

Sustainable Financial Markets



REPORT by Dorothea Schäfer

Sustainable Financial Markets: Financial Transaction Tax and High Capital Buffers Indispensable

3

INTERVIEW with Dorothea Schäfer

»A Financial System Should Be Able to Restore Stability Autonomously«

10

REPORT by Heike Belitz, Alexander Eickelpasch, and Anna Lejpras

Innovation Policy for SMEs Proves Successful

11

REPORT by Moritz Hess, Christian von Scheve, Juergen Schupp, and Gert G. Wagner

Members of German Federal Parliament More Risk-Loving Than General Population

20

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Sustainable Financial Markets: Financial Transaction Tax and High Capital Buffers Indispensable

by Dorothea Schäfer

The sustainability of the financial markets is a requirement that has only appeared on the economic policy agenda very recently, whereas a stable financial system has been a declared goal for decades. The relationship between sustainability and stability is, however, still unclear. The two terms are often used synonymously but stability is only one part of sustainability. The following outlines the requirements for sustainable financial markets based on the current general principles of environmental sustainability. Financial stability is considered a public good. The prerequisites for the sustainability of financial markets include internalizing costs of use, financial institutions forming adequate buffers in order to restore stability autonomously and without the help of the taxpayer, diversity, a long-term outlook, and credibility. Financial transaction tax and a higher leverage ratio meet the requirements for sustainability of financial markets; both are cornerstones of the planned restructuring of the financial markets.

The German government's progress report for 2012 states that without a reliable and stable financial market, creating a sustainable economy is being pushed further into the distant future. Unfortunately, on the financial markets, we are experiencing the opposite of what is sustainable.¹ The report was adopted in February 2012. It was written under the impression that the near collapse of the financial system in the fall of 2008 could be repeated because the Greek crisis reached its climax in October 2011.² The banks' capital base was again threatened with erosion, but this time, not as a result of dubious securitizations but because of a wave of devaluations of European government bonds. Banks are traditionally very heavily involved in this class of assets for liquidity reasons and due to a lack of compulsory capital adequacy directives. Market participants were again questioning the soundness of banks and the interbank market, i.e., mutual lending, was heavily disrupted once again. The return of symptoms of acute crisis showed that financial markets still lack stability and sustainability despite the many regulatory initiatives already implemented.

Sustainability Is More Than Stability

The call for sustainable financial markets has only emerged on the economic policy agenda very recently, whereas the stability of the financial system has been an aspired goal for decades. The relationship between sustainability and stability is, however, still unclear. The two terms are often used synonymously. Nevertheless, sustainability encompasses more than just stability. Sustainability can also be compatible with short-term instability if

¹ German Federal Government, Nationale Nachhaltigkeitsstrategie – Fortschrittsbericht 2012. www.bundesregierung.de/Content/DE/Publikation/Bestellservice/2012-05-08-fortschrittsbericht-2012.pdf?__blob=publicationFile.

² F. Fichtner, S. Junker, and D. Schäfer, EU-Gipfelbeschlüsse: Erste wichtige Schritte, aber keineswegs eine endgültige Lösung, Wochenbericht des DIW Berlin, no. 44 (2011).

the financial system is independently able to return to stability in the longer term.

Conversely, a stable financial system may not necessarily be sustainable. Imagine a private banking and financial system with a comprehensive government guarantee. A system of this kind can be very stable over a long period of time but it is not sustainable. US real estate financing companies Fannie Mae and Freddie Mac are good examples of this. These two wholesale banks were nationalized in 2008, shortly before the collapse of Lehman Brothers. Before nationalization the banks were private, for-profit financial service providers with an implicit government guarantee.³ A set-up of this kind not only leads to a lack of diligence when selecting investment projects and contractors. Even private insurance on credit risk is not rational with its background of implicit and free government guarantees. This situation creates incentives to operate highly risky, but if successful, highly profitable business models. Since this appetite for risk due to the government guarantee on refinancing markets is not penalized by appropriate risk premiums, risk-adjusted business models are displaced by high-risk ones. If this displacement is allowed to progress far enough, a system of this kind will easily collapse if external framework conditions change. The bailout and subsequent winding up of Fannie Mae and Freddie Mac alone have required funding from the US federal budget of more than USD 180 billion to date.⁴

Sustainability, therefore, requires that private financial service providers are excluded from government guarantees, although explicit and implicit government guarantees for short-term crisis management certainly appear to be compatible with the aim of a sustainable financial system.

Financial Market Stability as a Public Good

Financial markets do not have clear ownership rights. In principle, anyone is free to use them. No one can be excluded, and players cannot dispute the mutual exclusivity of the »good.«⁵ Financial stability is considered to be a public good. Financial markets are infrastructure facilities belonging to public services and must, there-

fore, be available for all of us to use. As long as there is stability, there is no exclusivity and no rivalry in the use of public goods. As with any public good, there is also an inherent incentive for private players to overuse the financial markets. As in commercial fishing, where the unbridled self-interest of fishermen leads to an endangering of flora and fauna in the world's oceans and the ultimate consequence is the eradication of edible fish,⁶ overuse of the financial markets causes stability to be slowly eroded. Since functioning financial markets are an essential part of public services, overuse and endangering financial stability also compromise prosperity and quality of life.

In the financial industry, as in the commercial fishing industry, the stability of the system can only be assured through consistent government intervention. Either the government restricts its use directly or it forces private players to internalize the costs they cause. In the case of fisheries, international fishing quotas are the means of choice with which the international community has attempted to achieve species stability and sustainability in the oceans. However, it is still hotly debated what steps policy-makers must take to prevent overuse of the financial markets, even five years after the start of the major financial crisis.

Requirements For Sustainability

The concept of sustainability has gained awareness in connection with the debate on environmental protection and climate change. Following this debate, it is possible to formulate certain requirements for sustainable financial markets.

Internalizing Costs

The characteristic of a public good implies that external effects arising from the use of financial markets are not considered by the perpetrator or »polluter«. Consequently, the more usage costs are internalized which then influence the behavior of market participants, the more financial markets are likely to satisfy the model of sustainability. In particular, this means that polluters must be made to bear the consequences of their decisions. Government guarantees for private-sector financial institutions, for example, undermine this principle whether they are given explicitly or implicitly.

³ Fannie Mae was founded in 1938 and privatized in 1968. Freddie Mac was established in 1968 and privatized in 1989. www.time.com/time/business/article/0,8599,1822766,00.html.

⁴ US-Regierung drückt bei Abwicklung aufs Tempo, Handelsblatt online, August 17, 2012, www.handelsblatt.com/unternehmen/banken/fannie-mae-freddie-mac-us-regierung-drueckt-bei-abwicklung-aufs-tempo/7015854.html.

⁵ D. Schäfer and B. Young, Von wegen privat (2012). www.fortschrittsforum.de/debattieren/wirtschaftswachstum/artikel/artikel/von-wegen-privat.html.

⁶ J.B.C. Jackson et al, Historical Overfishing and the Recent Collapse of Coastal Ecosystems, *Science* 293 (5530) (2001): 629-637.

Ability To Self-Regenerate

Sustainability requires that a system can regain balance by itself if it becomes unbalanced due to some shock that causes it to lose its stability. In the case of the financial system, for example, this means that banks must be able to absorb losses on securitizations and government bonds without any help from the taxpayer. It must also be possible for a bank to leave the market without any significant systemic consequences.

To retain the ability to self-regenerate, sufficiently comprehensive safety buffers are needed, i.e., a large distance to default is necessary. The prerequisites for this are high capital and liquidity reserves. If banks are considered as too big to fail, then the principle of a sufficient safety buffer requires financial institutions to become smaller again and remain at a size which is still manageable according to the applicable restructuring legislation. There should no longer be any system-relevant banks. The realization of a system in which investment and commercial banks are separated would contribute to sustainability if the financial institutions were thereby reduced to a manageable size.

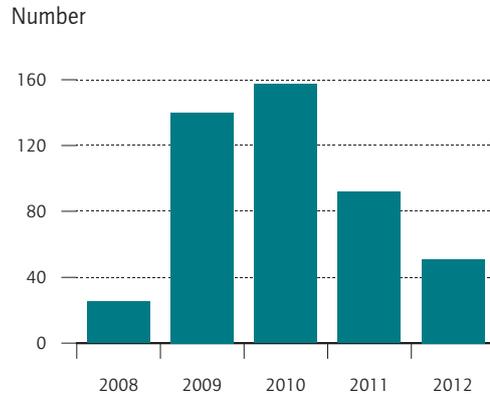
The extent of systemic relevance may vary from country to country. For example, since 2008, slightly more than 450 banks have closed in the US without direct government intervention. Customer deposits were usually transferred to other banks. The largest of them, the Washington Mutual Bank, had total assets of over USD 300 billion. The Federal Deposit Insurance Corporation (FDIC) directed JP Morgan Chase to take over all their operations and deposits, worth approximately USD 188 billion. The second largest bank, the Indymac Bank, had assets of almost USD 31 billion. None of the other banks restructured by the FDIC had total assets worth more than ten billion dollars. The vast majority of banks that closed had less than one billion dollars in total assets (see Figure 1).⁷

Diversity

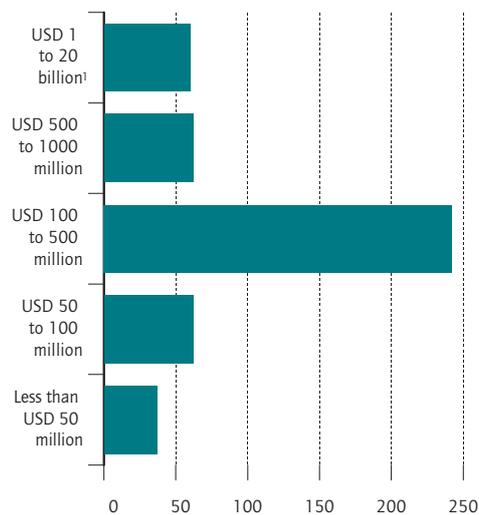
Monocultures are less resilient. System diversity actually increases the probability of successfully absorbing shocks and independently being able to return to a state of stability. Just as a nation with a more diverse economic structure has a better chance of surviving an industry crisis unscathed than a nation highly specialized in the industry in crisis, financial systems are more re-

Figure 1

US Bank Closures



According to total assets



¹ In addition, two banks with more than USD 20 billion dollars in total assets.

