

Bruno S. Frey

Withering Academia?*

Abstract: Strong forces lead to a withering of academia as it exists today. The major causal forces are the rankings mania, increased division of labor in research, intense publication pressure, academic fraud, dilution of the concept of ‘university’, and inadequate organizational forms for modern research. Academia, in a broader sense understood as ‘the locus of seeking truth and learning through methodological inquiry’, will subsist in different forms. The conclusion is therefore pessimistic with respect to the academic system as it presently exists but not to scholarly endeavour as such. However, the transformation predicted is expected to be fundamental.

1. An Absurd Question?

The academic community or academia, composed of universities, research institutes, academies, and other research venues, seems to be one of the most stable and long-lasting institutions in our society:

- There are few other institutions that have existed for so many centuries and have survived so many adverse conditions such as political revolutions and economic crises.
- Academia can boast great achievements in the past and the present.
- The academic sector is populated by a rapidly increasing number of students.
- Academia is supported by governments with huge financial resources flowing to it either directly, such as with state universities, or indirectly through all sorts of tax advantages.
- For-profit enterprises as well as many different kinds of private foundations give academia a large amount of financial support.
- Academia enjoys a high reputation among the media, politicians, and public officials, as well as among the public at large.

* The author gratefully acknowledges helpful suggestions for improvement by Margit Osterloh, Michael Baumann, Lea Cassar, Reto Cueni, Lasse Steiner, and Isabel Ellenberger.

Based on these considerations, it seems almost ridiculous to ponder about a possible disintegration or withering of academia. However, there are several aspects indicating that academia is not as sound as the above observations may suggest and that academia as it exists today could radically change and might even disappear.

2. Forces Undermining Present-day Academia

The following six aspects are the most important contributors to the withering away of academia. It is not denied that some of these aspects may also bolster the position of academia. The intention is, however, to focus on the more neglected forces tending to undermine academia. The six aspects are closely connected and often interact with each other. Nevertheless, it may be useful to consider them separately.

1. The *substance of scientific research matters less and less* as externally defined measures of ‘output’ take its place. Today, in many disciplines, the importance of a scientific idea and the position of a scholar are defined by *rankings*. What matters nowadays is the recognition produced by a general rankings system, normally based only on the *quantity* of scientific output in *scientific journals*, disregarding books and other forms of publication. To the extent *quality* is considered at all, it is done by counting the number of citations. Rankings provide simple measures of relative position in science, an aspect said to be particularly useful for scholars in other disciplines and public decision makers. However, rankings are faced with many serious problems (they are extensively discussed in Osterloh/Frey 2010 with a large number of references). For example, they disregard the simple fact that works are often cited because they are considered to be wrong and not because they are taken to be a valuable contribution to knowledge.

Rankings have become of ever greater importance not only in the natural sciences and medicine but also in the social sciences, in particular economics.¹ Professors are appointed, grants are received, and departments and whole universities are evaluated on the basis of publication rankings. In many cases, the decision makers involved do not take the trouble to read the respective works or to consider how much they contribute to our knowledge. To evaluate a scholar today it generally suffices to count the number of publications in journals of the top category (A+ or at least A). Little or no effort is made to evaluate the scientific interest of the publications, or to think about the potential importance of a publication for future research and society in general. Dependence on rankings has been substituted for consideration of content.

Another factor pushing academia away from scientific substance is the now prevalent policy of taking the sum of *outside funds acquired* as a

¹ The author is an economist and therefore knows about the situation in this field. Therefore, most of the examples given are from economics.

measure of scholarly output. A scholar is taken to be the better, the more money he or she brings into academia. While this may be correlated with scientific achievement, this need not necessarily be the case. It is well known that good social connections and personal ‘selling’ ability in this respect often matter more than serious scholarship. Evaluating scientific worth by attracting funds is likely to lead to distortions, favouring ‘busy-bodies’ and economic entrepreneurs over intrinsically motivated researchers.

