

Becker, Sascha O.; Wohlrabe, Klaus

Working Paper

Micro Data at the Ifo Institute for Economic Research: The Ifo Business Survey, Usage and Access

ifo Working Paper, No. 47

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Becker, Sascha O.; Wohlrabe, Klaus (2007) : Micro Data at the Ifo Institute for Economic Research: The Ifo Business Survey, Usage and Access, ifo Working Paper, No. 47, ifo Institute - Leibniz Institute for Economic Research at the University of Munich, Munich

This Version is available at:

<https://hdl.handle.net/10419/73721>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Working Papers

Micro Data at the Ifo Institute for Economic Research – The “Ifo Business Survey”, Usage and Access

Sascha O. Becker
Klaus Wohlrabe

Ifo Working Paper No. 47

August 2007

An electronic version of the paper may be downloaded from the Ifo website www.ifo.de.

Micro Data at the Ifo Institute for Economic Research – The “Ifo Business Survey”, Usage and Access

Abstract

The Ifo Institute for Economic Research has been conducting regular business surveys since its foundation in 1949. The most well-known of Ifo’s surveys is the Ifo Business Survey (*ifo Konjunkturtest*). The micro data of the Ifo Business Survey are accessible to external researchers on-site at Ifo as part of the *Ifo DataPool*, Ifo’s research data centre. This article gives an introduction of the survey questions and data coverage, an overview of past and present research with the Ifo Business Survey, and describes the data access procedure.

JEL Code: C0, C8.

Keywords: Micro data, business surveys, data access, *Ifo DataPool*, *Ifo DataLit*.

Sascha O. Becker
Center for Economic Studies
University of Munich
Schackstr. 4
80539 Munich, Germany
Phone: +49(0)89/2180-6252
sbecker@lmu.de

Klaus Wohlrabe
Ifo Institute for Economic Research
at the University of Munich
Poschingerstr. 5
81679 Munich, Germany
Phone: +49(0)89/9224-1229
wohlrabe@ifo.de

1 INTRODUCTION

The Ifo Institute has regularly been conducting business surveys since 1949. The *Ifo Business Climate* is calculated from the survey results. This is regarded as one of the most important indicators for economic activity in Germany.¹ The Ifo Business Climate is based on about 7,000 monthly replies given by the surveyed. These replies are stored as micro data of the Ifo Business Survey (IBS). Whereas the time series for a variety of industries and sectors has been available in the so-called *ifo DataBase*, access to the underlying micro data was only limited for research purposes.

Since 2004, the Ifo Institute has continuously been converting its micro data stock into the Stata format and now makes these data available in the *Ifo DataPool*. This enables external researchers to conduct scientific analysis at the Ifo Institute using anonymously rendered micro data of the four standard Ifo surveys, namely the Ifo Business Survey, the Ifo Investment Survey, the Ifo Innovation Survey and the Ifo World Economic Survey. Because the Ifo Institute has ensured the participating companies confidentiality, the dataset has been made anonymous and is usable only under strict access criteria at an Ifo-based single-user PC.

All of the four standard Ifo surveys have been conducted for years, some even for decades. For applied empirical research, these micro data provide the possibility for detailed panel analysis. As regards content, standard Ifo surveys offer aspects that are not available in other data sources, for example single enterprises' assessments of their current business situation and expectations on a monthly basis (in the Ifo Business Survey), the investment volume (in the Ifo Investment Survey), detailed information about innovation activity over 25 years (in the Ifo Innovation Survey) and assessments of the international economic cycle by experts in 90 countries (in the Ifo World Economic Survey) are only some examples. A notable advantage of the Ifo data is that they contain information about the plans and expectations of the survey participants.

This article describes a portion of the actual stock of business micro data in the *Ifo DataPool*, namely the Ifo Business Survey. In the following, the data quantity, documentation and the availability of the Ifo Business Survey will be described. Moreover, a brief overview of the previous scientific usage of these data will be given. The overview shows that the *Ifo DataPool* information can be applied for exploring several relevant economic issues.

In section 2 the *Ifo DataPool* and its components are described in more detailed. An overview of the previous scientific usage of the data follows in section 3. Section 4 describes the access to the data.

