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Handbook of ifo Surveys

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ifo
BEITRÄGE
zur Wirtschaftsforschung

**100
2023**

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Edited by Stefan Sauer, Moritz Schasching and Klaus Wohlrabe



ifo INSTITUTE

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Edited by Stefan Sauer, Moritz Schasching, Klaus Wohlrabe

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Preface

As one of the main pillars of the ifo Institute's economic research, the ifo Business Survey has been conducted monthly since 1949, a year after the foundation of the ifo Institute. Since then, ifo has extended its survey activity by developing and administering additional business, expert, and public opinion surveys on a variety of topics. The survey results are of great value for economic research and provide an important basis for scientific policy analysis, while the indicators from the ifo Business Survey have proved to be indispensable for business cycle analysis and economic forecasting. In particular, the main indicator resulting from the ifo Business Survey, the ifo Business Climate Index for Germany, has emerged one of the most important early indicators for the German economy. Its monthly publication is frequently covered by the media and often impacts financial markets.

This book provides a detailed overview of all ifo surveys. It outlines the methodological background, and provides selective and illustrative results together with interpretations. Filled with many potential applications of the survey results, the chapters also emphasize the immense research potential of the results and microdata.

The structure of the book allows each chapter to be read and understood separately. First, the focus is on the ifo Business Survey with its many different results and indicators. Subsequently we present all other surveys, such as the ifo HR Survey, the ifo Education Survey, and the Economic Experts Survey, with selected results. All the microdata sets of the ifo surveys are collected at the LMU-ifo Economics & Business Data Center (EBDC). The final chapter of this book describes this data pool and how researchers can access it free-of-charge.

Keywords: ifo Business Survey, ifo Business Climate, business cycle indicators, survey methodology, education survey, expert surveys.

JEL-No: C01, C53, C81, C83.

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Munich, July 2023

Stefan Sauer, Moritz Schasching, Klaus Wohlrabe

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1 Introduction to the ifo Surveys

STEFAN SAUER, KLAUS WOHLRABE

1.1 History of the ifo Surveys and their Importance for Economic Research

Shaping the economic policy debate in Germany and beyond is the most important mission of the ifo Institute. To achieve this, ifo combines excellent research with economic policy relevance. One of the keys for this is ifo's survey activity. Since 1949, just one year after the foundation of the ifo Institute, the ifo Business Survey has been used to ask companies about various aspects of their economic activity. The survey was initially introduced with the pragmatic aim of closing the considerable gaps in official statistics, especially in the post-war period, and reducing uncertainty about economic developments. Then, as now, the results provided prompt information for those important economic variables for which official statistics were only published following considerable delays and revisions. As the potential of business surveys for economic research quickly became clear, the ifo Business Survey emerged as one of the cornerstones of the ifo Institute (Anderson 1952b, Langelütke and Marquardt 1951, Strigel 1989).

Initially, scientific analyses of the results of the ifo Business Survey were limited to the ifo Institute itself (Anderson 1957, Anderson and Strigel 1960). Since the 1970s, however, researchers, forecasters, and other users of economic information have increasingly recognised that the importance of the results of this survey goes far beyond a mere statistical substitute. Company-specific plans and expectations as well as assessments of the current situation have become of central importance in economic theory. In the ifo Business Survey, they are mainly collected via qualitative questions, from which the data has proved to be very valuable for empirical economic research.

The most important use of the results of the ifo Business Survey is the analysis and forecast of overall economic developments. Numerous economic indicators contribute to this end: The monthly-collected assessments of the current business situation and the business expectations for the next six months have proven to be particularly relevant, as has the ifo Business Climate Index for Germany, which is calculated as a geometric mean of the balances of these two components, and is the most important leading indicator for the German economy (Abberger and Wohlrabe 2006). Numerous other indicators are calculated and published from the data yielded by the ifo Business Survey, including overall indicators on employment plans,

1 Introduction to the ifo Surveys

export expectations, or uncertainty in the German economy.