The emphasis on rankings and attracting outside funding is necessarily perceived to be controlling by individual scholars. As a consequence, the intrinsic motivations for research is crowded out. It is known that reduced intrinsic motivation leads to less innovative research (Osterloh/Frey 2000; Frey 2000; Azoulay/Graff Zivin/Manso 2009). Measuring the quality of scholars in this way also means that teaching becomes of secondary importance. Already today, young scholars are ill advised if they devote much time and effort into teaching—it is the number of publications in top journals which determines an academic career.²

2. *Modern scientific activity is based on a marked division of labour.* The scientific production process has increasingly been divided into neatly separated steps. For instance, in economics, it has become customary that a young scholar, usually a graduate student, collects the data, a second scholar undertakes the econometric analysis, and a third scholar interprets the results and writes the paper. As a consequence, single authorship has become an exception; an increasing number of papers have three, four or even five authors. Each of them formally acknowledges full responsibility for the content of the paper. However, realistically none of the individual authors can confidently judge whether the other authors have done their work carefully and sincerely. The division of labour has led to a more efficient and rapid output of scientific results but favours partial views and discourages comprehensive considerations. Each participant in a particular scientific endeavour has to trust that the others do their work carefully. Such reliance on trust may be well taken, but there is certainly no guarantee, especially when all the authors are under strong publication pressure.

There is an analogy to the financial meltdown. Bankers giving mortgages to homeowners without adequate securities had little or nothing to do with the bankers constructing the respective derivatives and the same holds for the traders selling them to other banks and the public. Few actors bothered to consider the systemic risks produced. A similar problem may occur in academia when the production process is dissected and few, if any, academics are able and willing to consider the overall picture.

3. *Publication pressure has strongly increased in academia* over the past decades as a result of more intensive globalized scientific competition. This pressure has produced a strong rise in scholarly outputs in terms of publi-

² However, this is impossible for the academic system as a whole because far too many scholars aspire to get published in the few open spaces in top journals (Frey 2009).

cations, but it is not clear whether the quality has also risen or if it possibly has decreased.³ The incentives to publish are not necessarily the ideal ones to gain valuable new knowledge. The need to publish as much and in as highly ranked journals as possible may influence the choice of:

- *Subjects* studied. The subject should be manageable and able to produce publications within the short time span given by the grant received or the position gained whereas content is of lesser or even no importance.
- *Methods* used. For instance, to use already existing data is less risky than to collect one's own data.
- Type of *collaboration*. It is useful to team up with already established scholars in order to raise the chance that a paper is accepted in a well-ranked journal.
- *Presentation* of the results. An effort must be made to 'sell' the results as novel and relevant, although there is an incentive to suppress the works and insights of competing scholars. This applies in particular to contributions by lesser known academics, in less prominent journals, and by scholars from other disciplines.
- Extent scholars are ready to engage in '*academic prostitution*', that is, to revise their paper according to the 'suggestions' of the referees even if they know that they are questionable or even plainly wrong (see Frey 2003).

The stronger the publication pressure, the stronger are these deviations from how scholars are ideally assumed to behave (Anderson et al. 2007). Overall, such practices undermine the claim of academia to pursue true knowledge.

4. It can be predicted that *academic misconduct and fraud* have increased over recent decades.⁴ The major reason is not that scholars are less moral than they used to be. Instead, the incentives to cheat have greatly increased due to higher stress in academia.⁵ Consider the situation of assistant professors with four-year contracts. They are well aware that if they have not performed sufficiently well in terms of publications their academic careers are doomed (see, e.g., Graber/Launov/Wälde 2008; Frey 2009). If they realize during their third year that they have not produced enough publications, they can choose between two courses of action. They may continue with their work, but there is a high probability of dismissal when their contracts expire. They then have to choose a career outside academia.

³ In Australia, for example, the pressure to increase the number of publications resulted in a decrease of citations per article, that is, presumably a reduction in quality (Butler 2003).

