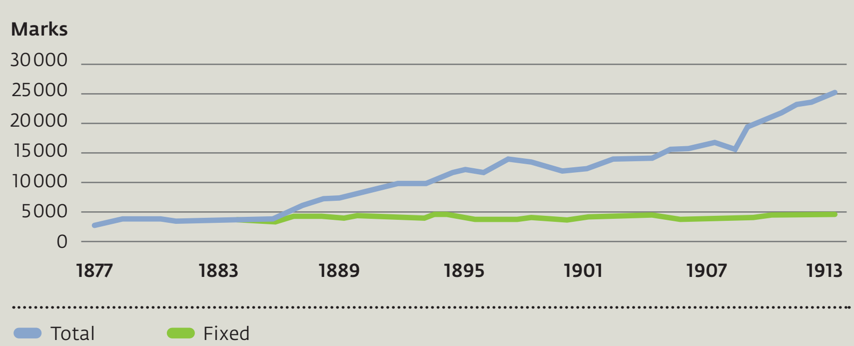
AVERAGE INCOME OF RESEARCH SCIENTISTS AND TECHNICAL STAFF AT SIEMENS, 1890 TO 1913



AVERAGE INCOME OF CHEMISTS AT BAYER, 1880 TO 1913



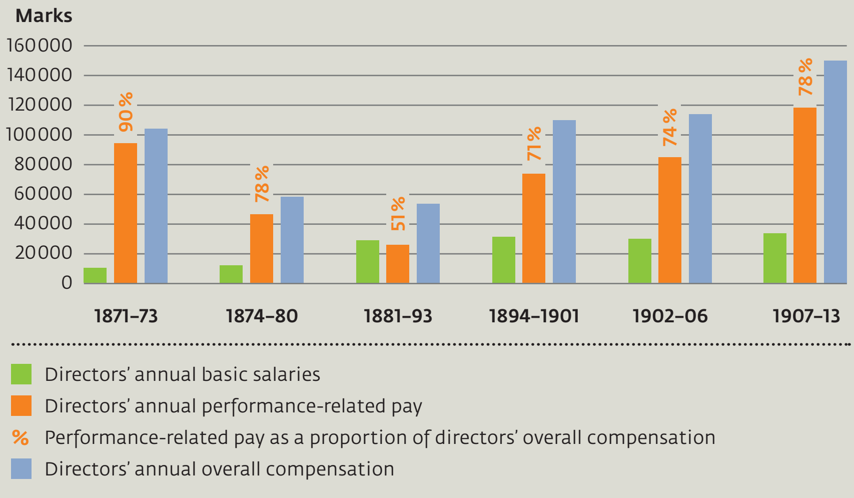
AVERAGE INCOME OF CHEMISTS AT BASF, 1877 TO 1913



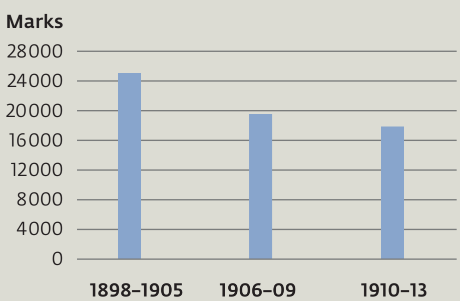
Until the 1890s, there was little difference between fixed salaries and actual payments. Not until after the turn of the century did the proportion of bonuses paid to research and development departments rise substantially.

Chart: designergold, based on material from the MPI for Research on Collective Goods

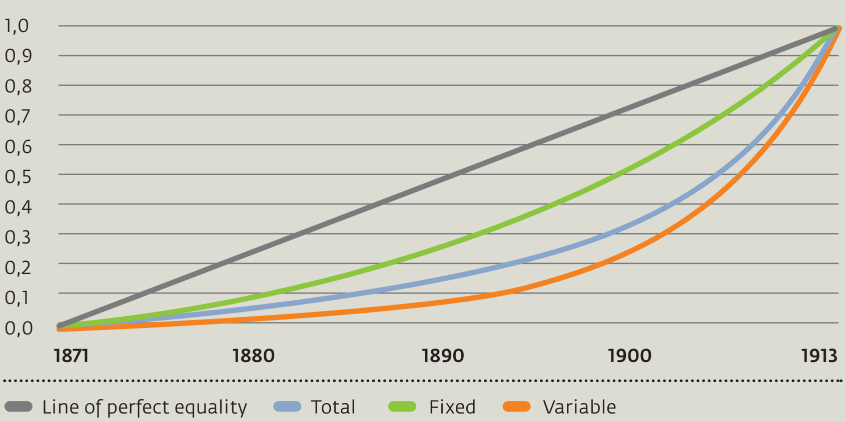
DIRECTORS' COMPENSATION / SALARIES



GUARANTEED OVERALL INCOME PAID TO DEPUTY DIRECTORS



LORENZ CURVE ILLUSTRATING BANK DIRECTORS' INCOME, 1871 TO 1913



The Lorenz curve (above) measures the concentration of income on a small number of persons. The further the curve from the line of perfect equality, the more strongly income is concentrated on fewer persons. Variable compensation was thus more strictly limited to a few managers than fixed compensation. The incentives were concentrated on a small number of them.

companies registered each year, the economists came across an interesting correlation: "It is not just the amount of pay that motivates an employee, but the way that pay is structured," explains Carsten Burhop. The effects can be inversely proportional: That is to say, when salary is increased by 1 percent, the number of high-quality patents declines by 0.6 percent. As the economists from Bonn discovered, increasing compensation in this way does anything but improve performance. But upping compensation in another way certainly does increase motivation: when the proportion of income paid as bonuses grows by a factor of 1.1, the number of patents rises by around 2 percent.