In addition to the evaluation of the aggregated results, empirical research based on the disaggregated microdata – fertile ground for all kinds of analyses – has increased over the past decades (Seiler and Wohlrabe 2013a). Researchers can access the microdata from all ifo surveys free of charge at the LMU-ifo Economics & Business Data Center (EBDC). The provision of this data is intended to increase the synergies between empirical and theoretical research. A separate chapter on the EBDC will serve researchers as a manual for working with the microdata.

However, the survey activities of the ifo Institute are not limited to the monthly ifo Business Survey. They have been expanded to numerous regular surveys on a wide variety of topics. The following overview shows the surveys ifo regularly conducts (as of 2022) in order of the year they were initiated:

- 1949 ifo Business Survey in the Manufacturing Industry
- 1950 ifo Business Survey in Retail Trade
- 1951 ifo Business Survey in Wholesale Trade
- 1956 ifo Business Survey in the Construction Industry
- 1988 ifo Management Survey
- 1999 ifo Business Survey in the Insurance Industry
- 2001 ifo Business Survey in the Service Sector
- 2008 ifo HR Survey
- 2013 Quantitative Expectations Module of the ifo Business Survey
- 2014 ifo Education Survey
- 2016 ifo Database for Family Businesses
- 2016 ifo and FAZ Economists' Panel
- 2022 Economic Experts Survey

This list shows ifo's efforts to cover a broad spectrum of the German economy by surveying as many sectors and industries as possible.¹ Furthermore, the survey activity is no longer limited to business surveys, but also includes economic expert surveys or public opinion surveys (e.g., ifo Education Survey). The list of surveys could be extended considerably by accounting for special one-off surveys, regular surveys in individual economic sectors, which have now been integrated into the monthly ifo Business Survey (e.g., leasing companies, IT service providers, architects), or surveys that have been discontinued.

¹ There also several discontinued surveys like the World Economic Survey (WES), the (quantitative) investment survey or the innovation survey. The underlying micro data is still available at the data centre EBDC (see Section 6). For more information see Oppenländer and Poser (1989a), Goldrian (2004), Goldrian (2007) or Sauer and Wohlrabe (2020a).

2 Handbook of ifo Surveys

1.2 Content and Aim of this Book

This book is intended to provide a detailed overview of the ifo Institute's various survey activities. Since the resulting data and indicators are used today by many different user groups, their respective interests are considered by describing the survey instruments in detail and providing information about the interpretation of the results and their application possibilities. While users from companies, politics, and various institutions are mostly interested in the aggregated results and time series for economic analysis, market observations, or in the context of economic policy decision-making, researchers often work with the disaggregated microdata.

The primary focus of the book is on the ifo Business Survey and its resulting indicators. The beginning of the survey, the structure of the panels of survey participants, and the survey methods are explored in an overview. The questions, which are collected monthly or, in some cases, quarterly, semi-annually, or annually, are presented in detail to show the large amount of information collected on various variables relevant to the business cycle. Attention is also paid to all steps of the aggregation from the raw data to the numerous indicators and time series that result from the survey. These results can not only be used for the analysis of the overall economic situation, but also offer many possibilities to depict the economic development in different sectors and industries. In addition, evaluations can also be carried out using other dimensions, such as regional breakdowns at the level of the German federal states or the classification of the participating enterprises by firm size. The presentation of the various indicators and results is intended to illustrate the great analytical potential of the ifo Business Survey. At the same time, it provides an interpretation aid for the users of these indicators and results.

Subsequent to the Business Survey, the other previously listed ifo surveys and their results and applications are presented. The respective survey methods, panels, and questionnaires are all described in detail.

The underlying microdata of all surveys can be accessed at the LMU-ifo Economics & Business Data Center. There, the data can also be linked to other data sets to open up even greater research potential. An extra chapter on the EBDC is intended to serve as a guideline for researchers on how to get free access to the data and to give an overview of the currently existing data sets.

