

## Chemical Industry Less Innovative

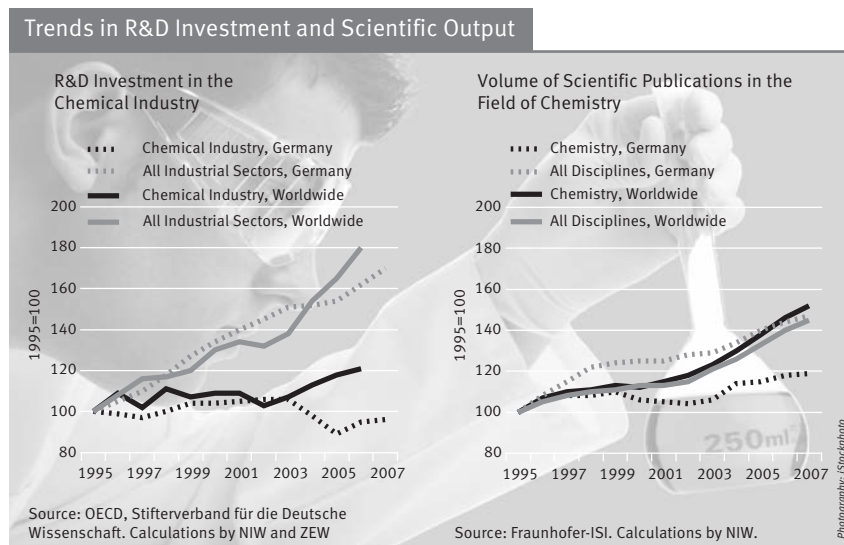
*The chemical industry is extremely important in the innovation systems of industrialised countries. It supplies many industrial sectors with important innovative materials. While Germany has traditionally been specialised in the chemical industry and chemical research, the country has lost ground in terms of its scientific productivity and R&D spending. This is the finding of a study commissioned by the German Chemical Industry Association (VCI), carried out by the Centre for European Economic Research (ZEW) in partnership with the Lower Saxony Institute for Economic Research (NIW).*

the publication output of German chemistry researchers began to increase again as well.

### Important Input for Innovation

The findings obtained through research are an important input for innovation in the chemical industry. In 2005-2007, half of all German chemical companies worked together with scientific institutions in order to develop or introduce innovations. In this regard, German companies partnered primarily with domestic institutions. Just two percent of companies who cooperated with scientific institutions worked exclusively with foreign partners; of the remaining companies, some two-thirds only cooperated with domestic partners. In the light of these findings, one might expect the high volume of scientific publications in the field of chemistry to translate (with a corresponding delay) into higher industrial R&D investment. However, this has not been observed to date.

Nominal worldwide R&D investment by the chemical industry in 2006 was



The number of scientific publications in the field of chemistry increased at a particularly fast rate between 2000 and 2007. Over this period, the number of published professional articles in the field of chemistry tracked by the Science Citation Index increased worldwide at an annual rate of 4.5 percent, whereas the average annual increase in all other scientific fields was only 3.6 percent. Emerging nations, particularly China, India and South Korea, accounted for a considerable portion of this growth.

Germany's scientific output in the field of chemistry was unable to match this pace. The volume of articles pu-

blished in the field of chemistry only increased by an annual average of 1.7 percent in Germany, leaving the country not only trailing the US (+2.7 percent), but also behind the average annual increase for all scientific disciplines in Germany (+2.3 percent). One reason for Germany's relative weakness in terms of publication output in the field of chemistry may be the staff cuts that took place in the chemistry faculties of German universities between 1995 and 2000. During that period, the number of academic positions fell at an annual rate of 4 percent. Beginning in 2000, research faculties began to grow again, and from 2004 onward

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## RESEARCH FINDINGS

just 20 percent above its 1995 level. This corresponds to an average annual growth rate of 1.7 percent. In Germany, however, the rate of growth was lower than this average, and stands in sharp contrast to the R&D investment growth trend for all industrial sectors. Worldwide R&D spending by industrial companies grew by 5.5 percent annually between 2000 and 2007; in Germany the rate of growth for all sectors was 4.5 percent.