2 THE IFO DATAPOL

The *Ifo DataPool* contains economically relevant micro- and macro information. Besides the Ifo micro data, also external data, for example, the European Social Survey (SOEP), British Household Survey, EconWin, Penn World Table and others are covered. These can be used after approval from the corresponding institute. This article describes the Ifo Business Survey (IBS). Data from the Ifo Business Survey are available for the following four sectors: manufacturing (*Verarbeitendes Gewerbe*, IBS VG), construction (*Bauhauptgewerbe*, IBS BAU), wholesaling and retailing (*Groß- and Einzelhandel*, IBS HAN) and IT services

¹ The Ifo Business Climate is a mean of accumulated responses on the current business situation and business expectations. For further information on its calculation see <http://www.ifo-geschaeftsklima.info>.

(*Dataverarbeitungs-Dienstleistungen*, IBS DVDL). Table 1 lists the current stock of Ifo Business Survey data, supplemented by the first survey and the survey frequency.

In addition to the data in Stata format, the *Ifo DataPool* also contains documentations of the variables as well as exemplary questionnaires.

<i>Ifo Survey</i>	Stock	Survey since	Frequency
IBS VG	01/1980 - 07/2006 (east since 01/1991)	1950 (east 1991)	monthly
IBS BAU	01/1991 - 7/2006 (east since 01/1991)	1956 (east 1990)	
IBS HAN	01/1990 - 7/2006 (east since 01/1991)	1950* (east 1990)	
IBS DVDL	03/1995 - 06/2004	1995	quarterly

*1950 retail, 1951 wholesale.

TABLE 1. *Ifo DataPool*: Stock

2.1 IFO BUSINESS SURVEY (IBS)

Some of the surveyed enterprises give particulars on more than one product group or different building or trade sectors. From the responses of these firms to single sectors, there result around 7,000 replies that are used to calculate the Ifo Business Climate. Thus, the quantity of responses is not equal to the number of surveyed enterprises. For a detailed description of the methodology and calculation of the Ifo Business Climate, see Goldrian (2007).

2.2 IFO BUSINESS CYCLE TEST – STANDARD QUERIES

The (standard) questions asked monthly in the Ifo Business Survey refer to both the current and expected economic situation of the enterprises, differentiated into several segments. The enterprises can give one of three categorical answers (“1” positive, “2” neutral, “3” negative) per standard question. This allows the replying enterprises to evaluate the general thrust of their economic situation. Table 2 lists the variables contained in the IBS’s micro data. These are surveyed monthly, as a rule. Only the Business Survey of DVDL service providers is conducted quarterly. All variables in Table 2 are categorical. In addition to the ordinally scaled answers to the standard questions, there are questions to be answered with “yes” or “no”, indicated in Table 2 as “*binary*”.

IBS VG	IBS HAN
Current situation: Business situation Manufactured goods Volume of orders (inland and abroad) Tendencies in the past month: Demand Volume of orders (inland and abroad) Output, inland sales prices Expectations for the next 3 months: Output, inland sales prices Exports, employment Expectations for the next 6 months: Business situation	Current situation: Business situation Turnover Stock of inventory Sales prices Plans and expectations f. t. next 3 months: Sales prices Orders Employment Expectations for the next 6 months: Business development
IBS BAU	IBS DVDL
Building activity: Change compared to previous month Obstructions (<i>binary</i>) Expectations for the next 3 months Works contracts: Change compared to the previous month Assessment (in months) Building prices: Change compared to the previous month Covering the production costs Expectations for the next 3 months Current situation: Business situation Expectations for the next 6 months: Business situation Equipment utilization: in per cent Employment: Expectations for the next 3-4 months Sickness ratio	Current situation: Business situation Business situation change compared to previous 3 months Turnover change compared to previous 2-3 months Turnover development compared to the same month in the prior year Volume of orders, employment Obstacles to business activity (<i>binary</i>) Expectations for the next 2-3 months: Turnover Employment Expectations for the next 2-3 months: Prices Expectations for the next 6 months: Business situation

TABLE 2. Business Survey variables (standard questions only)

2.3 BUSINESS SURVEY – SPECIAL QUESTIONS

Besides the variables contained in Table 2 on the IBS standard questions, additional questions are asked in all survey sectors. Table 3 lists the special questions, structured according to sectors, with scaling as well as periodicity. As in Table 2, most data are ordinal with three response categories; others are binary.