Sources: Federal Deposit Insurance Corporation (failed banks), calculations by DIW Berlin.

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The highest number of bank closures came at the climax of the crisis. The vast majority of closed US banks were not systemically important.

silient when they have diverse business models, types, and company sizes.

Accordingly, if a financial system tailored to just a few »national champions« with predominantly capital market financing experiences a capital market crisis, it will probably tend to be more at the taxpayers' expense than a system in which capital market oriented financial institutions share the market with many small- to medium-sized banks whose funding is based largely on deposits.

⁷ www.fdic.gov/bank/historical/bank/2008/index.html.

In financial markets important decisions have to be taken under uncertainty on a daily basis. The herd instinct and resulting bubbles formed make financial markets particularly vulnerable to crises. Decision-making bodies comprised of like-minded people are more susceptible to the herd instinct than those with diverse opinions. Workforce diversity in terms of gender, age, nationality, race, and conviction increases the likelihood that key decisions are examined with open and unbiased modes of thinking and quick solutions are critically examined.

Long-Term Orientation

The word sustainability itself implies that the benchmark for a sustainable financial system is a long-term one and, therefore, incompatible with short-term thinking. Ideally, a sustainable financial system will guarantee that it will not collapse for generations to come. Long-term orientation requires appropriate incentives to be set as part of regulation. The practice of excessively financing long-term investments with favorable short-term loans (excessive term transformation), immediate payouts on accounting profits as bonuses for traders and managers, the absence of penalties, increasingly shorter holding periods for securities, the spread of high-frequency trading and the immediate and full removal of credit risks from the bank's balance sheet are as incompatible with long-term orientation as outsourcing credit risks through off-balance sheet special purpose entities fully financed by third-party capital.⁸ A financial system can, therefore, only be called sustainable if long-term orientation is enforced either by law, for example, through the introduction of multi-year bonuses/penalty systems, or when short-term orientation loses its attractiveness due to cost increases.

Credibility

Sustainability requires people to trust the institutions of the financial system. As a result, the credibility of players and institutions is an essential prerequisite for building trust. Transparency contributes to that credibility if it is not seen as an end in itself but as a means to achieving a higher goal such as avoiding coordination failures. In addition, fair and conflict-free incentives, independent ratings' assessments, and an independent and strong banking regulator and supervisor are also crucial for the credibility of the financial markets. So, for

⁸ D. Schäfer, *Agenda für eine neue Finanzmarktarchitektur*, Wochenbericht des DIW Berlin, no. 51-52 (2008) and D. Schäfer, D. (2009), *Agenda for a New Financial Market Architecture*, Weekly Report 7, 41-49.

example, a banking supervising agency is not credible if the financial conglomerates it regulates are internationally active but the supervising agency itself is organized nationally.⁹

Financial Transaction Tax as a Building Block for More Sustainability

Trading in financial products could be interpreted as using a public good, the »stability of the financial markets«. Excessive financial innovation and the resulting increase in tradable contracts and products, as well as the shortening of holding periods and increased stock turn rates has led to an overuse of this public good. A financial transaction tax would not only help curb this overuse but it would also contribute to financing this public good.

The financial transaction tax applies directly to the trading activity and, will therefore, curb the use of the public good financial market stability. The tax is levied according to the principle of implementing a low taxation rate but a broad taxation base. For example, in its draft Directive, the EU Commission has proposed a tax rate of 0.1 percent on regular securities and 0.01 percent on derivatives. This tax rate is applied to both the buyer and the seller.¹⁰ The tax burden is high, if—and only if—trading activity (use) is high.¹¹ This corresponds to the principle of internalizing external costs. With a financial transaction tax, the trading of derivatives based on US subprime loans would have been immediately subject to the tax. The more derivatives financial institutions develop and trade, the higher the taxation burden on the system. Consequently, the taxation burden is a stumbling block to generating financial products and restricts excessive financial innovation. For a given number of instruments, the increased transaction costs resulting from the tax tend to result in lower turnover rates and increased holding periods. Both promote a long-term orientation.

⁹ D. Schäfer, *Nachhaltige Finanzmärkte – Eine Bestandsaufnahme nach fünf Jahren Finanzkrise*, Politikberatung kompakt, no. 69, (Berlin: DIW Berlin, 2012). Accompanying document for the Sustainable Regulatory Policy Group of the German Bundestag's Study Committee on Enquiry on Growth, Wellbeing and Quality of Life.

¹⁰ European Commission, *Proposal for a Council Directive on a common system of financial transaction tax and amending Directive 2008/7/EC of September 28, 2011 (RiLi)*. ec.europa.eu/taxation_customs/taxation/other_taxes/financial_sector/index_en.htm; and European Commission (2013): *Proposal for a Council Directive implementing enhanced cooperation in the area of financial transaction tax*. ec.europa.eu/taxation_customs/resources/documents/taxation/com_2013_71_en.pdf.

¹¹ D. Schäfer, *Finanztransaktionssteuer: kurzfristigen Handel verteuern, Finanzmärkte stabilisieren*, Wochenbericht des DIW Berlin, no. 8 (2012).

The tax makes transactions such as the established practice of closing a contract simply by creating a new one that goes in the opposite direction more expensive and less attractive, thereby reducing the interdependence of financial institutions. In principle, the technique is used to neutralize risks. But financial institutions also use this technology when they no longer need certain contracts (loan insurance, for example). The contract is not rescinded but neutralized by a counter contract with third parties.

In times of crisis, the European Securities and Markets Authority (ESMA) may indeed prohibit naked selling and trading of unsecured credit default swaps. A financial transaction tax would, however, reduce the attractiveness of introducing such instruments to the market long term, and thereby curb all activities by financial institutions in this segment.

The financial transaction tax would also have a curbing effect on transactions implemented solely for regulatory reasons. Financial institutions with large balance sheets but limited capital have, in the past, been able to use REPO transactions (sales transactions with a repurchase agreement) for creative accounting purposes.¹² A financial transaction tax would make such transactions more expensive, thus making them less attractive. Further, the financial transaction tax would prevent asset values and transactions from being outsourced to off-balance sheet special purpose entities, since internal transactions would otherwise be subject to taxation. Consequently, a financial transaction tax would reward internalization and combat shadow banking. Finally, it would also inhibit high-frequency trading. Transactions that promise large profits with minimal per-unit margins but high volumes and that are conducted purely to skim excess profits (»rent seeking«) would lose their economic viability as a result of the financial transaction tax. In summary, it can be concluded that the financial transaction tax would promote cost internalization, diminish the risk of overuse, and target long-term orientation. It would promote transparency and prevent rent seeking. Since financial transactions primarily affect upper income groups, it will have a progressive and therefore tempering effect on income inequality. As a result, the financial transaction tax would also make a contribution to social sustainability.¹³

A True Capital Ratio Related to Total Assets for More Sustainability.

The vulnerability of financial institutions to external shocks is, not least, a result of their capital inadequacy. Narrow equity ceilings mean a poor ability to absorb losses since capital is quickly used up. As a result, under these circumstances, the institutions are closer to insolvency and the risk of contagion to other creditors is high, leading to the threat of government intervention at the cost of the taxpayer. In contrast, with adequate capital reserves, financial institutions are better able to absorb shocks, increasing the probability of them being able to find their own way back to stability.

The total assets of major German banks are highly leveraged. The 2011 summer stress test, implemented by the European Banking Authority (EBA), revealed an average core capital ratio of 9.25 percent among the ten largest German banks. With this parameter, loss-bearing capital, primarily share capital plus retained earnings is set directly against risk-weighted assets. Since the risk-weighted assets, however, on average, amounted to only about a quarter of total assets, this resulted in a "core" leverage ratio (core Tier one capital to total assets) of less than two and a half percent.¹⁴ In October 2012, the extreme leverage at German financial institutions was reaffirmed in the International Monetary Fund's stability report. The authors estimated the leverage ratio of German banks at 2.2 percent. This represents more than 40-fold leverage. German financial institutions are therefore worse off than French (2.5 percent), Swiss (2.9 percent), and Japanese (2.8 percent) banks in terms of capital related to total assets.¹⁵

This extreme leverage is made possible by the risk weighting in Basel II/III which major banks generally calculate themselves using internal risk models. Risk weighting is the instrument through which a systematic underestimation of bank asset risk can be converted directly into capital savings and therefore into undercapitalization.