Various potential causes can be cited for the weak R&D growth witnessed in the chemical industry. One potential cause is that emerging countries are accounting for an ever-larger share of worldwide demand for chemical goods. This trend is also associated with a

sharp rise in demand for less research intensive chemical goods (construction, plastics). Furthermore, the chemical industry profits little from the demand for innovations stemming from the knowledge-intensive service sector. Finally, in many new fields of technology (such as nanotechnology or white biotechnology) major breakthroughs have yet to be achieved.

Current trends present a challenge for the chemical industry in its role as a driver of growth in Germany:

- A lower increase in innovation potential means that price competition becomes more important.
- Considerably higher R&D efforts are necessary to exploit new fields of

innovation, such as the energy and environmental sectors.

- Several emerging countries such as South Korea and China are rapidly increasing their scientific and technological capacities in the field of chemistry and will become serious competitors in research and innovation over the mid-term.

In order to ensure its long-term competitiveness, the German chemical industry must specialise further in innovation-intensive subsectors and products. For this to take place, however, higher R&D investments are necessary.

The complete study is available in German at: [www.zew.de/projekt813](http://www.zew.de/projekt813)

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## Younger Pupils More Often Victims

*An international comparative study by the Centre for European Economic Research (ZEW) has investigated whether children who begin school at an earlier age more frequently become victims of violence and bullying in school. The study, which draws on data from seventeen nations, confirms that younger children in a class are more frequently harassed by other pupils than their older classmates.*



*For boys and children with immigrant background the risk of being bullied in class is particularly high.*

A number of current publications in the field of educational economics have explored the effects that the age of initial school enrolment has on academic success and children's cognitive development. However, little attention has been given to other aspects of personal development in relation to enrol-

ment age. For this reason, the ZEW has examined how age impacts social outcomes. In particular, it was asked whether children who are observed at a specific time point (in the fourth grade) suffer harmful effects from being the youngest children in their class due to school enrolment at comparatively early age.

On the basis of individual data on pupils from seventeen nations who took part in the IGLU primary school study, the following results were obtained: children who are younger than their classmates due to official enrolment cut-off dates report experiencing bullying and violence in school significantly more often than older children. In this connection, boys and pupils with immigrant backgrounds are the most frequent victims of bullying and violence.

### Poorer Test Scores

Within individual nations there is a positive correlation between the impact of age on primary school grades and the age effect upon social outcomes. Children who suffer from bullying and violence because of their age also tend to have poorer test scores. While all of the countries included in the study use cut-off dates for initial school enrolment, the absolute ages at which pupils are first enrolled vary. The age effect thus seems to be independent of the absolute age (five, six or seven years old) that children begin school.

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## RESEARCH FINDINGS

# Study Calls for Elimination of 4.8 Billion Euro in Tax Breaks

*Five of the twenty largest tax breaks in Germany should be eliminated, including the tax exemptions for employee savings allowances as well as for Sunday, holiday and night-shift bonus pay. This is the recommendation of a study carried out on behalf of the German Ministry of Finance by the Fifo Institute for Public Economics, the Centre for European Economic Research (ZEW) and Copenhagen Economics, a Danish consulting firm.*

The study assessed tax breaks worth a total of 18.1 billion euro using a traffic light system: a red light was given to tax breaks recommended for repeal, and a yellow light to tax breaks which were essentially justified but in need of reform. A green light, by contrast, was assigned to tax breaks approved of in their current form.

for Sunday, holiday and night work should be abolished, according to the study's authors. The elimination of this exemption would lead to higher tax and social insurance revenues, greater tax transparency and a more egalitarian distribution of income, the authors argue.

The reduced tax rate for cultural and entertainment services (theatre, opera,

ding to the study. This exemption benefits a form of transportation that produces the greatest volume of greenhouse gases. Furthermore, the road- and rail-based competitors to air transport are unduly disadvantaged, as they are subject to energy taxes.