To illustrate the arithmetic, Burhop quotes the example of a researcher earning 50,000 euros in the form of a base salary of 40,000 euros and a 10,000-euro bonus: "To date, he or she has been filing 1,000 patents each year. Increasing overall income by 1 percent, from 50,000 to 50,500 euros, would have the effect of reducing output to 994 patents – if he or she simply received a higher base salary." But the picture is very different if the extra in-

Chart: designergold, based on material from the MPI for Research on Collective Goods

come is paid as a bonus. "In this variant, the bonus element of the overall income rises from 20 to 20.8 percent, so by a factor of 1.04." The number of patents thus increases by 8.

BRINGING A SMILE TO THE COAL BARONS' FACES

"This bonus effect of 8 additional patents more than cancels out the "6 patents fewer" effect of the higher total income. So overall, the number of patents increases from 1,000 to 1,002." Viewed in this way, there is an identifiable effect of bonuses on patentable inventions, but it is "very small and is visible only after a few years."

The two economists came up with similar results when they studied the data on coal mines in the Ruhr region in the 20th century and the effect of bonus payments to the managing directors. Such bonuses had been a common feature at stock corporations since the mid 19th century. Apart from bonuses, the pit owners in the early industrial years had little opportunity to influence the work of the directors in their masters' favor.

Burhop and Lübbers took a special interest in mines organized in a syndicate. Economists hold such groups in low repute. "Cartels encourage laziness," says Carsten Burhop, summing up a theory formulated by Nobel laureate Sir John Richard Hicks following his studies of syndicates in general: the biggest profit a monopoly earns is the quiet life its managers enjoy.

Our researchers set about testing this theory against the example of 28 mining companies in the Ruhr region. "The cartel that some of these firms formed minimized the competitive pressure and ensured that prices and production remained stable," says Burhop, citing the economic benefits the coal barons reaped from this policy.

To test the laziness theory, the two researchers used a mathematical model to estimate how high production could be under ideal conditions – firstly for pits exposed to the full impact of market forces, secondly for mines in a syndicate, and thirdly for companies that paid bonuses. They evaluated the number of miners and the value of the machinery and equipment used as input factors and related these to the annual output of coal.

The result surprised them both. Apparently Hicks' assessment doesn't necessarily apply to every syndicate. "It was clear that the efficiency of the mining companies was not significantly affected by membership in a cartel," Burhop explains. But he found another observation even more interesting: "Efficiency was far higher at those firms that paid substantial bonuses to their directors." On average, the pits paid their boards of directors some 77,300 German marks in bonuses. "Just by comparison, a miner earned 1,000 German marks a year in those days," adds Burhop.

Here too, Burhop and Lübbers established that 1 percent more in bonuses was enough to change the picture. For example, friction losses in production were reduced by 0.0035 percent – simply through better management and making more economical use of the means of production. With an average company losing 22.66 million marks due to efficiency losses in those days, that equates to savings of 790 marks. To achieve that, however, the shareholders had to pay an additional 773 marks in bonuses to their directors, leaving them just 17 marks bet-

Dietmar Grosse

ter off. Consequently, the owners of the mines gained little benefit from addressing their principal-agent problem with the directors they employed via the bonus route. "Of course the national economy benefits when efficiency is boosted," says Burhop: "But that was not the purpose the mine owners had in mind in paying bonuses."

The example of the coal mines in the Ruhr region shows that bonuses can work. On the other hand, their effect is minor and highly dependent on the intended goal. "The problem is not so much the idea itself, as that it channels the work effort in one direction," says Burhop. That is why he is not in favor of a general ban on bonuses, which would be more likely to harm the economy. But specifying the wrong goal can have an adverse effect. In Burhop's opinion, the present financial crisis is an example of the fatal consequences of single-minded fixation. "If I get a bonus that is directly dependent on this year's profit, I am not going to bother about next year," he continues. It was this kind of motivation that caused bankers to gamble away huge assets in pursuit of short-term gains.

When bonuses are linked to goals of this nature, they constitute a genuine source of risk. That is why, after steeping himself in historical research, our economist believes that stronger controls of the kind demanded by politicians and economic commentators are entirely appropriate. It is quite possible that the interests of business owners might even be more effectively asserted through transparency and control rather than through bonuses and other incentives – at least that was the case in the past, as research conducted by Carsten Burhop and Christian Bayer shows. The economic boom in the early years of German industrialization was followed in 1873 by a major crisis. After lengthy debate, the government responded in 1884 by reforming corporate law with stricter rules, tighter controls and harsher penalties. Prior to that time, only major shareholders had access to general meetings and made decisions on company affairs. There were few controls over the success or failure of directors, and getting rid of incapable bosses was a tortuous and expensive process.

After the law was reformed, all shareholders were permitted to attend general meetings where they had the right to vote and receive information on the company's performance in the form of a profit and loss account. The new rules also made it easier to dismiss directors who, as a result, found themselves having to make the effort without the extra pay. The monetary incentives for directors were nearly halved. Later on, more extensive regulations were introduced – such as a special tax on profit-share payments – but there is no doubt that the rules adopted in 1884 were a success. Our Bonn-based economist sees his task to be one of basic research rather than recommending solutions to current problems. But he has no objection to contributing his findings to the discussion on what action to take to keep business leaders on the straight and narrow. "After all, what worked in the days of the Empire might well also work today." ◂

Dietmar Grosse