⁴ The most recent case attracting much attention relates to the famous primate researcher Marc Hauser of Harvard University who admitted to be guilty of science misconduct.

⁵ More stress has been shown to increase the tendency to cheat, see James/Hendrickson 2008; James 2009; De Clercq/Dakhli 2009.

If, in contrast, they decide to resort to fraudulent behaviour, they have to consider the probability of being detected and the size of the punishment. The expected punishment for fraudulent behaviour tends to be negligible because it is not likely that a well-executed deception will be detected. For example, it is difficult or even impossible to find out whether the data collected have been slightly manipulated in order to produce the desired result. However, even if the manipulations are detected, the punishment is likely to be minor. The academic institutions in which the assistant professors work have an incentive to suppress the fact that fraud took place because it taints their reputations. They therefore tend to cover up the fraud and just ask the respective scholars to silently leave. Moreover, the culpable scholars can adduce a large number of defensive arguments why the ‘error’ happened. In countries rich in litigations, a university does not find it easy to legally prove a wrongdoing and therefore prefers to cover up any fraud (Enders/Hoover 2004). In the worst case, the wrongdoers are dismissed, which leaves them in the same situation as if they had not resorted to fraud. They have to leave academia. Normally, the sectors outside academia have little interest in what they often consider internal scholarly disputes, so that a dismissal has little or no negative consequences for the future careers of cheaters.

A benefit-cost comparison of the two courses of action suggests that due to the heavy publication pressure, a choice between ‘cheating’ and ‘not cheating’ in many cases will be decided in favour of the former.

It might be argued that the situation is much different for accomplished scholars with tenure. It is true that such scholars do not face dismissal. Nevertheless, they nowadays are also under considerable pressure to keep up their publishing rate. A scholar who published much in the past is expected to keep on doing so; otherwise, that particular scholar is accused of becoming lazy. Such scholars therefore are not immune to committing fraud—but they do it in different ways than assistant professors. For instance, they ask their graduate students to collect data, but, as long as the data collected are not in direct contradiction to the theories they want to communicate, they have no incentive to seriously check the research despite the fact that they sign as co-authors. Only in rare cases are senior authors made responsible for the fraud of co-workers because everyone understands that they cannot monitor everything. The recent scandals by fake stem-cell lines produced by Hwang Woo-Suk or the duplicated graphs by Jan Hendrik suggest that it is relatively easy to publish in the most prestigious journals such as *Nature* and *Science* using fabricated data. Although falsified experiments in principle can be detected, there are few incentives and possibilities to undertake serious replications in the social sciences (see Hamermesh 2007 for the case of economics).

There are many (additional) ways to commit fraud in academia. It includes stealing ideas from other scholars; the fabrication, falsification, modification and theft of data; suppression of references to the work of others; exchange of favours to become an author of a piece of research by

offering money, authorship in another paper, or even sexual services. Plagiarism of texts, while much discussed (e.g. Posner 2007; Enders/Hoover 2004) seems to lose importance due to the development of powerful anti-plagiarism software raising the detection probability of the plagiarism of texts.⁶

It can be expected that, due to the higher publication pressure now prevalent in academia, fraud is committed quite often—or at least more often than academic institutions allow us to believe. This prediction has rarely been seriously analyzed based on empirical facts. The meta-analysis by Fanelli (2009) collects 18 surveys that met the necessary criteria. Two percent of the researchers questioned were willing to confess to having acted in a clearly fraudulent way. However, lower-level fraud is more extensive. About 10 percent admitted questionable practices such as “dropping data points based on a gut feeling” or “failing to present data that contradict one’s previous research”. The figure for “questionable research practices” applies to 34 percent of researchers. When it came to airing suspicions about other scholars, the number for serious fraud strongly increased. The meta-analysis suggests that 14 percent of researchers have seen their colleagues fabricate, falsify, or modify data. Fanelli (2009, 1) believes that it appears likely that this is a conservative estimate of the true prevalence of scientific misconduct. Although Fanelli’s research collects the best evidence presently available, it concentrates almost exclusively on the natural sciences.⁷