IBS VG	Capacity utilization: volume of orders in months, machines' utilization in percent, technical capacity (<i>ordinal</i>)	4 x annual
	Obstacles to production (<i>binary</i>)	4 x annual
	Competitive position inland (<i>ordinal</i>)	4 x annual
	Competitive position abroad, EU and non-EU (<i>ordinal</i>)	4 x annual
	Raw material and primary material stock / manufactured goods stock, in weeks	4 x annual
	Overtime / short-time work / workforce (<i>binary</i>)	4 x annual
	Banks' lending willingness (<i>ordinal</i>)	2 x annual
	Assessment of the profit situation (<i>ordinal</i>)	2 x annual
	Innovation activity (<i>binary</i>)	1 x annual
IBS BAU	Construction backlog (<i>ordinal</i>)	1 x annual
	Work of subcontractors, non-included buildings, area of activity (<i>in percent</i> ¹)	1 x annual
	Winter construction (<i>binary</i>)	2 x annual
	Special difficulties (<i>binary</i>), e.g. order cancellation	
	Expected change in order processing (<i>ordinal</i>)	2 x annual
	Change of construction volume (<i>ordinal and in percent</i> ²)	1 x annual
	Rental machines / subcontractors (<i>binary, ordinal or in percent</i> ²)	1 x annual
	Mid-term business expectations (<i>ordinal</i>)	1 x annual
	Overtime / prefabricated material (<i>binary & in percent</i> ³)	1 x annual
	Winter closures (<i>binary and in months</i>)	1 x annual
IBS HAN	Trading obstacles (<i>ordinal</i>)	4 x annual
	Banks' lending willingness (<i>ordinal</i>)	2 x annual
IBS DVDL	Investment compared to previous year (<i>ordinal</i>)	1 x annual
	Investment expectations (<i>ordinal</i>)	1 x annual
	Hiring of new employees: part-, full-time (<i>binary</i>)	1 x annual
	Availability of trained employees (<i>ordinal</i>)	1 x annual
	Assessment of inland competition (<i>ordinal</i>)	1 x annual
	Assessment of EU-wide competition (<i>ordinal</i>)	1 x annual
	Expansion in business activity: inland, EU, abroad (<i>binary</i>)	1 x annual
	Turnover distribution within the firm (<i>in percent</i> ⁴)	1 x annual

¹ Of annual turnover, ² Compared to the previous year, ³ Of total working hours, ⁴ Turnover breakdown.

TABLE 3. Business Survey – special questions

2.4 OBSERVATION NUMBERS AND CLASSIFICATION VARIABLES

For linking the anonymous enterprise reports over time, the data contain firm-specific observation numbers. The data of the Ifo Business Surveys in the *Ifo DataPool* include different classification variables, for example – depending on the industry branch – the size category according to employees, turnover and the federal state where the company is based. Table 4 provides an overview.

<i>Variable</i>	IBS VG	IBS HAN	IBS BAU	IBS DVDL
Size¹	since 06/1980	O	to 12/1995 and west only	X
Federal state	X	X	X	X
Industry branch classification	X	X	X	X
Turnover size	O	since 1998 and east only	O	O

X: surveyed/available O: not surveyed/available, ¹ of the surveyed sector

TABLE 4. Variables for a classification of single enterprise responses

For the groups BAU, HAN and DVDL the Ifo Institute allocates identification numbers for the building, trade and service branches, respectively. Micro data for manufacturing has the Ifo branch classification as well as the branch classifications of the German Federal Statistical Office (WZ 93, 2 digits).

3 IFO BUSINESS SURVEY DATA IN ECONOMIC RESEARCH

In the following, a selection of scholarly publications that apply Ifo survey data is presented. Ifo DataLit, the online literature database collecting all publications using Ifo data, is available on the Ifo website. Many publications are based on aggregated time series that were available before the creation of the *Ifo DataPool*. This provides an overview of research based on Ifo Business Survey data, which can assist future research. Where micro data have been used, this is mentioned. Non-listed articles have been published primarily in Ifo studies or monographs (Oppenländer 1989, Goldrian 2004, 2007 and Sturm and Wollmershäuser 2005). These publications mainly deal with methodological aspects of the surveys.

3 IFO BUSINESS CYCLE TEST (IBS)

Early Research

Early descriptions of the Ifo Business Surveys were made by Langelütke and Marquardt (1951). Anderson (1952) was the first to use Ifo data for scientific analysis, who applied time series (January 1950 – February 1952) for testing the relationship between IBS data and the official statistics. Using a correlation analysis Anderson showed that partial aggregates of the Business Survey (e.g. nutrition) display a very good approximation of the official statistics. Individual components of Ifo Business Surveys are also available at the *Ifo DataPool*. Moreover, he forecasted macro time series using Ifo data. A similar approach was applied by Theil (1955), who discussed in particular the use of balances as an aggregation method. He was also the first to use micro data for manufacturing (leather and shoe industry) in his analysis. Thonstad and Jochems (1961) modelled production plans in dependency on companies' expectations and assessments of the business situation. As with Theil (1955) they used data for the leather and shoe industry (1956–1958). This was the first study to explore links between variables contained in the Business Survey.