The fatal effects of the introduction of risk weighting are illustrated by the following quote, »When Basel II 2007 came into force, the Swedish Financial Supervisory Authority allowed most lenders to use internal models to calculate the risk weighting of their exposures. The result of introducing these models was that the risk

¹² For example, for some years before going bankrupt, investment bank Lehman Brothers was able to make its equity base relative to total assets appear better than it really was with the aid of some creative accounting.

¹³ D. Schäfer and M. Karl, Finanztransaktionssteuer: ökonomische und fiskalische Effekte der Einführung einer Finanztransaktionssteuer für Deutschland, Politikberatung kompakt no. 64 (Berlin: DIW Berlin, 2012). Research project on behalf of the SPD parliamentary group in the Bundestag.

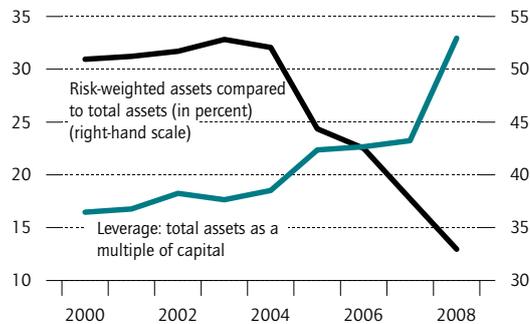
¹⁴ D. Schäfer, Banken: Leverage Ratio ist das bessere Risikomaß, Wochenbericht des DIW Berlin, no. 46 (2011); S. Binder and D. Schäfer, Banken werden immer größer, Wochenbericht des DIW Berlin, no. 32 (2011).

¹⁵ IMF, Global Financial Stability Report – A Report by the Monetary and Capital Markets Department on Market Developments and Issues (2012). www.imf.org/External/Pubs/FT/GFSR/2012/02/pdf/text.pdf.

Figure 2

Leverage and Risk-Weighted Assets of the Four Largest Banks in the United Kingdom

In percent



Source: Independent Banking Commission.

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The the proportion of risk-weighted assets to total assets has fallen and leverage has increased dramatically since the introduction of risk weighting under Basel II.

weights for Swedish mortgages dropped sharply. Many of the largest lenders only assigned these debts an average risk weighting of five percent. This was extremely low compared to the risk weighting of 50 percent contained in the 2007 regulations (Basel I).¹⁶ The Vickers report also noted for British banks that, under the regime of risk weighting, the ratio of risk-weighted assets to total assets consistently decreased, but the leverage continued to increase (Figure 2).¹⁷

The extreme leverage on the total assets of major banks contradicts the goal of sustainability. Since the major banks have no buffer with which to survive during »hard times«, modern banking systems have little capacity to self-regenerate. The consequence is that external costs are not being sufficiently internalized. In case of shocks, the taxpayer will generally have to bailout the banks' entire assets and not just the part of that debt supported by risk-weighted assets.

In principle, the absence of a buffer at the major banks has led to a high risk of loss for lenders and, therefore, should have triggered higher borrowing costs. But cur-

rently, the implicit government guarantee means that debt financing is artificially subsidized.¹⁸

There is yet another reason why risk weighting is not sustainable. It provides a channel for interest groups trying to achieve lower risk weighting for certain investments to exercise political influence with the aim of reducing their costs. Lobbying for lower risk weights from a microeconomic perspective is understandable, for example, banks' investments in renewable energies, for SME loans, or lending for house purchases, but it results in an overall weakening of the system because it makes debt financing cheaper for banks, thus reducing the leverage ratio and bringing them closer to insolvency. In contrast to the risk-weighted equity ratio, setting a real capital ratio (leverage ratio) related to total assets as a compulsory figure in Basel III is consistent with the goal of sustainability—provided it is set high enough.

DIW Berlin has variously proposed a leverage ratio of five percent plus a surcharge of one percent that could be reduced in a crisis.¹⁹ The proposed leverage ratio in the Basel framework is too low at only three percent. It uses a broader definition of capital which not only refers to core capital. In addition, it will not take effect until 2019 and that will be too late.

Conclusion

Self-interested financial market players tend to overuse the public good of financial market stability. In order to effectively stem this overuse, it would be necessary to regulate its use according to a model of sustainability. Sustainability is not entirely congruent with stability. Rather, the concept of sustainability leaves room for short-term instabilities that financial market players are able to overcome on their own. In a sustainable financial system, there are no systemically-relevant banks as this is contrary to principle of internalizing costs. Instead, bank size and restructuring legislation and/or procedures must be coordinated in such a way that the need for implicit government guarantees for private financial service providers can be eliminated. Equally, holding securities for fractions of a second and »rent-seeking« are also incompatible with sustainability. Moreover, diversity in the financial system, a wide range of diversification opportunities, and the credibility of financial market players are also indispensable elements of sustainability. A financial transaction tax and setting real

¹⁶ Finansinspektionen, Risk weight floor for Swedish mortgages. Memorandum, November 26, 2012, www.fi.se/upload/90_English/20_Publications/20_Miscellaneous/2012/riskvikt_eng.pdf.

¹⁷ The Independent Commission on Banking, Final report – Recommendations (2012). www.hm-treasury.gov.uk/fin_stability_regreform_icb.htm.

¹⁸ K. Ueda and B. Weder di Mauro, Quantifying the Value of the Subsidy for Systemically Important Financial Institutions, IMF Working Paper, WP 12/128(2012). www.imf.org/external/pubs/ft/wp/2012/wp12128.pdf.

¹⁹ For example, Binder and Schäfer, Banken werden immer größer" (2011).

capital ratios (leverage ratios) related to total assets are among the cornerstones of a sustainable development strategy for financial markets.

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Prof. Dr. Dorothea Schäfer, Research Director Financial Markets, Innovation, Manufacturing, Service Department, DIW Berlin

SEVEN QUESTIONS TO DOROTHEA SCHÄFER

»A Financial System Should Be Able to Restore Stability Autonomously«

1. Professor Schäfer, how sustainable is our financial system? The financial crisis showed us that our financial system is not particularly sustainable. Currently, a lot is being done to improve this situation. However, exactly what is required to make the system more sustainable remains a highly controversial issue.
2. What are the characteristics of a sustainable financial system? Sustainability can be defined as the long-term management of a system with the aim of maintaining it over a sustained period. The word itself is difficult to define but certain principles of sustainability can be identified. One very important precept is a long-term outlook. A second important prerequisite is that players within the system internalize the costs they cause. A third principle relates to the imperative that a financial system instills confidence in the population. If the public has no confidence in a system then it can never be sustainable as it is fundamentally very susceptible to collapsing. If people do not trust the institutions of the financial system, they tend to withdraw funds from their bank accounts, which is something that will condemn almost any financial system to failure. In these circumstances, only the government is able to avert a crisis.
3. Is a sustainable financial system more stable? Sustainability and stability are two terms that are often used synonymously. However, the two concepts are not the same. Sustainability can even be accompanied by short-term instability if the financial system is capable of independently restoring stability in the longer term. This is because sustainability is incompatible with taxpayers being forced to step in to save the financial institutions at regular intervals.
4. Are government guarantees therefore incompatible with sustainability? Permanent government guarantees certainly are incompatible with sustainability because they promote extremely high-risk behavior which makes a system very vulnerable to crisis.
5. How about government intervention or regulation? Regulation is the cornerstone of sustainability. A financial system without regulation is inconceivable. Regulation uses certain boundaries and incentives to point players in the right direction.
6. So what would the most important measures be to ensure a sustainable financial system? It is essential that the financial institutions using the public good of financial stability have enough of a capital buffer to be able to restore stability independently following a financial shock. This means, for example, that banks need much higher capital reserves than they have had to date. The major German banks, in particular, have such a low capital base that there is basically no scope for any negative financial market developments. If this is not done, the government will be obliged to shore up the major banks, at the very least with implicit guarantees. A low capital base is also a very small step away from insolvency, and the capacity to self-regenerate is non-existent. Capital reserves must, therefore, be increased as a matter of urgency.
7. Can a financial transaction tax also contribute to increased sustainability? I would certainly see it that way. A financial transaction tax would promote cost internalization and also contribute to financing the public good of financial stability. It will certainly lead to more transparency in the reporting of tax burdens because you will be able to see companies' actual activities on the financial markets much more easily than at present. Furthermore, it will also reward long-term orientation and penalize short-term trading with very short holding periods.

Innovation Policy for SMEs Proves Successful

by Heike Belitz, Alexander Eickelpasch, and Anna Lejpras

The innovation policy of the German government and Länder provides small and medium-sized enterprises (SMEs) with a wide range of programs to promote their research and development (R&D) and focuses, in particular, on the transfer of knowledge. In recent years, the programs have been streamlined and funding substantially increased as part of the second economic stimulus package. SMEs have profited from this: the number of research performing SMEs has grown; they have increased their R&D expenditure and intensified their knowledge exchange with universities and research centers. Technology-neutral government funding is to remain at the current level—around ten percent of SMEs' R&D expenditure—thus providing more targeted support for knowledge transfer.