Little is known about the extent of fraud in the social sciences. On the whole, there are only bits and pieces of evidence.⁸ In particular, it has not been empirically established that academic fraud has risen over the last decades. But, there is indirect evidence, namely the increased attention academia and government bodies pay to research misconduct. Many academies of sciences have codified rules against academic fraud. In Europe the Research Integrity Forum of the European Science Foundation is devoted to this task. In the United States, the government has been moved to establish an Office of Research Integrity; in a recent study, it comes to the conclusion that there is “an alarming picture of underreporting” (Titus/Wells/Rhoades 2008, 981).

Academic fraud induced by the mounting publication pressure has serious consequences for the existing system of scholarly research. There are negative external effects far beyond the persons committing the fraud. It distorts the choice of persons for an academic career as well as of projects

⁶ In contrast, “[...] deliberate plagiarism of ideas is extremely common [...]” believes Posner (2007, 101).

⁷ An exception is List et al. 2001 who undertook a survey among participants at the American Economic Association Meeting. See also Hand 2007 and Martinson/Anderson/De Vries 2005; 2006.

⁸ An interesting but very partial approach is the use of Benford’s Law to check whether data are fabricated. According to Tödter 2009, violations of this Law occurred in 25 percent of the articles suggesting falsification of data. See also Diekmann 2007 and Günnel/Tödter 2009. Another technique is to look at referencing errors (e.g., Harzing 2002).

submitted for funding. As a result, compared to a system with less fraudulent behaviour, a larger share of unsuited persons populates academia, and research is too much guided into unfruitful and wrong directions. Most importantly, the high reputation and the almost 'sacred' nature of scientific research and of its insights may break down, contributing to a meltdown of academia.

5. A quite different force contributing to a withering of academia relates to the *public good nature of the concept and name of 'academia', in particular of 'universities'*. Due to the demand of a highly competitive environment to attract as many paying students as possible, universities have engaged in aggressive sales pitches and have transformed themselves into for-profit universities (Economist 2010a). They have lowered their standards in order to attract a larger number of students paying. It is not unheard of that students who have to pay a considerable amount of money believe that they have acquired the 'right' to pass their exams and to be rewarded with a degree upon completion of their studies. This holds in particular for the countless summer courses for foreign students as well as for the numerous Executive Masters in many different areas going far beyond Executive Masters in Business Administration. These students are not expected to gain the same level of education and aptitudes as the 'normal' students, but they profit to the same extent from the high reputation of a particular university.

The high reputation of a university is a public good shared by all professors and present and former alumni but it is undermined by having too many students of lower quality. The leadership of a university with a high reputation of course is aware of this fact and seeks to maintain quality. However, the countervailing forces are strong because the pernicious effect of diluting the good name of universities is only visible in the long run (after most university presidents have already left). In contrast, bringing in paying students raises short-term revenue that can be used to enlarge the university and to therewith bolster its prominence.

6. Traditional academia may also wither away because *the existing organizational form is no longer adequate for the way academic activities are undertaken today*. Scholars no longer need to be at a particular university in order to benefit from a research environment. Today, leading scholars have most research contacts with colleagues from other scientific institutions instead of their own. Also, they no longer need the facilities of their own university, in particular its library, as they can access all they need via the Internet. In addition, the globalization of research has made scholars more mobile and as a result many simultaneously belong to various universities and scientific venues at the same time as can readily be seen from the many affiliations indicated in publications. The advantage of 'place-based' universities disappears (Economist 2010b).

Students also have disassociated themselves from particular universities when they take their courses online and combine courses from differ-

ent universities. Although they get their certificates from one particular university, their education is a reflection of many different sources. In principle, the body giving the certificate need not offer any courses at all and need not even be an academic institution.

It may also be doubted whether the strong pressure to engage in cooperative research is as beneficial as is commonly claimed. Presently, scholars are pushed into ‘clusters’ and other research groups. Yet there is evidence that this does not promote good and innovative research (see Osterloh/Frey 2010).