Studies on the Expectation Formation

König, Nerlove and Ouodiz (1981) showed how price expectations can be described dependent on current or past periods. They tested these links at the micro level (micro data from January 1977–December 1978) based on log-linear probability models. Nerlove (1983) proceeded similarly, estimating different models of expectation formation using a conditional Logit approach. The article of Kawasaki, McMillan and Zimmermann (1982) shows how Ifo micro data can be used for analysing disequilibrium dynamics within firms. The authors modelled, by means of IBS manufacturing micro data for the period from February 1977–December 1978, the price and production changes dependent on the inventory and order volumes of the previous month. The empirical implementation occurred via multivariate Logit models. Kawasaki, McMillan and Zimmermann (1983) followed a similar approach for analyzing profit maximizing strategies for the maintenance of stock inventory. Using the same micro data as Kawasaki, McMillan and Zimmermann (1982), they showed how enterprises react to demand changes. A survey of Wolters (1984) illustrated how autoregressive approaches as well as hypotheses of rational expectation formation could be useful for econometric analysis of inflation expectations. Moreover, by means of bivariate autoregressive models research was conducted to see whether Ifo tendency data concerning price expectations were appropriate for measuring inflation expectations in investment goods. Madsen (1993) conducted a similar analysis concerning production expectations in newly industrialised countries by employing Ifo production expectations from 1971 to 1990. Madsen (1996) similarly used Ifo expectation data (March 1978–February 1992) for testing several hypotheses of expectation formation. Another theoretical model of “interactive expectation formation”, has been tested by Flieth and Feaster (2002) using Ifo data. Hohnisch et al. (2004) examined whether herding behaviour played a role in how companies replied to surveys. Fahrmeir and Nase (1994) showed (micro data for non-metallic mineral products, 1980–1990) by using cumulative dynamic Logit models that survey responses are seasonally influenced. The theoretical model and a shorter investigation using the micro data was presented by Fahrmeir (1992).

Special Question on Innovation at the IBS

As shown in Table 3, once a year the enterprises are queried about their innovation behaviour. The analysis of this special question on innovation was a component of several studies. These studies dealt mainly with the determinants and effects of innovations, e.g. if innovations lead to a higher level of employment within the company or lead to a change of the market structure. The change of innovation behaviour over time has also been analysed. The following studies all used micro data of the Business Surveys, especially the above-mentioned special question on firms’ innovation behaviour. As econometric methods, mainly static and dynamic probit and logit models were used (cross section and panel analysis). Lachenmaier (2007) presents an overview and a summary of the following studies: Zimmermann (1989), Entorf and Pohlmeier (1990), Zimmermann (1991), Ross and Zimmermann (1993), König et al. (1994), Laisney et al. (1992), Pohlmeier (1992), Flaig and Stadler (1993, 1994, 1998), Flaig and Rottmann (1994, 1999), Rottmann (1995), Bertscheck (1995), Rottmann and Ruschinski (1997, 1998) and Smolny (1998).

Business Cycle Analysis

Ifo Business Climate has been the subject of numerous business-cycle studies. For introductory aspects, see Oppenländer and Poser (1989), Oppenländer (1995) and Goldrian

(2004, 2007). Döpke, Krämer and Langfeldt (1994) explored the Ifo time series as well as other leading indicators with regard to their forecasting performance of industrial production turning points in Germany. The authors used simple regression models and Granger causality tests. In a similarly structured article, Breitung and Jagodzinski (2001) discussed several measures for the goodness of fit for model assessments. Hüfner and Schröder (2002) compared the forecast quality of Ifo business expectations and the ZEW business cycle expectations via autoregressive models and Granger causality tests, examining especially the indicators' lead. Goldrian (2003) replied to this article, comparing the leads' variances. Other authors used Markov-Switching models, Probit and Logit estimations in conjunction with Ifo data, see e.g. Fritsche (1999), Döpke (1999), Funke (1997), Fritsche and Stephan (2002), Fritsche and Kouzine (2001, 2004), Bandholz and Funke (2003), Benner and Meier (2004, 2005), Hinze (2003), Flaig (2003), Flaig and Plötscher (2001), Schuhmacher and Dreger (2004), Knetsch (2004), Dreger and Schumacher (2005), Kholodilin and Siliverstovs (2006), as well as Abberger (2004, 2005, 2006, 2007a, b, c). An overview and a survey of the forecasting properties of different Ifo Business Survey time series is provided by Abberger and Wohlrabe (2006).