Over the past few years, the German government has made conceptual improvements to its funding of technology and innovation for small and medium-sized enterprises and the available budget for 2008 and 2009 was considerably increased as part of the second economic stimulus package, Konjunkturpaket II. This development significantly changed the funding landscape for innovative SMEs in Germany. Against this backdrop, the German Institute for Economic Research (DIW Berlin) conducted a study commissioned by the Federal Ministry of Economics and Technology (BMWi) on how to evaluate funding of technology and innovation for small and medium-sized enterprises in the period from 2005 to 2011 using macroeconomic criteria and proposed recommendations on how to develop the funding portfolio further.¹ The information is based, inter alia, on R&D as well as on the innovations of SMEs,² evaluation studies covering individual funding programs, and a written survey of SMEs receiving funding from the BMWi and the Federal Ministry of Education and Research (BMBF).

Research, Development, and Innovation in SMEs

SMEs account for 61 percent of jobs in the German economy as a whole and 44 percent of jobs in the manufacturing industry. In the crisis years 2008 and 2009, they had a stabilizing effect on employment.³ Of the approximately 260,000 German companies with 5 to 249 employees, 29,800 continuously conducted R&D in 2010. In addition, there are approximately 27,000 SMEs which

¹ H. Belitz, A. Eickelpasch, and A. Lejpras in cooperation with N. Barasinska and K. Toepel, *Volkswirtschaftliche Bedeutung der Technologie- und Innovationsförderung im Mittelstand: Endbericht, Politikberatung kompakt*, no. 67 (Berlin: DIW Berlin, 2012). Research project commissioned by the Federal Ministry of Economics and Technology.

² Here SMEs are defined as companies with fewer than 250 employees.

³ R. Söllner, *Ausgewählte Ergebnisse für kleine und mittlere Unternehmen in Deutschland 2009*, *Wirtschaft und Statistik* (November 2011): 1086–1096.

Overview

Selected Programs of Government R&D and Innovation Funding for SMEs in Germany in 2011

Category	Program	Funding agency	Running since	Target group
Grants for:				
R&D projects				
Single-company projects	Central Innovation Programme for SMEs (ZIM) ZIM-SOLO	BMWi	2009	SMEs
Collaborative projects, R&D contracts	ZIM-KOOP and associated programs: • Companies • Companies and R&D centers • R&D contracts	BMWi	2008	SMEs, R
	KMU-innovativ	BMBF	2007	SMEs, R
	Unternehmen Region with • Innovative regional growth centers, with »Potenzial« module • Innovation fora • InnoProfile	BMBF	2001 2007 2001 2005	SMEs, R
Research infrastructure	Industrial Collective Research Program (Industrielle Gemeinschaftsforschung, IGF) with associated funding: • ZUTECH • CORNET • Clusters • Leading Technologies for SMEs	BMWi	1954 1999 2008 2009 2010	RA, R
	INNO-KOM-Ost (non-profit industrial research centers in eastern Germany) with the modules • Preliminary research • Market-oriented R&D project • Investment grant for technical infrastructure (model project)	BMWi	2009	IRC
Consultancy and services	ZIM-DL (services)	BMWi	2008	SMEs
	»go-Inno« vouchers for consultation	BMWi	2011	Authorized consultancy company for SMEs
Network management	ZIM-NEMO	BMWi	2008	Networks with six companies
Low-interest loans for:				
Innovation projects	ERP (European Recovery Programme) – Innovationsprogramm	BMWi and KfW	2005	SMEs and larger companies

Explanatory notes: SMEs (according to EU definition), R: public research centers; RA: research associations which are members of the German Federation of Industrial Cooperative Research Associations (Arbeitsgemeinschaft industrieller Forschungsvereinigungen, AiF), IRC: non-profit external industrial research centers in East Germany; KfW: Germany's development bank, Kreditanstalt für Wiederaufbau Programs for East Germany.

Source: compiled by DIW Berlin.

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The government funds R&D and innovations through grants and low-interest loans.

only conduct occasional research.⁴ They accounted for 5.1 billion Euros, or 11 percent of the entire internal R&D expenditure of companies in Germany. Between 2005 and 2010, despite the financial and economic crisis, R&D expenditure of SMEs increased by 35 percent, which represented more significant growth than among larger

companies. Research-based and innovative SMEs are, therefore, key players in the German innovation system. Nevertheless, the R&D intensity of the SMEs is significantly lower than that of larger companies,⁵ State in-

⁴ C. Rammer et al., Innovationsverhalten der deutschen Wirtschaft. Indikatorenbericht zur Innovationserhebung 2011 (Mannheim, 2012).

⁵ Datenreport 2011 (Essen: SV Wissenschaftsstatistik, 2011). For SMEs in the manufacturing sector, see also the analysis of the cost structure survey in the manufacturing industry by A. Eickelpasch, Research-Based Companies Perform Better, DIW Economic Bulletin, no. 10 (2012).

tervention in the R&D activities of an economy is justified by the economic theory concept of market failure.⁶

The aim of government funding is to raise private sector R&D expenditure to an optimal macroeconomic level. Market failure can take different forms. It is not only the company conducting the research that profits from the new knowledge gained because third parties (for example, other companies) cannot be prevented from using it too (knowledge spillover) and the company conducting the research, therefore, risks not being able to reap the full benefit. Market imperfections also result from information asymmetries in risk assessment and from the fact that it is not possible to divide up R&D projects which have to be a certain minimum size. SMEs also face further disadvantages compared to large companies. For instance, it is more difficult for SMEs to obtain credit. Moreover, due to their limited absorptive capacity, they are less able to make use of knowledge spillovers and frequently only achieve the required level of R&D capacity by cooperating with other companies. Unlike large companies, they cannot spread the innovation risks across multiple projects and face greater difficulties introducing innovations onto the market.

To compensate for market imperfections, the government can provide direct funding for R&D by SMEs and facilitate knowledge transfer with a suitable research infrastructure. R&D policy for small and medium-sized enterprises in Germany is primarily the responsibility of the BMWi. But the BMBF, the individual Länder and the European Union (EU) also support SMEs through special programs.

The BMWi funds the R&D activities of SMEs by providing grants to cover the costs of individual or collaborative projects as well as low-interest loans for innovative projects. This funding is not restricted to particular fields or areas of technology. This means that all SMEs are entitled to apply, irrespective of their sector. These programs are known as »technology-neutral« (see Overview). Moreover, SMEs are also eligible to receive funding through the generally accessible specialized programs run by the central government (»technology-specific funding«), for instance, for bioengineering or energy supply technology. Here funding of R&D collaborative ventures and of innovative networks of companies and research institutes is of key importance. This is intended to ensure that scientific findings can also be quickly exploited by SMEs for the development of new products.

The government's technology and innovation policy for SMEs has been further developed since 2005 (see Box).

Box

Development Trajectories of Technology and Innovation Policy for SMEs

1. Concentration of BMWi technology-neutral funding in the Central Innovation Program for SMEs (ZIM) with components for funding single-company projects (ZIM-SOLO), R&D collaborative and consortia projects (ZIM-KOOP) as well as networks of innovative SMEs (ZIM-NEMO). Grants can cover 35 to 50 percent of an R&D project's costs.
2. Opening up of BMBF's specialized technology-specific programs with the introduction of a new entry program, KMU-innovativ, covering eight technologies and simplifying access to the BMBF's traditional specialized programs. Here, funding can be awarded for up to 70 percent of project costs.
3. A stronger focus of research conducted primarily in public or non-profit research centers on projects with the greatest potential for commercial exploitation. The most important funding programs in this context are the BMWi's Industrial Collective Research Program (IGF) and non-profit industrial research centers in eastern Germany (INNO-KOM-Ost).

Sharp Increase in Government Funding for SMEs

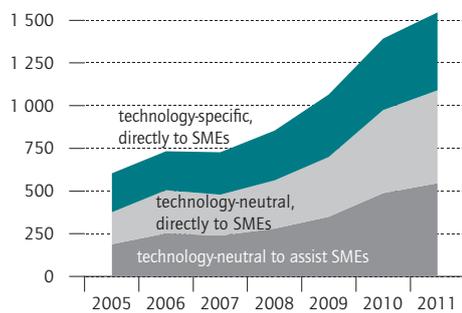
Total funding provided through the government's technology-neutral and technology-specific programs are either granted directly to SMEs or used to finance the SME-specific research infrastructure amounted to just over 1.5 billion Euros in 2011 (see Figure 1). Compared to 2005 (602 million Euros), funding therefore more than doubled. Technology-neutral funding provided by the BMWi accounted for just over a billion Euros (71 percent of total funding) in 2011. Around half of this went directly to the SMEs, while the other half was used to finance the SME-related research infrastructure. Technology-neutral funding increased much more dramatically than technology-specific funding. The increase in funding provided by the Central Innovation Programme for SMEs (Zentrales Innovationsprogramm Mittelstand, ZIM) as part of the second economic stimulus

⁶ B. Peters et al., Ökonomische Bewertung von staatlichen Investitionen in Forschung und Innovation, Studien zum deutschen Innovationssystem, no. 15 (Mannheim, 2012).

package played a central role here. To counteract the effects of the global financial and economic crisis, another 900 million Euros were made available for ZIM as part of the second economic stimulus package in 2008 and 2009 in addition to the 626 million Euros originally planned.

Figure 1

Government Funding for SMEs¹



1 "To assist SMEs": funding to research centers, mainly as part of collaborative projects, benefiting SMEs directly.

Sources: Bundesbericht Forschung und Innovation 2012, p. 387 and 2010, p. 397 (2005 and 2006); calculations by DIW Berlin.