The precarious unity of research and teaching is further undermined. Pure ‘research’ universities have become common. This means that universities involved in teaching are second-class, leading to de-motivated scholars. In contrast, successful scholars at research universities get many additional benefits, not only in terms of income. Ivy League universities now grant their full professors a sabbatical every third, rather than every seventh year (Economist 2010b).

Both with respect to research and teaching, the traditional universities have lost much of their traditional functions. This contributes to the withering of academia as understood today.

The six forces undermining present-day academia have all become increasingly important over time. I do not argue that they did not exist in the past; the picture of an ideal traditional academia is certainly mistaken. However, the undermining forces discussed have gained in strength. There may well be a ‘tipping point’ situation. The existing establishments of academia may seemingly flourish while the forces leading to their disintegration are hardly visible, and partly suppressed. A sequence of shocks, such as well-publicized cases of major fraud in academia, may lead to a sudden change in view. Academia may then receive bad press, be ridiculed, and quickly lose ground. Under these circumstances, the forces presently supporting the existing academic community will be undermined. In particular, having a century old tradition may prove to be a disadvantage instead of an advantage because it may suggest that it has outlived its usefulness. The large financial resources flowing from government and the private sector into the academic sector may suddenly be interpreted as a striking example of waste. The high reputation presently enjoyed may make it a particularly attractive target for destruction as it showers attention on the persons acting as destroyers. The great achievements of academia in the past may well be reinterpreted as purely negative. For example, the great insights gained in nuclear physics may mainly be perceived as contributing to the destruction of nature and mankind.

3. Where Is Academia Heading?

It would be mistaken to assume that academic activities would vanish and all science disappears. The need to seriously and methodically deal with the problems in our world certainly remains. However, if the arguments discussed above are

valid, the *institutional character of academia will fundamentally be transformed*.⁹ In particular, the trend towards large, well-funded university campuses and huge research centres with the concomitant building structures will disappear.

On the basis of the six undermining aspects discussed above one may speculate in what direction this transformation will go.

1. *Rankings and outside funding*

The rankings mania may be expected to lead to more and more rankings, which then will be aggregated to super rankings and super rankings of super rankings . . . until it becomes clear to everyone that numerical evaluations of academic research lead to nothing, and people return to evaluate the *content* of science. Signs are already visible. Good researchers now seek to collaborate with ‘interesting’, ‘promising’, and ‘extraordinary’, colleagues irrespective of how these scholars are ranked.

There may come a time when decision-makers at research institutes, faculties and universities doubt whether a continuous increase in outside funding is indeed desirable. Instead of enlarging the size and the academic hierarchy going with it, the advantages of staying small but to produce innovative and challenging research may, may be appreciated.

2. *Division of labour in research*

It is difficult to conceive that this tendency will be discontinued. However, it is likely that ‘specialists on systemic effects’ trying to understand the overall picture will emerge and will be trained. The constant demand for interdisciplinary research points in this direction. However, under the present conditions, it essentially means the end of a career for a (young) scholar because the rankings are defined in terms of contributions to a *particular* discipline. Only some older scholars, who are less in need to meet the publication demands by the present academic system, can to some extent afford to work seriously in an interdisciplinary way.

3. *Publication pressure*

The emphasis on quantitative publication and mechanically structured qualitative measures is likely to end when it becomes clear that it does not create the most relevant and insightful scholars (Osterloh/Frey 2010). To accept open-access publications on the Internet with minimal or no interventions by referees may be a first step.

An extreme and idealistic solution would be to publish scientific contributions anonymously. After all, it should not matter *who* wrote an article but only whether its *content enlarges our knowledge*. There are, of course, many problems with such a solution. An obvious one is that scholars would no longer have an extrinsic incentive to publish. Nevertheless, the force of this incentive argument should not be overestimated. Many scholars are intrinsically motivated to a considerable extent and would still pursue their research and would still publish even if their name was not published. In

⁹ Reading 1996 and Bailey 2008 argue that universities are ‘in ruins’ due to missing common values, i.e. due to very different reasons.