2 The ifo Business Survey

The ifo Business Survey is the oldest and best-known of the ifo Institute's surveys. Since 1949, it has been conducted monthly to collect a broad spectrum of information on the current economic situation as well as plans and expectations for the near future (Langelütke and Marquardt 1951). The ifo Business Climate Index for Germany, which is considered the most important leading indicator for the German economy, is calculated from the responses of the participating companies. First, an explanation of the basic objectives, the methodology, and the processes of the monthly survey are explained. Following this, the various survey areas, as well as regional results, supplementary questions, and numerous other results and indicators are discussed in detail. In this way, the user of the data can gain insight into the survey results, their interpretation, and potential for analysis.

2.1 Concept of the ifo Business Survey

STEFAN SAUER

2.1.1 Objective and History of the ifo Business Survey

Initially, the ifo Business Survey was set out to close gaps in the official statistics for post-war Germany and to reduce uncertainty in the country's economic developments. Collecting information about current economic developments still is one of the main goals of the survey, as official figures are often only available after a considerable delay and are revised retrospectively. Furthermore, the survey's results can be used to provide early indications of economic turning points or disturbances in the economic cycle of upswing and downswing phases, contributing to the quality of forecasts overall.

Anderson (1952a) was the first to use the data of the ifo Business Survey for scientific analyses. Using correlation analyses, he showed that the survey's time series were a very good approximation of official statistics for many industries. Since then, close connections between time series from the Business Survey and official key figures have been shown in numerous studies. Abberger and Wohlrabe (2006) provide an overview of these studies regarding the ifo Business Climate Index. Moreover, Lehmann (2023b) additionally sums up the scientific literature from recent years about the forecasting power of various other indicators from the ifo Business Survey.

In line with the primary objective of recording economic developments, the selection of the

2 The ifo Business Survey

sectors to be surveyed had to include those that react particularly promptly and clearly to new economic impulses or produce these impulses themselves through their business activities. Thus, a panel of companies from the manufacturing industry was first set up, among whom the monthly ifo Business Survey was conducted from 1949 onwards. In autumn 1949, the first questionnaire was sent out to a limited number of manufacturing companies throughout Germany, with a total of 88 questionnaires completed in response.

Shortly after the survey was introduced, there was no longer any doubt about its usefulness. Consequently, in 1950 the ifo Institute expanded the monthly survey to the retail trade sector and, in 1951 to the wholesale trade sector. The construction industry was added in 1956. In the service sector, the survey was started in 2001, though its results have only been published since 2005, following a start-up phase. Previously, there had only been separate quarterly surveys in individual areas of the service sector, such as architects, IT service providers, or leasing companies.

A third goal of the survey that has become increasingly important over the past decades is the collection of microdata for research projects (Becker and Wohlrabe 2008). Response rates from these projects are uncommonly high and attrition is low compared to other business surveys (Link 2020), making this data a treasure-trove for all kind of analyses. The advantages of these microdata sets include the high number of monthly responses (about 9000) from a set of firms that are representative of the German economy, the extensive set of questions answered by every firm, and the large number of observations-by-firm. Researchers can access the data free of charge at the LMU-ifo Economics & Business Data Center at the ifo Institute.

The monthly ifo business survey is also part of the Joint Harmonised EU Programme of Business and Consumer Surveys in the EU Member States and in the Candidate Countries of the European Commission.

2.1.2 Questionnaire Based on Qualitative Questions

The main objective of the ifo Business Survey is a good reflection of key economic variables. Therefore, the questions of the survey are mainly about current developments, such as demand, production, or capacity utilization, but also about plans and expectations for the near future, for example regarding business activity, price setting, or exports. Since there are numerous topics that promise interesting results for economic analyses and forecasts as well as for other research projects, the questionnaires were divided into questions with different frequencies (monthly, quarterly, semi-annually, or once a year). The classification is mainly based on the importance of a variable or topic and the resulting urgency for up-to-date information. In addition, one-time supplementary questions on current economic topics can also be inserted if needed.