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Over two-thirds of the current annual funding for SMEs of 1.5 billion Euros are awarded for technology-neutral projects.

R&D activities of SMEs are not only funded by the central government but also the individual Länder. Since no consistent official information on the amount of funding provided at regional level was available, DIW Berlin requested this data from the federal state ministries. According to the information received, the Länder contributed 420 million Euros to R&D grants going predominantly to SMEs in 2010 and so only about half as much as the central government (905 million Euros) (see Figure 2).

Broad Technology-Neutral Funding Particularly in Demand

Not only in terms of amount of funding provided but also the number of companies funded, ZIM is by far the most important program. From mid-2008 to the end of 2011, according to the funding agency, over 9,000 SMEs were awarded grants through ZIM. The approval rate for applications for R&D funding was 70 percent for

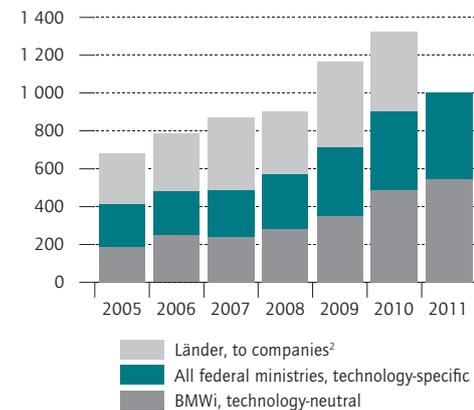
ZIM-SOLO (funding for single-company projects) and 75 percent for ZIM-KOOP (collaborative and consortia projects). This indicates that the target groups are being successfully reached.

In order to get an overall picture of the utilization of the various programs, DIW Berlin surveyed companies which were awarded grants through the BMWi and BMBF's SME-focused funding programs in the years 2005 to 2011. The survey was conducted in summer 2011. Of the just under 12,000 funded SMEs contacted, around 3,000 companies provided responses that could be used for the analysis. The survey shows the crucial importance of ZIM and of other technology-neutral funding programs. Almost 90 percent of the SMEs funded received technology-neutral grants (see Figure 3). 63 percent of the SMEs applied to ZIM-KOOP (or its predecessor programs) and 40 percent used ZIM-SOLO. 46 percent of the SMEs applied to the technology-specific specialized programs run by the BMBF, the BMWi, other ministries, and the EU.

Figure 2

Government and Länder Funding—Directly to SMEs¹

In million Euros



1 Assumption: 50% of the technology-neutral funding goes directly to SMEs.
 2 Länder funding: All companies, not including North Rhine-Westphalia and Schleswig-Holstein for 2005, not including North Rhine-Westphalia for 2006.

Sources: 2012 Federal Report on Research and Innovation (BUFI) 2012 and 2010, Länder; calculations by DIW Berlin.

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Government funding has been continuously increasing since 2005.

DIW Berlin's survey shows that just over half of the SMEs funded only applied to the technology-neutral

programs (primarily ZIM and precursors). 34 percent accessed both funding lines. Only a small proportion (12 percent) only used technology-specific programs (see Figure 4). Therefore, technology-neutral programs form the basis of SME funding, supplemented by the specialized technology-specific programs run by the BMBF and BMWi, in particular.

There is also some overlap between funding from the central government and the individual Länder. Länder funding of single-company and regional R&D collaborative projects may, in some cases, be similar to central government funding. It is not possible to completely avoid these overlaps because the Länder pursue their own structural policy goals and also allocate R&D and innovation funding for this purpose. In view of the limited financial resources of many Länder, it is to be expected, however, that they would be more likely to design their R&D funding as complementary in type and scope if there was more certainty in the medium-term regarding the structure and budget of the central government's funding programs for SMEs.

SMEs which were only awarded technology-neutral funding differ from SMEs which were also or only awarded technology-specific funding in the following respects (see Table 1):

Two-thirds of these SMEs are in the manufacturing industry (mainly research-intensive branches) and a quarter in the knowledge-intensive service industries. The share of those companies also or only applying to specialized programs which fall in the knowledge-intensive service sector is considerably higher.

Companies only receiving technology-neutral funding tend to be smaller than the other companies. They have an average of 30 employees. Companies which receive grants from both types of programs or only specialized ones are normally considerably larger.

Among those companies receiving technology-neutral funding, the share of spin-offs from research centers or universities is considerably lower (6 percent) than for those receiving technology-specific funding (20 percent).

Evaluation of Research Funding Overwhelmingly Positive

The central aim of the government's technology and innovation policy should be to stimulate further R&D activities in SMEs and thus also a knowledge spillover to other companies (for example, through imitation, mo-

bility of skilled labor, collaborative partnerships, etc.) in order to maximize the contribution R&D makes to macroeconomic growth. With the aim of examining the extent to which the existing system of technology and innovation funding fulfills this objective, recent evaluation studies covering the most important funding programs were analyzed.⁷ The importance of R&D funding for the SMEs receiving support was also examined using DIW Berlin's survey.

Table 1

Features of SMEs Receiving Funding

In percent

	Company received funding from... programs		Total
	Only technology-neutral	Technology-neutral or technology-specific	
Total			
Manufacturing	66.0	55.3	61.1
Knowledge-intensive branches*	42.7	34.8	39.1
Less knowledge-intensive branches*	23.3	20.4	22.0
Knowledge-intensive service industries*	26.1	35.6	30.4
Other branches of industry	7.9	9.2	8.5
Companies with... employees			
1 to 4	9.4	8.2	8.8
5 to 9	20.9	14.5	18.0
10 to 49	53.8	47.1	50.7
50 to 249	15.6	24.8	19.8
Company formed from...			
a university	4.3	13.3	8.4
a research center	1.9	6.5	4.0
Greater region...			
West Germany	64.8	63.4	64.2
East Germany	35.2	36.6	35.8

* Definition according to the lists of knowledge and technology-intensive goods and industries (NIW/ISL/ZEW) based on the 2008 classification of economic activities (WZ 2008).

Source: Survey by DIW Berlin.

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SMEs receiving technology-neutral funding tend to be smaller.

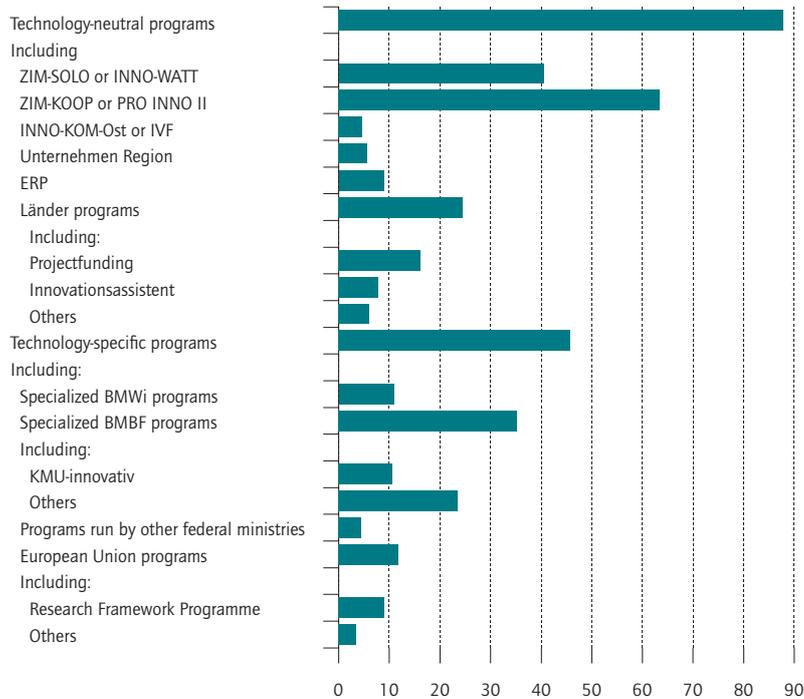
The evaluation reports provide evidence that the BMWi and BMBF funding programs have increased the volume and improved the quality of R&D activities. The dead-weight effects are minimal. Predominantly as a result of the further development and expansion of the German government's range of funding programs, particularly

⁷ The study analyzed, inter alia, evaluations of the following funding programs: BMWi: ZIM, IGF, HighTech-Gründerfonds, ERP-Innovationsprogramm, SIGNO, INNO-WATT, PRO INNO and InnoNet as well as BMBF: KMU-innovativ, research grants, and InnoRegio.

Figure 3

SMEs Making Use of Programs for R&D and Innovation in 2005 to 2010

Survey results in percent



N = 3010.

Source: survey by DIW Berlin.

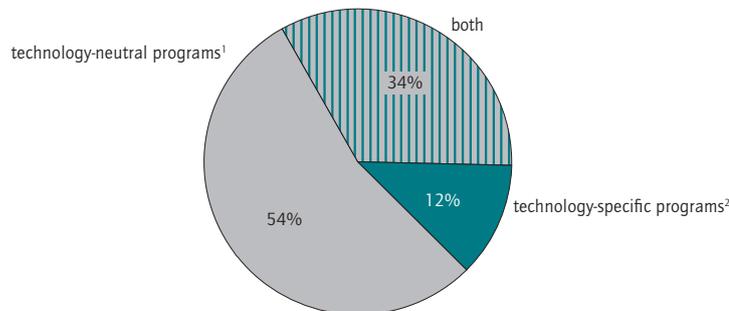
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The Central Innovation Programme for SMEs (ZIM) and its predecessors are used the most.