A red light was also issued to the tax exemption on "employee savings allowances" (the so-called "Arbeitnehmersparzulage", i.e. a dedicated cash contribution made by employers to specific investment products on behalf of their employees). The study's authors argue that incentives to save are of little use to individuals who have no ability to save. As the savings rate in Germany is already quite high, the employee savings allowance creates unnecessary incentives, resulting in deadweight losses.

The study additionally speaks out against the tax benefit granted to real estate investment trusts (REITs) for the amortisation of hidden reserves. This tax benefit is said to be superfluous, as REITs are already an attractive financial vehicle.

## Savings of over Ten Billion Euro

The ten tax breaks identified by the study in need of fundamental reform account for annual revenue losses of 10.5 billion euro. While the study issued a yellow light to tax benefits for handcraft and household services as well as to energy tax subsidies for the manufacturing, agricultural and forestry industries, the authors were ultimately approving of 2.8 billion euro in tax breaks in their current form. The capital gains allowance on personal income received a green light, as did subsidies for capital-equipment investments and for the so-called "Riester-Rente", a government-supported pension scheme.

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*No clearance for take-off: The study proposes eliminating the mineral tax exemption on aviation fuel.*

Alongside economic effectiveness and potential deadweight losses, the study examined the extent to which tax privileges for specific groups and activities were justified and fair. In accordance with subsidy guidelines adopted by the German government in 2006, the researchers also asked whether the examined tax breaks should be converted into direct financial aid, which is easier to manage and often cheaper fiscally.

Tax breaks worth some 4.8 billion euro were red-lighted by the study. Particularly the tax exemption on bonus pay

(concerts etc.) is also viewed as unjustified by the authors. While it can be assumed that some demand stimulus results from this subsidy, it incentivises behaviour that a great many individuals – particularly those from wealthy households – would engage in anyway, resulting in a type of deadweight loss known in German as a "Mitnahmeeffekt". For this reason, the authors state that an alternate subsidy programme that targets specific segments of the population would be a better option.

The mineral tax exemption on kerosene should be done away with, accor-

## RESEARCH FINDINGS

# ZEW Study Shows Inefficiency in National Real Estate Stock Markets

Economists today are largely in agreement that the information efficiency of stock markets can be described, at the very least, as weak. Consequently, it is supposed that it is not possible for investors to achieve excess returns through a systematic divergence from a buy-and-hold strategy. A recent analysis conducted by the Centre for European Economic Research (ZEW) has shown, however, that international real estate stock markets exhibit this (weak) informational efficiency only to a limited extent. Moreover, the study demonstrates that there are national markets in which trading strategies achieve higher returns than a buy-and-hold strategy.

The efficient market hypothesis says that security prices fully reflect all information available at a given point in time. The investigation of weakly efficient markets focuses on the question of whether current prices take into account all information that can be derived from past securities price trends. For stock markets in general, the hypothesis that markets are informationally efficient has mostly been confirmed – at least in its weak form. This means that it is not possible for investors to achieve returns in excess of a buy-and-

tes returns between January 1990 and December 2006. The majority of traditional statistical test procedures used in the study refute the hypothesis of weak information efficiency for real estate stock markets. The only case in which the hypothesis of weak information efficiency could not be discarded in any of the four tests was the Australian real estate market. A trading strategy based on moving averages was also implemented due to its practical relevance and as a further robustness test of the results.

Average Annual Returns in Selected Markets in Percent

Real Estate Stock Markets	Buy-and-Hold Strategy	Trading Strategies Without (With) Transaction Costs			
		I	II	III	IV
Australia	15,80	9,92 (2,43)	8,65 (3,65)	8,79 (6,03)	11,55 (10,63)
Germany	7,70	10,01 (3,33)	9,76 (5,37)	9,21 (7,00)	8,87 (8,22)
France	15,83	13,40 (6,01)	14,57 (9,57)	18,59 (16,17)	17,63 (17,10)
Hong Kong	12,45	36,98 (29,05)	31,19 (26,29)	24,66 (22,10)	17,57 (16,89)
Canada	12,53	18,20 (10,78)	36,93 (11,20)	11,52 (8,88)	13,03 (12,34)
Sweden	2,72	19,66 (12,38)	21,04 (16,22)	17,05 (16,48)	21,89 (16,67)
Switzerland	8,73	-14,44 (-21,56)	-6,96 (-12,21)	-2,96 (-6,19)	8,28 (7,49)
Singapore	7,66	28,46 (20,61)	20,56 (15,68)	22,30 (19,85)	13,90 (12,92)
United Kingdom	13,12	18,07 (11,03)	15,90 (11,17)	18,85 (16,62)	18,51 (18,21)
United States	20,25	22,61 (15,32)	19,27 (14,58)	18,30 (15,84)	18,10 (17,38)