4 ACCESS TO THE *IFO DATAPOOL*

The Ifo Institute for Economic Research has obligated itself vis-à-vis the firms participating in its surveys to treat the survey data as strictly confidential. The confidentiality applies both to the identity of the participating firms as well as to the survey responses. The strict confidentiality of data is the basic prerequisite for the Ifo Institute able to conduct its surveys and to ensure the stability of the survey panels. Thus, as a matter of principle, the Ifo Institute does not allow access to the survey data to outside persons. A limited usage for research purposes is only allowed if it is guaranteed that a publication will not allow conclusions to be drawn on the identity of individual firms. The use, evaluation and calculations with the data must not be driven by commercial purposes.

Upon request in written form, the Ifo Institute forwards by e-mail a user-oriented information package on the micro data. The package contains a sample dataset in Stata format (with fictitious data), the documentation and a sample questionnaire. Interested researchers must send a written application to the management of the Ifo Institute containing the intention and details of the planned research, detailed wishes on what data is to be provided and the preferred time for the visit. In case of acceptance, the researcher must sign a data-protection agreement specific to the project.

The data will be provided at the Ifo Institute on a special PC without internet access with access control specific to the researcher. Data cannot be stored on external media and cannot be printed out. The research data will be checked by Ifo staff to ensure that conclusions as to individual survey participants cannot be drawn. If this is the case, the data will be forwarded to the researcher. Data that does not fulfil this criterion will be erased.

In the case of publication or presentations, the researcher must state that the data origin is from the Ifo Institute. All research results must be submitted to the Ifo Institute prior to publication or to access by third parties. The Ifo Institute will again check to see that no conclusions as to individual firms have been drawn. If such have been made, they will be deleted.

Access to data at the Ifo Institute is generally free of charge. Living expenses in Munich must be born by the visiting researchers. Data access is dependent on the availability of work stations at the Ifo Institute on the desired day.

REFERENCES

- ABBERGER, K. (2004). Nonparametric regression and the detection of turning points in the Ifo business climate. *CESifo Working Paper* 1238.
- ABBERGER, K. (2005). Another look at the Ifo business cycle clock. *Journal of Business Cycle Measurement and Analysis* **2** 431-443.
- ABBERGER, K. (2006). Qualitative business surveys in manufacturing and industrial production - What can be learned from industry branch results. *Ifo Working Paper* 31.
- ABBERGER, K. (2007a). The use of qualitative business tendency surveys for forecasting business investment in Germany. *Forecasting Letters*, in press.
- ABBERGER, K. (2007b). Qualitative business surveys and the assessment of employment: A case study for Germany. *International Journal of Forecasting* **23** 249-258.
- ABBERGER, K. (2007c). Forecasting quarter-on-quarter changes of German GDP with monthly business tendency survey results. *Ifo Working Paper* 40.
- ABBERGER, K., WOHLRABE, K. (2006). Einige Prognoseeigenschaften des Ifo Geschäftsklimas - Ein Überblick über die neuere wissenschaftliche Literatur. *Ifo Schnelldienst* **59 (22)** 19-26.
- ANDERSON, O. Jr. (1952). The business test of the IFO Institute for Economic Research, Munich, and its theoretical model. *Review of the International Statistical Institute* **XX** 1-17.
- BANDHOLZ, H., FUNKE, M. (2003). In search of leading indicators of economic activity in Germany. *Journal of Forecasting* **22** 277-297.
- BENNER, J, MEIER, C.-P. (2004). Prognosegüte alternativer Frühindikatoren für die Konjunktur in Deutschland. *Jahrbücher für Nationalökonomie und Statistik* **224** 637-652.
- BENNER, J, MEIER, C.-P. (2005). Was leisten Stimmungsindikatoren für die Prognose des realen Bruttoinlandsprodukts in Deutschland? Eine Echtzeit-Analyse. *Die Weltwirtschaft* **3** 241-255.
- BERTSCHEK, I. (1995). Product and process innovation as a response to increasing imports and foreign direct investment. *The Journal of Industrial Economics* **43** 341-357.
- BREITUNG, J., JAGODZINSKI, D. (2001). Prognoseeigenschaften alternativer Indikatoren für die Konjunkturentwicklung in Deutschland. *Konjunkturpolitik* **47** 292-314.
- DÖPKE, J. (1999). Predicting Germany's recessions with leading indicators – Evidence from probit models. *Kiel Working Paper* No. 944.