From the very beginning of the survey, the questions have been almost exclusively qualitative,

with participants being able to choose between predefined answer options. At the time of the conception and introduction of the ifo Business Survey, however, a qualitative approach for data collection was not unprecedented. For example, qualitative data had been used in agricultural statistics since the middle of the nineteenth century, as the harvest prospects in the latter cannot be subjectively expressed in figures (Wohlfahrt 1940). Sporadic qualitative surveys have also previously been conducted in economic statistics, such as, for example, those conducted by the Department of Labour Statistics of the Imperial Statistics Office from 1903 onwards. For company surveys, however, there were no comparable models, neither in Germany nor abroad, regarding the scope of the questions, periodicity, panel size, or methodological analysis of the survey results.

A major advantage of qualitative business surveys is the flexibility of this approach. The participating companies can base the assessment of their situation on individual factors that have the highest importance for them. This considerable advantage over traditional quantitative surveys, especially in times of major structural changes, contributed to the almost worldwide establishment of business surveys based on the methods developed at the ifo Institute. For example, during the transformation from a centrally planned economy to market economy structures, the economic policy authorities in Russia and China quickly recognized that the existing statistics were no longer suitable. Qualitative business surveys proved to be an important supplement to official statistics and were of enormous value for business cycle analysis and forecasting.

The decision to conduct qualitative surveys was made because many variables, such as the assessment of incoming orders or stocks, can be recorded more accurately by predefining response categories (Langelütke and Marquardt 1951). It also resulted in simpler and more time-saving answers for the survey participants. This was intended to lessen companies' aversion to surveys and questionnaires, which was particularly wide-spread in the post-war period. This decision has not been changed in the more than seven decades since then.

However, the wording of the questions has evolved. The constant monitoring of the collected data, as well as suggestions from the survey participants, led to frequent changes, especially in the first years. Around the year 2000, the EU also endeavored to standardize the questionnaire of economic surveys in all member states, leading to further amendments to the questions. Since then, however, there have been only minor changes to a few regular questions. These regular questions are harmonized as far as possible over all surveyed sectors, which allows the calculation of overall indicators for the German economy as a whole.

2.1.3 Monthly Survey Process

The ifo Business Survey process is structured identically every month: At the beginning of the month, the questionnaires are set with the monthly standard questions and, if necessary, with supplementary questions. They are then sent to a fixed panel of more than 10,000 companies, which is continuously updated. The participants can choose whether they receive

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the questionnaire by post or by e-mail. Online participants receive a personal link that leads to a questionnaire assigned to the company on a web portal. This has now become the main form of participation.

The answers of the survey participants are usually received by the ifo Institute in two larger waves. Most of the questionnaires are returned within the first days after sending them out. In the middle of the month, those companies that have not yet replied are reminded to participate. As a result, a high number of completed questionnaires arrive in the following days. About one week before the end of the month, the survey is completed. Questionnaires received any later cannot be included in the calculation of the time series and indicators. Nevertheless, they can still be used for research with the microdata.

While the answers received online can be imported directly into the microdata pool, the paper questionnaires must first be digitized. The day before the results are published, an automatic plausibility check of the microdata is carried out. This reveals any inconsistencies in the answers or possible errors in the digitization of the paper questionnaires and corrects them if necessary. The aggregation of the data, including seasonal adjustment, indexing, and generating the output of results (tables, graphs, etc.) is then processed automatically overnight. The aggregation of the data and the calculation of the various business cycle indicators is elaborated in detail in the following chapters.

2.1.4 Publication of the Results

The monthly publication dates of the ifo Business Survey results are always fixed in advance for the entire calendar year. As part of the harmonization of surveys in Europe, the European Commission coordinates these dates, which are set a few workdays before the end of every month. This early availability of the results is one of the main advantages of the ifo Business Survey over other economic information, such as official statistics. On the day of the publication, at exactly 10 a.m., the ifo Business Climate for Germany as well as the indicators on the current situation and the expectations for the next months are announced to news agencies in a telephone conference. The press release with commented results is then sent electronically a minute later (ifo Institute 2022a). Since the ifo Business Climate receives a lot of attention and has a direct influence on the financial markets (Mittnik et al. 2013a), before 10 a.m. the new values of the indicators are only known to a small group of people responsible for the preparation of the press release. Finally, the press release is uploaded to the ifo Institute's website together with other selected graphs and time series, and is also posted on social media channels. The publication of further indicators, such as the ifo Employment Barometer or the ifo Export Expectations, as well as regional Business Climates, takes place in the following days in the form of press releases and on the ifo website. In addition, detailed comments on selected results are published in the ifo Schnelldienst (e.g. Demmelhuber and Wohlrabe 2020) and in graphical and tabular form in the ifo Konjunkturperspektiven (ifo Institute 2022b).