Source: ZEW

hold strategy when using trading strategies based on technical analysis.

Nevertheless, very few studies have analysed the weak information efficiency of real estate markets outside of the US. Addressing this gap in research, the ZEW study (Discussion Paper No. 09-054) examines real estate stock returns in a global context, in a total of 14 national markets. The study investiga-

## Excess Returns With Trading Strategies

The table shows the average annual returns for the examined time period achieved with either a buy-and-hold strategy or one of the four evaluated trading strategies. Overall, at least one of the four trading strategies achieved higher returns than the buy-and hold



Photography: Digitalstock

strategy in all markets except the Australian and Swiss real estate markets (when excluding transaction costs). When transaction costs are considered, the buy-and-hold strategy achieved higher returns than any of the trading strategies in the US and Canadian markets. For the remaining markets, however, at least one trading strategy proved to be more advantageous than the buy-and-hold strategy. Trading strategies proved to be particularly advantageous in extremely volatile markets such as Hong Kong and Singapore. As the US and Australian real estate stock markets in particular have a relatively long history and solid institutional foundations, the study's results suggest that inefficiencies in national markets diminish as the markets become more developed.

It thus remains to be seen to what extent a heightened interest on the part of institutional investors and analysts, the availability of a greater number of derivative products, and the gradual maturity of the market itself will increase efficiency of individual real estate markets.

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## ZEW CONFERENCE

# Competition in End-Customer Markets for Electricity and Gas

Since 1998 household customers in Germany have been able to choose their power supplier, and since 2005, their gas supplier. The market opening was introduced to foster more competition and lower prices in the long run. However, energy prices have actually risen sharply in the course of the past decade. At the same time 90 percent of households continue to obtain their electrical service from the same provider as before – for gas, the proportion is even higher, at more than 95 percent.

Why does competition in the end-consumer market for electricity and natural gas develop so hesitantly? This was one of a number of questions explored at a symposium held at Centre for European Economic Research (ZEW) at the end of November 2009. The symposium was organised by the German chapter of the International Association

its electricity market for major customers in the 1980s, and yet has held firmly to a policy of government regulated electricity supply for household customers. In the following presentation, Tim Mennel and Nikolas Wölfing, both of ZEW, searched for signs of price inflation in end-consumer markets. They came to the conclusion that an

Clearly, the willingness of German customers to switch energy suppliers lags behind that of British households. The presentation by Phil Burns from the London consulting firm Frontier Economics made this point clear. According to Burns, British consumers frequently make use of their right to switch providers, although the British market has consolidated itself following numerous mergers.

## Intelligent Energy Meters

Georg Erdmann, professor at the Technical University of Berlin and president of the IAEE, discussed the introduction of “smart metering”, planned by the German government. The term refers to the real-time measurement and pricing of electricity and natural gas usage with advanced meters. The German government expects smart metering to increase the technical efficiency for power supply systems.

According to Erdmann’s estimation, smart metering is a welcome step from the perspective of environmental policy. However, this innovation is not compatible with competition in the end-consumer market. According to Erdmann, the high investment costs that would be associated with widespread installation of smart meters cannot be borne by utility providers.

By contrast, Kai Paulssen of the Federal Network Agency defended the strategy of his organisation, which aims at the step-by-step introduction of smart metering in the deregulated marketplace without any additional charges for end consumers.

The lively participation in the debates permitted a rewarding exchange between academics and practitioners. Plans are for the series of joint GEE/ZEW symposia to be continued this year.