- DÖPKE, J., KRÄMER, J.W., LANGFELDT, E. (1994). Konjunkturelle Frühindikatoren in Deutschland. *Konjunkturpolitik* **40** 133-153.
- DREGER, C., SCHUMACHER, C. (2005). The out of sample performance of leading indicators for the German business cycle: Single vs combined forecasts. *Journal of Business Cycle Measurement and Analysis* **2** 71-88.
- ENTORF, H., POHLMEIER, W. (1990). Employment, innovation and export activity: Evidence from firm-level data. in Florens, J-P. Ivaldi, M., Laffont, J-J., Laisney, F. (eds): *Microeconometrics: Surveys and Applications*. Oxford: Basil Blackwell, 394-415.
- FAHRMEIR, L. (1992). Posterior mode estimation by extended Kalman filtering for multivariate dynamic generalized linear models. *Journal of the American Statistical Association* **87** 501-509.
- FAHRMEIR, L., NASE, H. (1992). Dynamische Modellierung und Analyse von Mikrodaten des Konjunkturtests. *Ifo Studien* **40** 1-22.
- FLAIG, G. (2003). Seasonal and cyclical properties of Ifo business test variables. *Jahrbücher für Nationalökonomie und Statistik* **223** 556-570.
- FLAIG, G., PLÖTSCHER, C. (2001) Estimating the output gap using business survey data: a bivariate structural time series model for the German economy. *Ifo Studien* **47** 221-232.
- FLAIG, G., STADLER M. (1993). Dynamische Spillovers und Heterogenität im Innovationsprozess. Eine mikroökonomische Analyse,” in Hochmuth, U. Wagner, J. (eds): *Firmenpaneldaten in Deutschland - Konzeptionelle Überlegungen und empirische Analysen*. Tübingen: Francke, 185-199.
- FLAIG, G., STADLER M. (1994). Success breeds success: The dynamics of the innovation process. *Empirical Economics* **19** 55-68.
- FLAIG, G., STADLER M. (1998). On the dynamics of product and process innovations. A bivariate random effects probit model. *Jahrbücher für Nationalökonomie und Statistik* **217** 401-417.
- FLIETH, B., FEASTER, J. (2002). Interactive expectations. *Journal of Evolutionary Economics* **12** 375-395.
- FRITSCH, U. (1999). Vorlaufeigenschaften von Ifo-Indikatoren für Westdeutschland. *Discussion Papers of DIW Berlin*, dp179, DIW Berlin.
- FRITSCH, U., KOUZINE, V. (2001). Do probit models help in forecasting turning points of German business cycles? *Discussion Papers of DIW Berlin*, dp241, DIW Berlin.
- FRITSCH, U., KOUZINE, V. (2004). Prediction of business cycle turning points in Germany. *Jahrbücher für Nationalökonomie und Statistik* **225** 22-43.
- FRITSCH, U., STEPHAN, S. (2002). Leading indicators of German business cycles – An assessment of properties. *Jahrbücher für Nationalökonomie und Statistik* **222** 289-311.