An essential purpose for which the ifo Business Survey was created is the mutual exchange

of information between companies and the ifo Institute. Since there is no data without the cooperation of the participating companies, the participants receive the results of the survey free of charge in return for their cooperation. This is usually done via an online platform on which selected content such as time series, tables, and graphs are uploaded. In addition to the survey participants, many other customers are interested in the time series from the ifo Business Survey. Most of them obtain the data for a fee and then use it for their own purposes or as distributors of the results for others. The largest customers include various data providers as well as research institutes, ministries, or banks, which use the results for their own business cycle analyses and forecasts. Finally, the microdata together with the time series is archived every month at the LMU-ifo Economics & Business Data Center (EBDC), where they can be analyzed by researchers free of charge.

2.1.5 Data Protection

The ifo Institute pays particular attention to data protection in the ifo Business Survey, as in all other surveys. High standards are ensured regarding data protection and data security in any handling of personal data, both in the online surveys and in the paper questionnaires sent by post. The ifo Institute has built up an extensive pool of survey data over decades and therefore has great experience in handling sensitive data. Personal data is only collected to the extent necessary, and all information is treated in strict confidence. For the research with the microdata, all data sets are anonymized to make conclusions about the identity of the respective company impossible. Therefore, legal data protection is always fully guaranteed.

2.2 Methodology of the ifo Business Survey

This chapter explains the basic methodological concepts of the ifo Business Survey. It provides information on the survey design, the survey modes, and the processing of the microdata into time series and indicators.

2.2.1 Survey Designs

STEFAN SAUER

The design of a survey depends on its objectives. Therefore, before starting a survey, various fundamental and conceptual decisions must be taken. First, a distinction is made between one-time surveys and regular surveys with a fixed group of participants (e.g., firms, households, experts). These so-called panel surveys are the norm for ifo surveys. In the ifo Business Survey a fixed set of questions is asked every month to observe and analyze developments of various variables over longer periods. In addition to the monthly surveys, the ifo Institute also conducts quarterly, semi-annual, or annual panel surveys. One-off special surveys on a specific topic, on the other hand, tend to be the exception. Instead, one-off supplementary questions on current economic topics can be included in the regular surveys (see Section 4.13).

While the advantage of panel surveys is that developments of numerous variables can be observed both at the individual level of the participants and at the aggregated level, the establishment and maintenance of representative panels is labor-intensive. Full surveys of all German companies (or households or economic experts) are of course not practical, especially since participation in the ifo surveys is voluntary. The survey panels therefore constitute stratified samples from all German enterprises, covering all important economic sectors (professional representation) as well as a sufficiently large proportion of companies (company representation). It usually takes several years to build up a sufficiently large and stable panel. Even so, it often happens that participants don't participate actively in the survey over a longer period or no longer participate at all. To counteract this so-called non-response or panel mortality, constant panel maintenance by acquisition of new participants is necessary to keep the panel stable or expand it, and thereby to avoid systematic biases. Similarly, so-called selection effects that might lead to systematic biases of the results must be avoided. Therefore, the distributions of the companies according to regions, company size, and industries must roughly reflect the reality (see Section 2.7).

A second crucial pillar is the design of the questionnaire. The first step is to select topics and variables that reflect the objectives of the survey and to construct questions that promise interesting and meaningful results. The ifo Business Survey asks about variables that are important for business cycle analysis. It focuses on current developments as well as plans and expectations for the near future. There are many topics and variables of interest, but

the processing effort for company surveys should not be unnecessarily high. Therefore, the number of questions should be limited. Furthermore, the questions can be grouped according to their importance and urgency. Less important questions should either not be included at all in the survey or asked at a lower frequency. The questionnaire of the ifo Business Survey, for example, was therefore divided into a standard part with questions that recur monthly and questions that are only asked quarterly, or once or twice a year.