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*Professor Erdmann speaking at the symposium on deregulated end-customer markets at the ZEW.*

for Energy Economics (IAEE) in cooperation with the Department of Environmental and Resource Economics, Environmental Management at ZEW.

In his opening presentation, Andreas Löschel, head of ZEW’s Department of Environmental and Resource Economics, Environmental Management, highlighted that market opening for household customers was not a necessary component of the EU energy market reform. Dr Löschel pointed to the example of Chile, which deregulated

electricity and natural gas market for customers willing to switch was beginning to establish itself.

## Frequent Switch of Utilities

This perspective was confirmed by Peter Reese of the consumer portal Verivox. In his thorough and detailed presentation, Reese delved into differences between various regions in Germany and described the profile of customers willing to switch their supplier.

## ZEW CONFERENCE

## Workshop on Social Software and Knowledge Formation at ZEW

*The Centre for European Economic Research (ZEW) and the Knowledge Media Research Center (KMRC), Tübingen, held a workshop at the beginning of November 2009 on the "Potential of Social Software for Knowledge Creation and Economic Performance", which brought together scholars from the fields of psychology, economics, pedagogy and business information systems.*

Fourteen young researchers were selected from a large number of applications to present their work at the conference. The conference's opening speech was given by Alessandro Acquisiti of Carnegie Mellon University in Pittsburgh. Using a mathematical procedure, Acquisiti showed how personal data visible on the social network site Facebook can be misused in order to discover an individual's social security number. The presentation was a convincing demonstration of how the thoughtless disclosure of personal data on the Internet can lead

to privacy risks. With the presented method, Acquisiti was able to correctly identify the social security number of an individual user in 80 percent of cases.

In the second keynote presentation, Tom Postmes of the University of Groningen in the Netherlands showed how social identity is formed in online networks. Using online experiments, he was able to demonstrate that over time, a tendency towards convergent attitudes occurs among different groups in social networks. The process of convergence toward a specific norm is related

to the fact that a certain feeling of "togetherness" develops. Specific experimental manipulations resulted in an acceleration of this process. For example, the development of a social identity is fostered by the group's relative demarcation from another group.

The presentations by young researchers covered a wide range of subjects, including research collaboration between different company sites, the application of blogs in teaching and the effects of social tags – the keyword indexing of contents on the Internet – upon knowledge generation.

The programme and further information about the workshop is available at [www.zew.de/veranstaltung1034](http://www.zew.de/veranstaltung1034).

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## The First ReCapNet Conference at ZEW

*The first meeting of the Leibniz Network on Real Estate and Capital Markets (ReCapNet) took place at ZEW on 30-31 October 2009. This international research network, launched at the beginning of 2009, investigates the consequences of the increasing importance of capital market financing for real-estate markets.*

In her presentation, Sau Kim Lum of the National University of Singapore discussed the effects of government housing policies on real estate prices within the context of an expanded consumer-based asset pricing model. Daniel Kohler of the University of Bamberg compared economic and geographic diversification strategies in the real estate market. Liang Peng of the University of Colorado at Boulder discussed how fluctuating credit availability intensifies real estate market cycles. Christian Rehring of the University of Regensburg presented findings from his research into the return characteristics of direct and indirect

real estate investments in the US and UK. Two additional presentations addressed the decision-making behaviour of international real estate investors. André Scharmanski of the Federal Institute for Research on Building, Urban Affairs and Spatial Development explored path dependencies in investment behaviour, while Sabine Dörry of the University of Frankfurt considered the influence of educational standards for real estate professionals. Mortgage markets were the focus of presentations by Christian Hott of the Swiss National Bank and André Ebner of the University of Munich. Hott described a simulation model for



*Sau Kim Lum speaking at ZEW.*

credit defaults in the mortgage market that he calibrated with data for the US, UK and Switzerland. Ebner explored the determinants of equity withdrawal by homeowners in the Netherlands.