Wikipedia, the entries are written and published by anonymous persons, and it nevertheless flourishes. Similarly, some high quality newspapers and weeklies do not reveal the author of an article, *The Economist*, edited in the UK, being an example.

4. *Academic fraud*

Once rankings have lost their prominent role as evaluation measures and the publication pressure is eased, scholars will have fewer incentives to engage in misbehaviours in order to further their academic careers. However, it would be naïve to assume that fraud will disappear. The recognition by other scholars and fame in the public are still potent factors inducing people to deviate from the ideal behaviour of a scholar.

Various other suggestions have been put forward to reduce or eliminate academic fraud. For instance, a scholar associated with the U.S. Office of Research Integrity advances the following recommendations (Anderson 2009): Greater attention to scientific misconduct; development and articulation of national and institutional policies on research conduct and integrity; international cooperation in inquiries, investigations, and adjudication of cross-national misconduct; alignment of institutional and national policies on research integrity; and intensified and improved training in the responsible conduct of research. These recommendations are certainly helpful, but it is doubtful whether they are effective. As pointed out above, the scholars and universities involved have an interest in not revealing the academic fraud but to suppress it. They therefore will engage only half-heartedly in the recommendations just listed.

5. *University image*

The term ‘university’ has already been diluted to a large extent. In many countries, lower level institutions may officially use the name though their research performance is clearly not of the same standard as traditional universities. For scholars who plan to be active in the future, the reputation of the university in which they work will be of little importance as their own prestige will depend more on their personal achievement. They have little reason to oppose the dilution of a university’s reputation and name because they are no longer committed to one particular university but are associated with several academic places. This development is likely to continue at an even more rapid rate until the title of ‘university’ is no longer of any value.

6. *Dissolution of universities*

The existing universities with their campuses and buildings are likely to slowly disappear and virtual identities take up the role of a ‘scholarly community’, which is no longer related to a particular venue at a particular place. These communities are likely to be loose associations and may often only exist virtually. This means that the individual scholar’s position is reaffirmed compared to the situation in hierarchically organized research units.

4. Conclusion

I have argued that there are strong forces undermining the *present-day* academic system. The major forces identified are the rankings mania, the increased division of labour in research, the intense publication pressure, academic fraud, dilution of the concept of ‘university’, and the independence of scholars and students from particular universities. These forces are seen to lead to a meltdown of academia. In particular, the present university system is expected to radically change and thus a century old tradition to die.

Academia in the broader sense, that is, ‘the locus of seeking truth and learning through methodological inquiry’, will continue to subsist in *different forms* because it performs a vital function in society. The particular forms it will take are yet unknown. However, it can be expected that the future of innovative research in many disciplines, in particular in the social sciences, lies in smaller rather than in the bigger units presently promoted. The large university campuses and huge research centres with the concomitant building structures and administrative hierarchies tend to disappear.

The conclusion therefore is pessimistic only with respect to the academic system as it presently exists but not to scholarly endeavour as such. However, the transformation predicted is expected to be fundamental and to perhaps take place sooner than one might think.