Once a question program has been established, it should be changed as little as possible. Even minor changes in the wording of a question can lead to structural breaks in the corresponding time series because of the associated change in the companies' responses. If questions are changed or deleted, the corresponding time series can no longer be calculated.

Furthermore, there are some important rules regarding the design and formulation of the questions. On the one hand, a simple sentence structure must be used as well as understandable and common words. Beyond that, ambiguities or incomprehensible constructs, such as double negations, must be avoided. The questions should also be formulated as neutrally as possible to avoid unintentionally influencing the participants or pushing them towards an answer. The ifo Business Survey mainly focuses on qualitative questions with given answer categories instead of quantitative questions with numbers. This is mainly to minimize the effort of answering. The answers given must cover all possibilities and be mutually exclusive. Before conducting a survey for the first time, pre-tests with selected participants can be helpful to uncover possible problems in the questionnaire, such as incomprehensible questions.

2.2.2 Data Collection Channels

ARTEM MARJENKO

There are different ways in which data can be collected in a survey. The most common are paper questionnaires, which are mailed or faxed to survey participants, e-mail questionnaires meant to be printed out¹, an online questionnaire, a social media survey, and phone and face-to-face interviews. When it comes to business surveys, paper, e-mail, and online questionnaires are typically used to collect data. This is true for the ifo Business Survey as well as for corresponding business surveys in most of the other EU countries; only in Italy and Spain phone interviews are also conducted. Table 2.1 summarizes the characteristics of these three data collection channels.

¹ Except for the fact that an e-mail questionnaire is transferred by e-mail to the recipient, it is in many ways similar to the paper questionnaire.

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Table 2.1: Characteristics of different survey channels

	Paper questionnaire	E-mail questionnaire	Online questionnaire
Cost	Printing, mailing, data capturing cost (variable cost)	Printing and data capturing cost (variable cost)	Expenses for hardware, programming, and software licenses (fixed cost)
Access to survey reports	A limited number of survey reports is sent to survey participants by mail or fax	Many survey reports can be sent as e-mail attachments	All survey reports are accessible through the survey web portal
Space for additional ad hoc questions on the questionnaire	limited	limited	unlimited
Validation check for responses	Responses must be checked for accuracy and corrected if necessary	Responses must be checked for accuracy and corrected if necessary	Invalid responses can be prevented from even being entered
Data security	Fax transmission is not encrypted	e-mail and fax transmissions are not encrypted	Encrypted data transmission, password protected access to the survey web portal

Because of the many benefits that the online form provides, the ifo Institute constantly tries to convince survey participants to switch to this channel of data collection. This effort has led to a considerable increase in the share of online participants over the last years. Nevertheless, there is still a significant number of participants who prefer a classical paper questionnaire, as figures in Table 2.2 indicate. Some say that handling a paper questionnaire is more convenient, while others cite security concerns regarding the online process. Although the risk of data breach in the online process is rather low, the ifo Institute continues to provide the paper option to serve everybody's needs. Only some surveys – such as the ifo Business Survey in the

insurance industry or the ifo HR Survey – are conducted solely online. Technological progress promises new ways to carry out surveys: Submitting data from mobile devices through a dedicated ifo survey app could be a future option.

Table 2.2: Share of responses submitted via different channels in the ifo Business Survey

	Paper questionnaire		E-mail questionnaire		Online questionnaire	
	2017	2022	2017	2022	2017	2022
Manufacturing industry	30%	19%	-	-	70%	81%
Wholesale and retail	49%	32%	-	-	51%	68%
Construction industry	60%	49%	-	-	40%	51%
Service sector	17%	1%	14%	12%	69%	87%

2.2.3 Aggregation of Micro-data into Time Series

KLAUS WOHLRABE

Micro-data, i.e., the responses of the companies, are the backbone of the ifo Business Survey. In their raw form, they are used primarily in the context of research. Before the publication of the survey results, the micro-data need to be aggregated into time series. Only then does it make sense to interpret and use them in the context of business cycle analysis. One of the basic principles of aggregation in the ifo Business Survey requires that the answers first receive an individual weight. This weight represents the size of the company. In the ifo Business Survey, larger companies are given more weight than smaller ones. In a second step, industry and sector weights are assigned. Sectors that make a larger contribution to gross value added in the German economy are given a correspondingly higher weight.