Figure 4

Number of SMEs Which Received Technology-Neutral or Technology-Specific Grants in 2005 to 2010

In percent



- 1 ZIM and precursor programs, programs run by the KfW development bank and the Länder.
- 2 Specialized BMWi programs, programs run by the BMBF, other federal ministries and the EU.

Source: survey by DIW Berlin.

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Technology-neutral funding is particularly popular.

ZIM and KMU-innovativ, many SMEs were awarded funding for the first time. For the majority of SMEs, the funding they received enabled them to expand their company's technological base and recruit additional R&D personnel. Furthermore, the continuity of project funding provides SMEs with planning certainty. There is also evidence that projects funded through both ZIM and KMU-innovativ have provided more positive stimulus for the companies' R&D activities.⁸

The exchange of knowledge between SMEs, large enterprises, and research centers is particularly stimulated by funding of collaborative R&D projects and strengthening of the SME-specific research infrastructure.⁹

The evaluation findings provide very little information about the impact of funding on the economic performance of the SMEs. This is the result of major methodological inadequacies which are primarily due to insufficient data, the problems of creating a suitable control group, and also the requirements of econometric techniques. Furthermore, business innovations involve complex and multifaceted processes which make it difficult to identify the effects of isolated factors, particularly when there is a very long time span between R&D and market launch.

DIW Berlin's Survey Confirms Positive Impact Based on Program Evaluations

The analysis conducted on the basis of DIW Berlin's survey indicates that government funding does not replace a company's own R&D investment but rather complements it. This applies to both SMEs that have only accessed technology-neutral programs and those that have also or only been awarded technology-specific funding. The funding helps to build technological capacity. Also, from the point of view of innovation performance, companies receiving technology-neutral grants are comparable to those receiving both technology-neutral and technology-specific funding (see Table 2). However, the economic performance indicators of SMEs only receiving technology-neutral funding are less favorable. This is primarily likely to be due to the smaller size of these companies.

⁸ See C. Rammer, B. Aschhoff et al., Begleit- und Wirkungsforschung zur Hightech-Strategie. Systemevaluierung „KMU-innovativ“. Abschlussbericht, (Mannheim and Berlin, December 13, 2011).

⁹ On knowledge transfer in SMEs receiving funding see A. Eickelpasch, Mittelstandsförderung: Wissenstransfer stärkt Unternehmen, Wochenbericht des DIW Berlin, no. 49 (2012).

Table 2

Selected Performance Indicators Of SMEs Surveyed

	Funding awarded		Total	N
	Technology-neutral funding only	Both technology-specific and technology-neutral funding		
Employees per company (number) in 2010	30	66	47	2,976
Sales in 2010 of new or significantly improved products, that... (% of sales volume)	64.6	42.4	56.5	2,491
are completely new to the market	25.9	22.6	23.6	
were already available from competitors	38.8	19.8	32.9	
Companies with process innovations that were... (% of companies)				
implemented	54	59	56	1,637
not implemented	46	41	44	1,271
Exports in 2010 (% of sales volume)	30.3	39.4	36.2	2,568
Only companies with data for 2005 and 2010:				
Sales volume in 2010, compared with 2005 (%)	34.4	40.3	38.4	2,398
Exports in 2010, compared with 2005 (%)	37.2	48.6	45.2	2,214
Employees in 2010, compared with 2005 (%)	16.3	21	19.4	2,261

Source: survey by DIW Berlin.

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In 2010, products new to the market made up almost a quarter of SMEs' sales volume.

The successful commercial exploitation of the results of a company's funded R&D activities also depends on the prevailing external circumstances. Above all, this includes demand, the economic environment, investment financing conditions, competition on the product markets, and the availability of skilled personnel.

During the global financial and economic crisis, the share of companies launching innovations plummeted and overall expenditure on innovation in Germany also fell accordingly, whereas the R&D expenditure of SMEs in fact increased. This is because investment in innovative projects lends itself more to short-term adjustments than expenditure for R&D personnel which represents the lion's share of R&D costs.¹⁰ Furthermore, government measures such as the expansion of R&D project funding for SMEs as part of the second economic stimulus package, as well as the introduction of the short-time allowance contributed that SMEs did not cut R&D expenditure between 2007 and 2009. This had not been the case during previous periods of economic downturn.

In DIW Berlin's survey, the companies receiving funding were also asked to assess the prevailing external conditions for R&D and innovation. The majority of the companies surveyed considered market factors as well

as financing conditions and access to information to be of central importance (see Figure 5). The following conditions were considered to carry most weight: the self-financing capacity, customers' openness towards proposed innovations, and information about government funding as well as new technologies. In almost all categories, most companies that considered a factor to be of high importance also tended to rate that factor positively. The availability of skilled personnel and R&D tax incentives (not yet introduced in Germany) are exceptions to the rule.

Conclusion

Analyses of DIW Berlin's report lead us to propose the following recommendations regarding technology policy for SMEs:¹¹

The German government needs a mid to long-term technology and innovation policy for SMEs which includes a clear range of funding measures.

ZIM should be continued to provide basic technology-neutral funding for SMEs in Germany. Subsidies

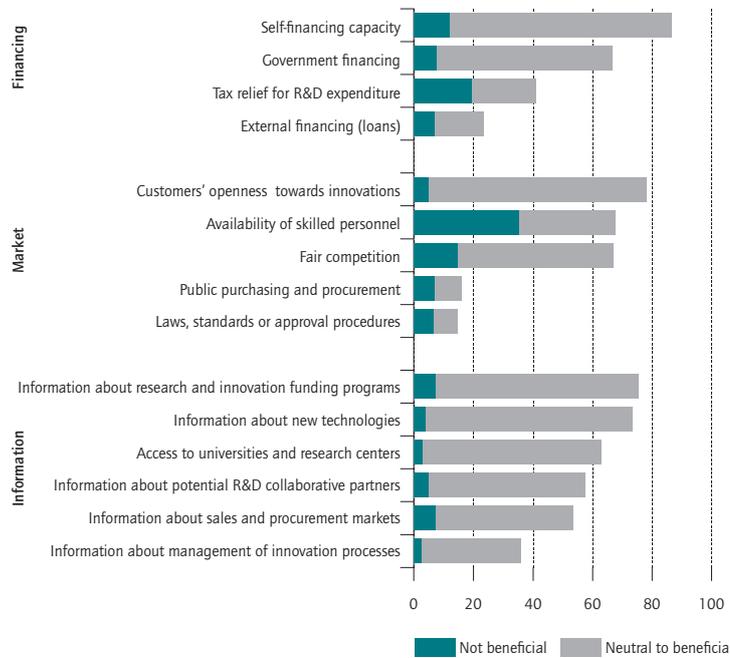
¹⁰ See C. Rammer, Auswirkungen der Wirtschaftskrise auf die Innovationstätigkeit der Unternehmen in Deutschland, Vierteljahrshefte zur Wirtschaftsforschung 80 (3) (2011): 13-33.

¹¹ H. Belitz, A. Eickelpasch, and A. Lejpras in cooperation with N. Barasinska and K. Toepel, Volkswirtschaftliche Bedeutung der Technologie- und Innovationsförderung im Mittelstand: Endbericht, Politikberatung kompakt, no. 67 (Berlin: DIW Berlin, 2012).

Figure 5

Companies' Assessment of External Conditions for R&D and Innovation

In percentage of companies assigning major importance to the factor



N = 2865

Source: survey by DIW Berlin.

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According to the companies surveyed, the availability of skilled personnel has the greatest scope for improvement.

should cover approximately ten percent of SMEs' research expenditure.¹²

Funding for R&D projects that are conducted by research centers and tailored towards the needs of SMEs should also be continued. With this in mind, the IGF and INNO-KOM-Ost programs should hone their focus on cross-industry and cross-technology projects. SMEs should be consulted on new research projects already at the planning stage.

The specific focus on funding innovations in SMEs in eastern Germany should be continued and the corresponding funding bonuses offered under the ZIM program should also be maintained.

When it comes to funding (regional) research and innovation networks, greater emphasis should be placed on dovetailing with direct project funding than has been the case to date.

¹² In 2010, this was approximately 500 million Euros which corresponded with the federal government's estimated budget for ZIM.

During the economic crisis, larger SMEs (with up to 1,000 employees) received funding under the second economic stimulus package from the ZIM program. This funding has now been phased out but, given the importance of these companies for Germany's technological performance, it should be reinstated and evaluated.¹³

Measures, tested with KMU-innovativ, to simplify SMEs' access to technology-specific funding programs should be extended to similar programs run by other departments.

A review of the European Recovery Program (ERP) should be carried out to ascertain whether access to this credit line could also be made easier for SMEs.¹⁴

¹³ In July 2012, the funding program was extended to SMEs with up to 500 employees (as long as the company was not majority owned by a larger company). This initially ran until the end of 2013. An evaluation is being carried out in parallel, see www.zim-bmwi.de.

¹⁴ See also H. Belitz and A. Lejpras, Innovationsfinanzierung im Mittelstand: Zugang zu Krediten erleichtern! Wochenbericht des DIW Berlin, no. 49 (2012).