Further information: [www.recapnet.org](http://www.recapnet.org)  
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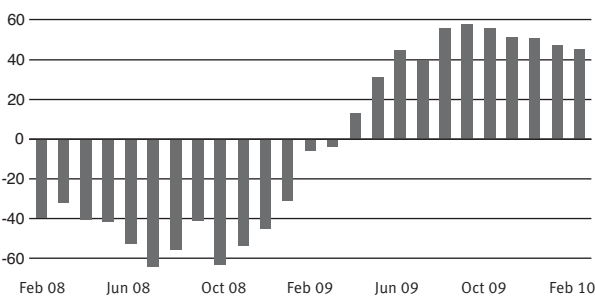
ZEW FINANCIAL MARKET DATA

## ZEW Financial Market Surveys February 2010

The ZEW conducts three monthly surveys questioning financial market experts for their expectations within six months time for essential financial market data in several European countries and the Eurozone. The questions regard the current business situation, the business outlook, interest rates, stock markets, exchange rates, and inflation. Additionally, a “special question” on an interesting economic topic is asked. Up to 350 financial market experts are questioned in the Financial Market Survey for Germany. About 70 analysts participate

in the Financial Market Survey for Switzerland that is conducted in cooperation with the Swiss bank Credit Suisse. About 80 analysts contribute to the Financial Market Test for the Central and Eastern European Region (CEE) and Austria, carried out in cooperation with Erste Group Bank der Österreichischen Sparkassen. The CEE Region consists of Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia and Slovenia. The survey collects economic data for each of these countries, but also looks at the CEE Region as a whole.

The complete results of the surveys are published every month in Financial Market Reports. The “ZEW Finanzmarkt-report” ([www.zew.de/FMR](http://www.zew.de/FMR)) contains the survey’s outcome for Germany. The survey results for Switzerland are published in the Financial Market Report Switzerland ([www.zew.de/FMR\\_CH](http://www.zew.de/FMR_CH)). The survey results for the CEE Region and Austria are published in the Financial Market Report CEE ([www.zew.de/FMR\\_CEE](http://www.zew.de/FMR_CEE)). Below, some selected outcomes of the February 2010 surveys are featured briefly.

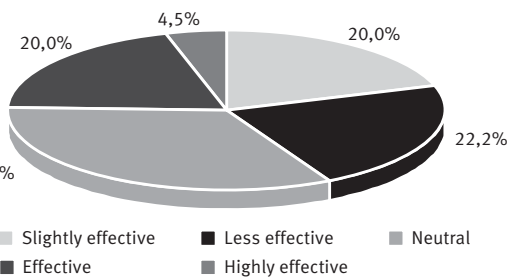


Balance of positive and negative assessment of the expected economic development in six months' time. Source: ZEW

### Germany: Economic Expectations

The ZEW Indicator of Economic Sentiment for Germany decreased by 2.1 points in February 2010. The indicator now stands at 45.1 points. The development of the indicator suggests that the surveyed financial market experts expect the German economy to recover only at a slow rate within the next six months. Prospects for the retail and consumer goods sector and for the automotive industry remain poor. The experts utter a more pessimistic view towards the business conditions in the export-oriented steel and chemicals sectors.

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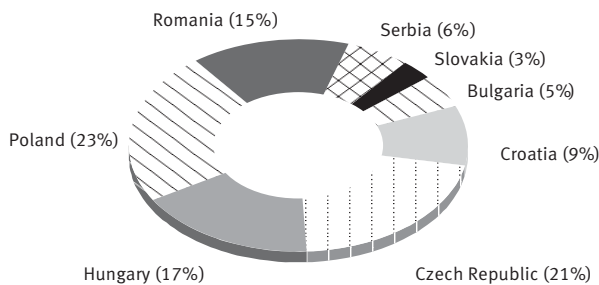


How effective are regulatory measures in preventing future crises? Source: ZEW, Credit Suisse

### Switzerland: Financial Market Regulation

The financial market experts were queried to convey their assessments regarding regulatory measures in the financial sector. In particular, the analysts were asked how effective regulatory measures in the financial sector can be in preventing future crises. Roughly 25 percent of the respondents expressed the view that such measures could prove to be effective, or even very effective. On the other hand, one-third of the analysts maintained a neutral stance toward such measures, while 42.2 percent were rather sceptical.