As mentioned above, the majority of the regularly asked questions have three answer categories. There are different procedures for aggregating this type of data (see also Pesaran and Weale 2005). Since the introduction of the surveys in 1949, the ifo Institute has been using the balance methodology, which goes back to Anderson (1952b). The relative proportion of negative answers (the third category) is deducted from the relative proportion of positive answers (the first category). The neutral or central category is thus only indirectly taken into account. If, for example, 30% of the companies stated positive expectations, 50% unchanged (neutral), and 20% negative, the balance in this example would be +10, for which the relative share of 20% (negative) would be deducted from the positive share of 30%. The share of neutral answers of 50% would not be taken into account. The balance can accordingly be

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Table 2.3: Balance statistic: An illustrative example

Firm	Answer	Weight	Response distribution		
			+	=	-
A	satisfactory	5		5	
B	well	2	2		
C	well	4	4		
D	bad	2			2
E	satisfactory	5		5	
F	well	2	2		
Distribution unweighted			3	2	1
Sum of the weights			20	8	2
Percentages (unweighted)			100%	50%	33.33%
Percentages (weighted)			100%	40%	16.67%
				50%	10%

between -100 and +100. In the case of -100, all answers are negative and in the case of +100 all answers are positive. If the balance is positive, a (weighted) majority of the companies have chosen the corresponding category. Strictly speaking, this majority only applies to those companies that have not chosen the neutral category. In the example above, the neutral category is chosen most often. When interpreting the balance, it should be noted that a certain balance can result from different response behaviour. For example, a balance of +10 can result from a response variation of 10% (+), 90% (=), and 0% (-). Another possible distribution is 50%, 10%, and 40%. This list could be continued at will. The extent to which the responses are scattered is also a measure of the uncertainty of enterprises regarding a particular economic activity. The balance methodology can also be used for weighted answers. This is shown as an example in Table 2.3. The individual weights of the companies are accordingly used to calculate the relative shares. In the example, the unweighted balance is calculated as $50 - 16.67 = 33.33$, while the weighted balance is $40 - 10 = 30$.

Until March 2018, aggregation within the framework of the balance methodology was carried out in a 'tree' structure based on the official classification of economic activity of the German Federal Statistical Office (WZ2008). A section of this tree structure is shown as an example in Figure 2.1 for the manufacturing industry up to the three-digit level. The highest level, here the entire manufacturing industry, is the so-called 1-digit level. On the 2-digit level, well-known industries such as the automotive industry or mechanical engineering are listed. Below this level, the breakdown has different levels of aggregation, some of which extend to the 6-digit level. The aggregation of the answers within this tree structure takes place from bottom to top. Each company report is assigned to an economic branch at the lowest level of the hierarchy and receives an individual weight. In the manufacturing industry, this is determined by the number of employees. The balances are then aggregated to the next higher level according to their

gross value added share. In the example in Figure 2.1, for example, the results of the machine tool industry and the manufacturers of gears and cogwheels (plus the other sub-sectors of mechanical engineering) are combined to form the balance for mechanical engineering. Finally, all balances at the 2-digit level are also aggregated to the total manufacturing industry with a weighting based on the shares of gross value added.

As intuitive as the aggregation according to the tree structure in Figure 2.1 is, it has some practical disadvantages. The company panel in the ifo Business Surveys does not remain constant over time: Companies leave or are newly registered. This also has an impact on the number of observations in individual branches of the economy. On the one hand, some areas may contain too few companies over time. The corresponding balance will then no longer accurately represent economic development. For example, balances based on fewer answers are more volatile than those with many answers. On the other hand, it is possible that the balance values tend to assume high (extreme) balance values such as +100. This may also distort the upper aggregates. Another important aspect is the fact that some answers cannot be taken into account at all because there are not enough enterprises to form a separate (sub-)aggregate.