For SMEs too, the internationalization of R&D and innovation is of increasing importance. However, their funding applications to the EU's Seventh Framework Program for Research (FP7) have limited chances of success. Therefore, the German government should—based on its experiences with SME funding in Germany—lobby for the conditions for SME access to EU funding programs to be eased. Furthermore, participation in project applications as part of international research consortia should be supported nationally, as is already the case in other countries.

Technology and innovation funding can incentivize an increase in R&D activities and a change in innovation behavior. However, to what extent this can be translated into economic results is largely dependent on other

external circumstances. SMEs constantly refer to the shortage of skilled personnel as the main obstacle. When it comes to recruiting from the scarce pool of qualified employees, they lose out to large enterprises in particular. In this context, the BMWi should ensure that the pool of skilled personnel in SMEs can be put to more effective use.

Finally, the conditions for the evaluation of government funding of R&D and innovation should also be improved. To quantify the short and long-term, direct and indirect impact of funding measures and their reciprocal effects the available funding data from all funding institutions should be collected and combined with enterprise data.

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Members of German Federal Parliament More Risk-Loving Than General Population

by Moritz Hess, Christian von Scheve, Juergen Schupp, and Gert G. Wagner

Politics and business often involve making risky or dangerous decisions whose outcomes can be predicted only with difficulty, if at all. As attitudes toward risks and dangers vary between individuals, it is reasonable that people with different attitudes are active in areas requiring decisions with differing degrees of risk. For example, it has frequently been observed that entrepreneurs are more risk-loving than employees. In late 2011, we surveyed members of the German Bundestag (federal parliament) as to their attitude toward risk (and danger or uncertainty), revealing that they are far more risk-loving than average people; they are even significantly more risk-loving than the self-employed.¹ It is possible to take a critical view of the fact that politicians are prepared to assume higher risks than the general population normally would. In this respect, politicians do not represent the population. Yet, we interpret this finding in a positive manner, as a socially rational »division of labor« between citizens, voters, and politicians in the context of a representative democracy whose institutions limit risk-seeking and power.

How people make decisions in risky or uncertain situations depends on their risk appetite, among other factors. Technically, risk describes a situation in which probabilities about the future are known, whereas »danger« refers to a risky situation without known probabilities (»uncertainty«). In the following, we only use the term »risk« as including danger and uncertainty.²

It has long been assumed that the self-employed have a greater appetite for risk than employees, and empirical studies have confirmed this.³ Fundamentally speaking, the strength of individuals' risk appetites plays a role in their occupational choices.⁴ In light of such findings, the question arises whether and how politicians in democracies, as an occupational group, differ from the population they represent and the voters who elected them.

Would it be desirable that politicians are as similar as possible to their voters in terms of their risk appetites? After all, politicians in democracies are mandated to represent the interests of the people. Or should there be a kind of »division of labor« in the form of distinct differences when it comes to representing the people in parliaments and governments? One rationale for such a division of labor could be that indeterminate situations (uncertainty and danger) and conflicting goals (with no clear-cut solution) are regular features in the realm of

¹ For an overview of the literature and an extensive description of the survey and its analysis, see Moritz Hess, Christian von Scheve, Juergen Schupp, and Gert G. Wagner, Sind Politiker risikofreudiger als das Volk? Eine empirische Studie zu Mitgliedern des Deutschen Bundestags, SOEPpaper No. 545, Berlin 2013.

² See Frank Knight, *Risk, Uncertainty and Profit* (Boston: 1921).

³ See Marco Caliendo, Frank Fossen und Alexander Kritikos, Selbständige sind anders: Persönlichkeit beeinflusst unternehmerisches Handeln, Wochenbericht des DIW Berlin, No. 11 (2011): 2-8. For a comprehensive overview, see F. M. Vieider, T. Chmura, and P. Martinsson, Risk Attitudes, Development, and Growth – Macroeconomic Evidence from Experiments in 30 Countries, WZB Discussion Paper SP II 401, (2012): 3.

⁴ See Holger Bonin, Thomas Dohmen, Armin Falk, David Huffman, and Uwe Sunde, Cross-sectional Earnings Risk and Occupational Sorting: The Role of Risk Attitudes, *Labour Economics* 14(6), (2007): 926-937.

politics, and that it is difficult to make decisions in the absence of an above-average appetite for risk.⁵

Hypothesis

Politicians' above-average risk appetite has fueled speculation and anecdotes over the centuries. Yet, virtually no representative empirical studies on the topic are available anywhere in the world.⁶ A current study for the US shows that people with risk-loving attitudes are more likely to participate in political meetings, distribute leaflets, and be active in campaigns.⁷ The author explains this with the pleasure derived from new experiences and the excitement to be found in political action, which risk-loving people tend to seek more than risk-averse ones.⁸

Although the literature is sparse,⁹ it can be assumed, on the basis of the theoretical deliberations, that career politicians display more risk-loving attitudes than the average population, simply because of their occupational choice, which is a choice to join a highly competitive professional field. Kepplinger argues¹⁰ that politicians often want to remedy problems or deficiencies (rather than to make an already good situation better). And in his interpretation of »prospect theory, «Kepplinger contends that in these situations, politicians are willing to take great risks in order to change a bad situation.¹¹ However, it is unclear whether politicians are also more risk-loving than the self-employed, who are also frequently faced with complex problems and decisions.

⁵ Steinkopf argues that the word »Wagnis« (gamble) might be the best term for describing the decisions that good politicians have to make in difficult situations (see Leander Steinkopf, Ohne Wagnisse kein politisches Handeln, Frankfurter Allgemeine Zeitung, March 6, 2013, <http://www.faz.net/aktuell/feuilleton/risikofreudige-parlamentarier-ohne-wagnisse-kein-politisches-handeln-12105146.html>).

⁶ A remarkable exception is an empirical study that Kepplinger conducted with members of the German Federal Parliament (see Hans Mathias Kepplinger, Politikvermittlung, (Wiesbaden: VS Verlag für Sozialwissenschaften, 2009), 27-50).

⁷ See Cindy D. Kam, Risk Attitudes and Political Participation, American Journal of Political Science 56(4) (2012), 817-836.

⁸ An evaluation of the German Socio-Economic Panel Study (SOEP) data collected by DIW Berlin and TNS Infratest Sozialforschung about persons who are merely interested in politics or who have a fixed political opinion shows that these »political persons,« who make up roughly one-quarter of the population in Germany, have a somewhat greater risk appetite overall than »apolitical persons.« See page 79 in Gert G. Wagner, Wie entscheiden Politiker?, Spektrum der Wissenschaft, special issue No. 1 (2012): 74-79.

⁹ See Hess et al., Sind Politiker risikofreudiger, 5.

¹⁰ See Kepplinger, Politikvermittlung, 43.

¹¹ See Amos Tversky and Daniel Kahneman, Rational Choice and the Framing of Decisions, Journal of Business 59 (1986): S251-S278.

Table 1

Risk Attitudes of Members of Parliament and the General Population in Germany (SOEP)

	German parliament	SOEP, all respondents	SOEP self-employed
General risk			
Average	6.4	3.7	4.5
Standard deviation	1.68	2.23	2.12
N	173	17522	1058
Driving			
Average	4.4	3.0	3.7
Standard deviation	2.29	2.59	2.57
N	174	16512	1050
Financial matters			
Average	3.6	1.9	2.7
Standard deviation	2.12	2.17	2.42
N	172	17394	1057
Sports and leisure			
Average	5.0	3.2	3.8
Standard deviation	2.15	2.63	2.62
N	175	17185	1052
Occupation			
Average	6.5	3.2	4.9
Standard deviation	1.83	2.7	2.75
N	175	15326	1043
Health			
Average	5.0	2.7	3.4
Standard deviation	2.3	2.46	2.55
N	172	17519	1056
Political decision-making			
Average	6.0		
Standard deviation	1.94		
N	172		

The table shows the averages and standard deviations for respondents' assessments of their own attitudes toward risk, including general risk as well as risks in the areas of driving, financial matters, leisure and sports, career, health, and political decisions. Values are reported for the members of parliament surveyed in 2011 as well as for all SOEP respondents and the subgroup of self-employed SOEP respondents in the survey year 2009.

Sources: Survey of members of the German parliament 2011, SOEP v27, calculations by DIW Berlin.

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Members of parliament are more risk-loving than the self-employed in all categories.

Empirical Analysis

In the winter of 2011, we surveyed risk attitudes of members of the 17th German Bundestag. We conducted a mail survey, and of the 620 members of parliament who received the survey questionnaire, 175 responded. This amounts to a response rate of 28.2 percent. Compared to other mail surveys, this is a high response rate and the data permits conclusions about all members of parliament, as the socio-demographic composition of this

sample corresponds by and large to that of the parliament overall.¹²

Our questionnaire had two focal areas on social demographics as well as on risk attitudes. The first included questions on gender, age, highest educational achievement, and the occupation practiced prior to being elected to parliament. A question about where respondents attended school provided data about their socialization in East or West Germany.

No data were collected about respondents' party membership, the intent being to immediately dispel possible concerns on the part of members of parliament that their responses and the results of the study could potentially be used for partisan purposes.