- FUNKE, N. (2000). Predicting recessions: Some evidence for Germany. *Weltwirtschaftliches Archiv* **133** 91-102.
- GOLDRIAN, G. (2003). Prognosegehalt von Ifo-Geschäftserwartungen und ZEW-Konjunkturerwartungen: eine Anmerkung. *Jahrbücher für Nationalökonomie und Statistik* **223** 223-226.
- GOLDRIAN, G. (ed.) (2004). *Handbuch der umfragebasierten Konjunkturforschung*. Ifo Beiträge zur Wirtschaftsforschung, Band 15, München.
- GOLDRIAN, G. (ed.) (2007). *Handbook of survey-based business cycle analysis*. Ifo Economic Policy Series, Edward Elgar, Cheltenham.
- HINZE, J. (2003). Prognoseleistung von Frühindikatoren. *HWWA Discussion Paper* 236, Hamburg.
- HOHNISCH, M., PITTAUER, S., SOLOMON, S., STAUFFER, D. (2005). Socioeconomic interaction and swings in business confidence indicators, *Physica A* 345 646 – 656.
- HÜFNER, F. P., SCHRÖDER, M. (2002). Prognosegehalt von Ifo-Geschäftserwartungen und ZEW-Konjunkturerwartungen: Ein ökonometrischer Vergleich. *Jahrbücher für Nationalökonomie und Statistik* **222** 316-336.
- KAWASAKI, S., McMILLAN, J., ZIMMERMANN, K. F. (1982). Disequilibrium dynamics: An empirical study. *American Economic Review* **72** 992-1004.
- KAWASAKI, S., McMILLAN, J., ZIMMERMANN, K. F. (1983). Inventories and price inflexibility. *Econometrica* **51** 599-610.
- KHOLODILIN, K.A., SILIVERSTOV, B. (2006). On the forecasting properties of the alternative leading indicators for the German GDP: Recent evidence, *Jahrbücher für Nationalökonomie und Statistik* **226** 234-259.
- KNETSCH, T.A. (2004). Evaluating the German inventory cycle using data from the Ifo business survey. *Discussion Paper of the Economic Research Centre of the Deutsche Bundesbank*, No. 10/04.
- KÖNIG, H., NERLOVE, M., OUDIZ, G. (1981). On the formation of price expectations. An analysis of the business test data by log-linear probability models. *European Economic Review* **16** 103-138.
- KÖNIG, H., LAISNEY, F., LECHNER, M., POHLMEIER, W. (1994). On the dynamics of process innovative activity: An empirical investigation using panel data. in Oppenländer, K-H., Poser, G. (ed.): *The Explanatory Power of Business Cycle Surveys*. Avebury: Aldershot, 243-262.
- LACHENMAIER, S. (2007). *Effects of innovation on firm performance*. Mimeo.

- LAISNEY, F., LECHNER, M., POHLMEIER, W. (1992). Innovation Activity and Firm Heterogeneity: Empirical Evidence from Germany. *Structural Change and Economic Dynamics* **3** 301-320.
- Langelütke, H., Marquardt, W. (1951). Das Konjunkturtest-Verfahren. *Allgemeines Statistisches Archiv* 35 189-208.
- Madsen, J.B. (1996) Formation of inflation expectations: from the simple to the rational expectations hypothesis. *Applied Economics* **28** 1331-1337
- NERLOVE, M. (1983). Expectations, plans, and realizations in theory and practice. *Econometrica* **51** 1251-1280.
- OPPENLÄNDER, K. H., POSER, G. (Hrsg) (1989). *Handbuch der Ifo-Umfragen*. Duncker & Humblot, Berlin.
- OPPENLÄNDER, K. H. (ed.) (1995). *Konjunkturindikatoren*. Oldenbourg, München Wien.
- POHLMEIER, W. (1992). On the simultaneity of innovations and market structure. *Empirical Economics* **17** 253-272.
- ROSS, D. R., ZIMMERMANN, K.F. (1993). Evaluating reported determinants of labour demand. *Labour Economics* **1** 71-84.
- ROTTMANN, H. (1995). *Das Innovationsverhalten von Unternehmen. Eine ökonometrische Untersuchung für die Bundesrepublik Deutschland*. Europäische Hochschulschriften 1814. Frankfurt am Main: Peter Lang GmbH Europäischer Verlag der Wissenschaften.
- ROTTMANN, H., RUSCHINSKI, M. (1997). Beschäftigungswirkungen des technischen Fortschritts – Eine Paneldaten-Analyse für Unternehmen des Verarbeitenden Gewerbes in Deutschland. *Ifo Studien* **43** 55-70.
- ROTTMANN, H., RUSCHINSKI, M. (1998). The labour demand and the innovation behaviour of firms. An empirical investigation for West German manufacturing firms. *Jahrbücher für Nationalökonomie und Statistik* **217** 741-752.
- SCHUMACHER, C., DREGER, C. (2004). Estimating large-scale factor models for economic activity: Do they outperform simpler models. *Jahrbücher für Nationalökonomie und Statistik* **224** 731-750.
- SMOLNY, W. (1998). Innovations, prices and employment: A theoretical model and an empirical application for West German manufacturing firms. *The Journal of Industrial Economics* **46** 359-381.
- STURM, J.-E., WOLLMERSHÄUSER, T. (eds) (2005). *Ifo survey data in business cycle and monetary policy*. Heidelberg, Physica-Verlag.
- THEIL, H. (1955). Recent experiences with the Munich business test: An expository article. *Econometrica* **23** 184-192.