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Portfolio allocation between CEE countries (averages) Source: ZEW

### CEE Region: Optimal Portfolio Allocation in 2010

The preferences of the financial market experts with regard to the optimal portfolio allocation in 2010 were queried. On average the analysts would invest 39 percent of their capital in bonds, 37 percent in stocks and 24 percent in other asset classes. The geographical allocation of the average stock portfolio would be 30 percent stocks from the CEE region, 24 percent from the Eurozone, 23 percent from the USA and 23 percent from Asia. The CEE stock portfolio would contain mainly shares from Poland and from the Czech Republic.

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## INSIDE ZEW

## ■ ZEW President Wolfgang Franz presents the 2009/10 Annual Report of the German Council of Economic Experts



Wolfgang Franz during his presentation at the Baden-Württembergische Bank in Stuttgart.

Within the framework of the ZEW lecture series “Wirtschaftspolitik aus erster Hand” (First-Hand Information on the Current Economic Policy), ZEW President Prof. Dr. Dr. h.c. mult. Wolfgang Franz presented the 2009/10 Annual Report of the German Council of Economic Experts in November and December 2009.

The report analyses and appraises the current economic situation in Germany as well as the economic prospects for the year 2010 and beyond. In front of altoget-

her approximately 700 guests, the “economic sage” discussed the most important findings from the report at the permanent representation of the federal state Baden-Wuerttemberg at the European Union in Brussels, at the headquarters of Baden-Württembergische Bank in Stuttgart, at EnBW Energie Baden-Württemberg AG in Karlsruhe and at the Centre for European Economic Research (ZEW) in Mannheim. For further information visit: [www.sachverstaendigenrat-wirtschaft.de](http://www.sachverstaendigenrat-wirtschaft.de)

## ■ Habilitations and Doctoral Graduates at the ZEW

The training of professional staff is one of the greatest concerns of the ZEW. Among ZEW scientists, there have been two habilitations and numerous doctoral graduates over the past year. We thank all supervisors taking care of the papers.

### Habilitations since January 2009

**Andreas Löschel**, “Sustainability Impact Assessment with Computable

General Equilibrium Models – Imperfect Competition, Technical Change and Model Linkages”, Professor Udo Ebert, Carl von Ossietzky University of Oldenburg.

**Michael Schröder**, „Die Eignung nachhaltiger Kapitalanlagen für die Vermögensverwaltung von Stiftungen“, Professor Henry Schäfer, University of Stuttgart.

### Doctoral Graduates since January 2009

**Niels Anger**, “Political Economy and Economic Impacts of Climate Policy”, Professor Christoph Böhringer, Carl von Ossietzky University of Oldenburg.

**Johannes Gernandt**, “Empirical Essays on Wages”, Professor Wolfgang Franz, University of Mannheim.

**Diana Heger**, “Entrepreneurship, Innovation and Competition: Empirical Evidence for Germany”, Professor Cornelius Kraft, Technical University of Dortmund.

**Michael Overesch**, “Besteuerung und Entscheidungen von grenzüberschreitend tätigen Unternehmen – Eine empirische Steuerwirkungsanalyse”, Professor Ulrich Schreiber, University of Mannheim.

**Wojtek Piaskowski**, “Pricing, Risk and Solvency Requirements: An Analysis of Investment Guarantees Embedded in Individual Pension Products – A Regime Switching Approach”, Professor Peter Albrecht, University of Mannheim.

**Timo Reister**, “Steuerwirkungsanalysen unter Verwendung von unternehmensbezogenen Mikrosimulationsmodellen”, Professor Christoph Spengel, University of Mannheim.

**Andreas Schrimpf**, “Financial Markets and the Macroeconomy: Cross-Sectional Returns, Time-Variation of Risk Premia and Forecasting”, Professor Joachim Grammig, Tübingen University.

**Atilim Seymen**, “Business Cycle Analysis with Structural Vector Autoregressions: Four Applications”, Professor Bernd Lucke, University of Hamburg.

# ZEW

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I M P R I N T

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