The second focal area included questions about attitudes toward risk. These questions were designed in analogy to questions asked in the German Socio-Economic Panel Study (SOEP) in the interest of comparability with the general population, i.e., with the SOEP data.¹³ On a scale of 0 (fully risk-averse) to 10 (fully prepared to take risks), respondents indicated the degrees of their general risk appetite as well as their risk attitudes in the areas of driving, financial matters, leisure and sports, occupation and health. An additional question was asked about respondents' risk appetite concerning political decisions.¹⁴

As expected, the members of parliament proved to be more risk-loving than the citizens whom they represent in parliament.¹⁵ It is unlikely that this is due to strategically distorted responses on the part of the members of parliament, as particular risk attitudes do not seem to be socially desirable or undesirable.

In most risk categories, the averages of the 175 parliamentarians who gave valid responses were around or above 5, the middle of the scale. Risk attitudes in the areas of financial matters and driving are exceptions. Here, members of parliament tend to be rather risk-averse. Their greatest appetite for risk was in the areas of professional career¹⁶ and political decisions as well as in their general attitude toward risk. In other words, their great risk appetite in their work supports the hypothesis concerning occupational choice because the self-employed also display significantly higher risk appetites than the general population, on average. In light of these results, it is safe to assume that members of parliament have an appetite for risk that is far greater than average.

It should be noted that in the SOEP survey year 2009, which was selected because it was the last year in which questions were asked about attitudes toward risk in various areas of life, the general appetite for risk was unusually low (see Figure 2). That year saw the high point of the financial crisis which made people risk-averse. But even in 2011, when the average for the general population was 4.5, the difference from the average for members of parliament—6.4—was exceptionally distinct and statistically highly significant (as was also the case in all other years).¹⁷

In addition, the differences in the attitudes toward risk between all SOEP respondents and the self-employed are quite similar across all categories of risk. In contrast, the parliamentarians' attitudes toward risk display greater variation (see Figure).

The differences in the three groups' risk appetites are smallest when it comes to driving and greatest in the area of occupational choice. This is where we see the big-

12 See Hess et al., *Sind Politiker risikofreudiger*, 12. Kepplinger, *Politikvermittlung*, reports an almost identical response rate (31%) in a survey of members of parliament that he conducted in spring 2008.

13 Concerning the SOEP, see Gert G. Wagner, Joachim R. Frick and Jürgen Schupp, *The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements*, *Schmollers Jahrbuch* 127(1) (2007): 39-169 and Thomas Siedler et al., *The German Socio-Economic Panel (SOEP) as Reference Data Set*, *Schmollers Jahrbuch* 129(2) (2009): 367-374.

14 The questions posed in the SOEP have been validated multiple times and replicated in other surveys around the world. On the development of the questions, their fundamental validation, and initial results, see Thomas Dohmen et al., *Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences*, *Journal of the European Economic Association* 3(9) (2011): 522-550.

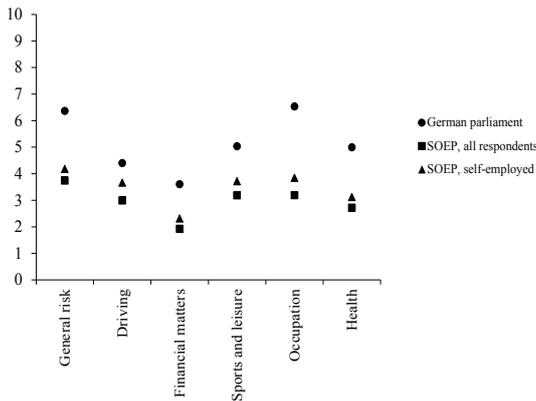
15 This result is in line with the conclusions of Kepplinger, *Politikvermittlung*, 45. In his survey, 66% of the surveyed members of the German Federal Parliament agreed with the statement «Politicians who avoid the risk of making mistakes are not acting rationally», and only 15% agreed with the statement that in that same situation, the politicians are acting «irrationally.» Concerning the level of risk-aversion in the general population in Germany and other Western societies, see F. M. Veider et al., *Risk Attitudes, Development, and Growth*: 15.

16 This finding does not contradict public opinion which assumes that politicians act in their own self-interest, thereby avoiding risks. For even if the public's stereotypes were correct, political careers are more risky and at times more dangerous than careers outside politics—despite all imaginable risk-avoidance strategies. The few political careers that span decades are not representative and distort public opinion.

17 In light of these results, it is safe to assume that members of the German parliament have a risk appetite that is far greater than average. Assuming, for example, that parliamentarians overall were as risk-loving as the average of the adult population in 2012 and that only those with an above-average risk appetite responded to the survey, then the 445 parliamentarians who did not respond would have to be extremely risk-averse, with an average of 4.13 on an 11-point scale, which is significantly lower than the average of the general population. This would be an entirely implausible result. Instead, the assumption (supported by the distributions of the demographic indicators) that the survey of the members of parliament is not distorted is clearly more plausible. This is based on the following simple model calculation: if all parliamentarians were as risk-loving on average as the adult population overall (=4.76), the sum of all parliamentarians' risk appetites would be $620 \times 4.76 = 2,951.2$. As the weighted risk for 175 parliamentarians is 1113 (175×6.36), according to the survey, a weight of 1838.24 remains to be distributed among the 445 parliamentarians who did not respond to the survey, amounting to an average risk appetite of $4.13 (1838.24 / 445)$.

Figure

Attitudes toward Risk of Members of the German Parliament (2011) and the German Population (2009)



The figure shows the averages for respondents' assessments of their own attitudes toward risk, including general risks as well as risks in the areas of driving, financial matters, recreation and sports, career, health, and faith in other people for members of parliament, all SOEP respondents, and the subgroup of self-employed SOEP respondents.

Sources: Survey of members of the German parliament 2011, SOEP v27, calculations by DIW Berlin.

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Members of parliament are prepared to take much greater risks than the general population in career matters.

gest difference between all SOEP respondents and the self-employed, which can be considered further evidence to support the hypothesis of deliberate occupational choice. In this area, both the self-employed and politicians are more risk-seeking (or risk-tolerant) than the rest of the population, and this applies to politicians to an even greater extent than to the self-employed.¹⁸

A series of regression analyses shows that this above-average appetite for risk cannot be explained by differences in gender, age, and education.¹⁹ Attitudes toward risk in general and related to one's professional career displayed particularly strong effects. Overall, the descriptive analyses were confirmed by the regression

¹⁸ More in-depth analysis is required to ascertain whether the self-employed in particularly risky fields of business have appetites for risk similar to those of members of parliament. It might also be of interest to examine whether managers employed in top positions also have above-average appetites for risk.

¹⁹ See Hess et al., Sind Politiker risikofreudiger, 18. The control variables also display the expected correlations. Older persons and women are significantly more risk-averse than younger persons and men. A high level of education display positive correlations with risk appetite.

Table 2

Average General Risk Appetite of All SOEP Respondents in the Years 2004 to 2012

2004	4,25
2005	
2006	4,68
2007	
2008	4,40
2009	3,74
2010	4,23
2011	4,54
2012	4,76

Sources: SOEP v29, calculations by DIW Berlin.

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analyses, and consequently they will not be presented in detail here.

The results paint a very clear picture: the survey of members of the German parliament conducted in the winter of 2011 revealed that members of parliament showed significantly stronger risk-loving attitudes across virtually all the indicators and risk categories surveyed than the general population and the self-employed, whose attitudes were measured in the German Socio-Economic Panel Study (SOEP) conducted by DIW Berlin. The finding holds in particular for general attitudes toward risk and attitudes in the area of occupational choice. Thus, it may be assumed that because of their occupational choices, career politicians tend to be individuals who at least do not shy away from risky decisions.

Evaluation of Findings

What does politicians' greater appetite for risk mean for the political system and for society in general? Taking a pessimistic perspective, one might lament that politicians with above-average appetites for risk will agree to unnecessary risks when taking important societal decisions with potentially negative effects that must then be borne by society as a whole. In this vein, it is possible to argue that the vast majority of the population would have come to a different (i.e., more risk-averse) decision in such risky situations and that, consequently, elected politicians do not represent the will of the population in general.

We take a positive perspective, arguing that practicing the profession of politician properly unquestionably requires a high appetite for risk. Otherwise, important societal decisions would not be made at all in light of ever-present and barely comprehensible risks and occasional dangers, which would result in stagnation and societal standstill.²⁰

This perspective could also be supported with arguments derived from the theory of biological and societal co-evolution, according to which political elites' appetites for risk can promote the common good if the societal conditions are such that risk-loving behavior cannot degenerate into irresponsible decisions.²¹ Hence, it is important to ensure that the individual interests and preferences of (career) politicians are just one aspect determining the complex process of political decision-making. The structural features of democratic political systems and the fact that in democracies, as a rule, important political decisions are made collectively and are preceded by extensive discussions in public and in committees, limit the influence of individual appetite for risk and of potentially risky and dangerous decision-making situations in the plenary of parliaments as well as in governments.

In this respect, the combination of a political system focusing on discussion and consensus with the risk-loving attitudes of individual political actors seems ideal for society. In conclusion, one can argue from a political-economy perspective that the differing appetites for risk on the part of politicians, voters, and citizens are evidence of a successful division of labor provided that democracy and the constitution function effectively to limit power and politicians' above-average appetite for risk.

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20 See also Keepplinger, *Politikvermittlung*, 44.

21 See R. McDermott, J. H. Fowler, and O. Smirnov, On the Evolutionary Origin of Prospect Theory Preferences, *The Journal of Politics*, 70(2) (2008): 335–50.