Bibliography

- Anderson, M. S. (2009), *Scientific Inquiry: Maintaining the Legitimacy of Research Enterprise*, Global University Network for Innovation, URL: <http://web.guni2005.upc.es/news/detail.php?id=1321> (09/09/2010)
- /E. A. Ronning/R. De Vries/B. C. Martinson (2007), The Perverse Effects of Competition on Scientists’ Work and Relationships, in: *Science and Engineering Ethics* 13, 437–461
- Azoulay, P./J. S. Graff Zivin/G. Manso (2009), *Incentives and Creativity: Evidence from the Academic Life Sciences*, Mimeo, Sloan School of Management, December 2010
- Bailey, R. S. (2008), *Is the University in Ruins?*, Institute for Economic Development Policy, Discussion Paper Series No. 2008–02
- Butler, L. (2003), Explaining Australia’s Increased Share of ISI Publications—The Effects of a Funding Formula Based on Publication Counts, in: *Research Policy* 32, 143–155
- De Clercq, D./M. Dakhli (2009), Personal Strain and Ethical Standards of the Self-employed, in: *Journal of Business Venturing* 24, 477–490
- Diekmann, A. (2007), Not the First Digit! Using Benford’s Law to Detect Fraudulent Scientific Data, in: *Journal of Applied Statistics* 34, 321–329
- Economist (2010a), *For-profit Higher Education. Schools of Hard Knocks*, 11/09/2010, 55
- (2010b), *Schumpeter: Declining by Degree. Will America’s Universities Go the Way of Car Companies?*, 04/09/2010, 64
- Enders, W./G. A. Hoover (2004), Whose Line Is It? Plagiarisms in Economics, in: *Journal of Economic Literature* 42, 487–493

- Fanelli, D. (2009), How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data, in: *PLoS ONE* 4, e5738.doi: 101371/journal.pone.0005738
- Frey, B. S. (2000), *Not Just for the Money. An Economic Theory of Personal Motivation*, Cheltenham–Northampton
- (2003), Publishing as Prostitution?—Choosing between One's Own Ideas and Academic Success, in: *Public Choice* 116, 205–223
- (2009), Economists in the PITS, in: *International Review of Economics* 56, 335–346
- Graber, M./A. Launov/K. Wälde (2008), Publish or Perish? The Increasing Importance of Publications for Prospective Economics Professors in Austria, Germany and Switzerland, in: *German Economic Review* 9, 457–472
- Günnel, S./K.-H. Tödter (2009), Does Benford's Law Hold in Economic Research and Forecasting?, in: *Empirica* 36, 273–292
- Hamermesh, D. S. (2007), *Replication in Economics*, NBER Working Paper No. 13026, National Bureau of Economic Research
- Hand, D. (2007), Deception and Dishonesty with Data: Fraud in Science, in: *Significance* 4, 22–25
- Harzing, A.-W. (2002), Are Our Referencing Errors Undermining Our Scholarship and Credibility? The Case of Expatriate Failure Rates, in: *Journal of Organizational Behavior* 23, 127–148
- James, H. S. Jr. (2009), *Is the Just Man a Happy Man? An Empirical Study of the Relationship between Ethics and Subjective Well-being*, Working Paper No. AEWP 2009–07, Department of Agricultural Economics, University of Missouri
- /M. K. Hendrikson (2008), Perceived Economic Pressure and Farmer Ethics, in: *Agricultural Economics* 38, 349–361
- List, J. A./C. D. Bailey/P. J. Euzent/T. L. Martin (2001), Academic Economists Behaving Badly? A Survey on Three Areas of Unethical Behavior, in: *Economic Inquiry* 39(1), 162–170
- Martinson, B. C./M. S. Anderson/R. De Vries (2005), Scientists Behaving Badly, in: *Nature* 435, 737–738
- / — / — (2006), Scientists' Perceptions of Organizational Justice and Self-reported Misbehavior, in: *Journal of Empirical Research on Human Research Ethics* 1, 51–66
- Osterloh, M./B. S. Frey (2000), Motivation, Knowledge and Organizational Form, in: *Organization Science* 11, 538–550
- / — (2010), *Academic Rankings and Research Governance*, Working Paper Series No. 484, Department of Economics, University of Zurich
- Posner, R. A. (2007), *The Little Book of Plagiarism*, New York
- Reading, B. (1996), *The University in Ruins*, Cambridge/MA–London
- Titus, S. L./J. A. Wells/L. J. Rhoades (2008), Repairing Research Integrity, in: *Nature* 453, 980–982
- Tödter, K.-H. (2009), Benford's Law as an Indicator of Fraud in Economics, in: *German Economic Review* 10, 339–351