- THONSTAD, T., JOCHEMS, D. B. (1961). The influence of entrepreneurial expectations and appraisals on production planning: An econometric study of the German leather and shoe industries. *International Economic Review* **2** 135-153.
- WOLTERS, J. (1984). Ökonometrische Analyse von Inflationserwartungen. *Allgemeines Statistisches Archiv* **68** 307-331.
- ZIMMERMANN, K. (1989). Innovative activity and industrial structure. *Empirica* **16** 85-110.
- ZIMMERMANN, K. (1991). The employment consequences of technological advance: Demand and labour costs in 16 German Industries. *Empirical Economics* **16** 253-266.

Ifo Working Papers

- No. 46 Hülsewig, O., J. Mayr and S. Sorbe, Assessing the Forecast Properties of the CESifo World Economic Climate Indicator: Evidence for the Euro Area, May 2007.
- No. 45 Buettner, T., Reform der Gemeindefinanzen, April 2007.
- No. 44 Abberger, K., S.O. Becker, B. Hofmann und K. Wohlrabe, Mikrodaten im ifo Institut – Bestand, Verwendung und Zugang, März 2007.
- No. 43 Jäckle, R., Health and Wages. Panel data estimates considering selection and endogeneity, March 2007.
- No. 42 Mayr, J. and D. Ulbricht, Log versus Level in VAR Forecasting: 16 Million Empirical Answers – Expect the Unexpected, February 2007.
- No. 41 Oberndorfer, U., D. Ulbricht and J. Ketterer, Lost in Transmission? Stock Market Impacts of the 2006 European Gas Crisis, February 2007.
- No. 40 Abberger, K., Forecasting Quarter-on-Quarter Changes of German GDP with Monthly Business Tendency Survey Results, January 2007.
- No. 39 Batchelor, R., Forecaster Behaviour and Bias in Macroeconomic Forecasts, January 2007.
- No. 38 Sülzle, K., Innovation and Adoption of Electronic Business Technologies, December 2006.
- No. 37 Overesch, M. and G. Wamser, German Inbound Investment, Corporate Tax Planning, and Thin-Capitalization Rules – A Difference-in-Differences Approach, December 2006.
- No. 36 Kempkes, G. and C. Pohl, The Efficiency of German Universities – Some Evidence from Non-Parametric and Parametric Methods, October 2006.
- No. 35 Kuhlmann, A., German Productivity – A Reassessment via the New Ifo Productivity Database, October 2006.
- No. 34 Kuhlmann, A., What is the X-Factor in the German Electricity Industry?, September 2006.

- No. 33 Temple, J. and L. Wößmann, Dualism and cross-country growth regressions, August 2006.
- No. 32 Baumann, F., V. Meier and M. Werding, Transferable Provisions in Individual Health Insurance Contracts, July 2006.
- No. 31 Abberger, K., Qualitative Business Surveys in Manufacturing and Industrial Production – What can be Learned from Industry Branch Results?, May 2006.
- No. 30 Ruschinski, M., Investigating the Cyclical Properties of World Trade, May 2006.
- No. 29 Holzner, Chr., V. Meier and M. Werding, Time Limits in a Two-tier Unemployment Benefit Scheme under Involuntary Unemployment, April 2006.
- No. 28 Eggert, W. and A. Haufler, Company Tax Coordination cum Tax Rate Competition in the European Union, April 2006.
- No. 27 Lachenmaier, S. and H. Rottmann, Employment Effects of Innovation at the Firm Level, April 2006.
- No. 26 Radulescu, D.M. and M. Stimmelmayer, Does Incorporation Matter? Quantifying the Welfare Loss of Non-Uniform Taxation across Sectors, March 2006.
- No. 25 Lessmann, Chr., Fiscal Decentralization and Regional Disparity: A Panel Data Approach for OECD Countries, March 2006.
- No. 24 Fuchs, Th., Industry Structure and Productivity Growth: Panel Data Evidence for Germany from 1971–2000, December 2005.
- No. 23 Holzner, Chr. and A. Launov, Search Equilibrium, Production Parameters and Social Returns to Education: Theory and Estimation, December 2005.
- No. 22 Sülzle, K., Stable and Efficient Electronic Business Networks: Key Players and the Dilemma of Peripheral Firms, December 2005.
- No. 21 Wohlrabe, K. and M. Fuchs, The European Union's Trade Potential after the Enlargement in 2004, November 2005.
- No. 20 Radulescu, D.M. and M. Stimmelmayer, Implementing a Dual Income Tax in Germany: Effects on Investment and Welfare, November 2005.