Due to the above-mentioned points, the aggregation rules must be maintained and adapted on a permanent basis. In order to mitigate the problem somewhat, a change was made in 2018 in the allocation of micro-data to the balance calculation. Figure 2.2 shows an example of this. The most important difference is that balances from the 3-digit level are no longer used to calculate balances at the 2-digit level. This means that all micro-data assigned to mechanical engineering are directly included in the balance calculation of mechanical engineering with their company weight. This idea is propagated to the lower levels. All micro-data from the “machine tools” sector, for example, are used accordingly, independent of other 4- or 5-digits units below. This procedure makes it easier to maintain the aggregation scheme and minimize distortions from understaffed sub-aggregates. In addition, as all answers can be assigned to a 2-digit aggregate, they can be used at any time.

The time series calculated using the balance methodology on the basis of micro-data vary between the theoretical values of -100 and +100.² However, each time series can also be converted into an index, as is the case with the ifo Business Climate Index for Germany (Section 3.1). A base year is chosen and the corresponding average of the time series for that year is then set equal to 100. All observations are then converted relative to this value using a rule of three. The index calculation follows a tradition in the economic press, where indexation is used to improve the comparability of time series with different scales.

² They are also publicly available for analysis in this form.

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Figure 2.1: Aggregation of micro-data until March 2018

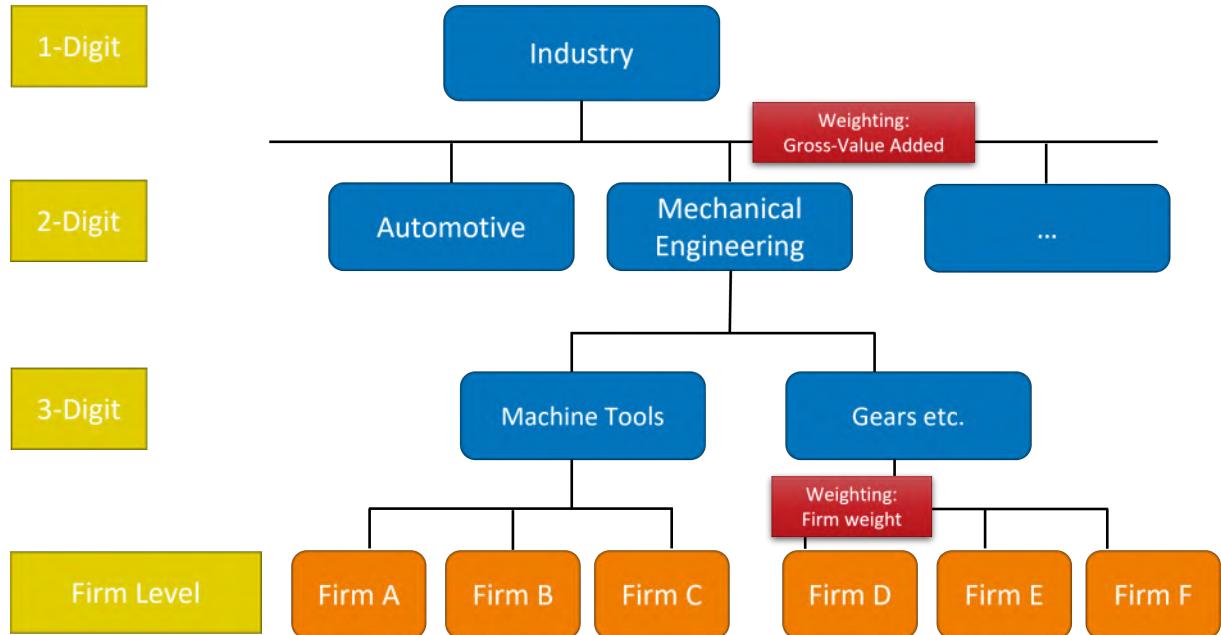
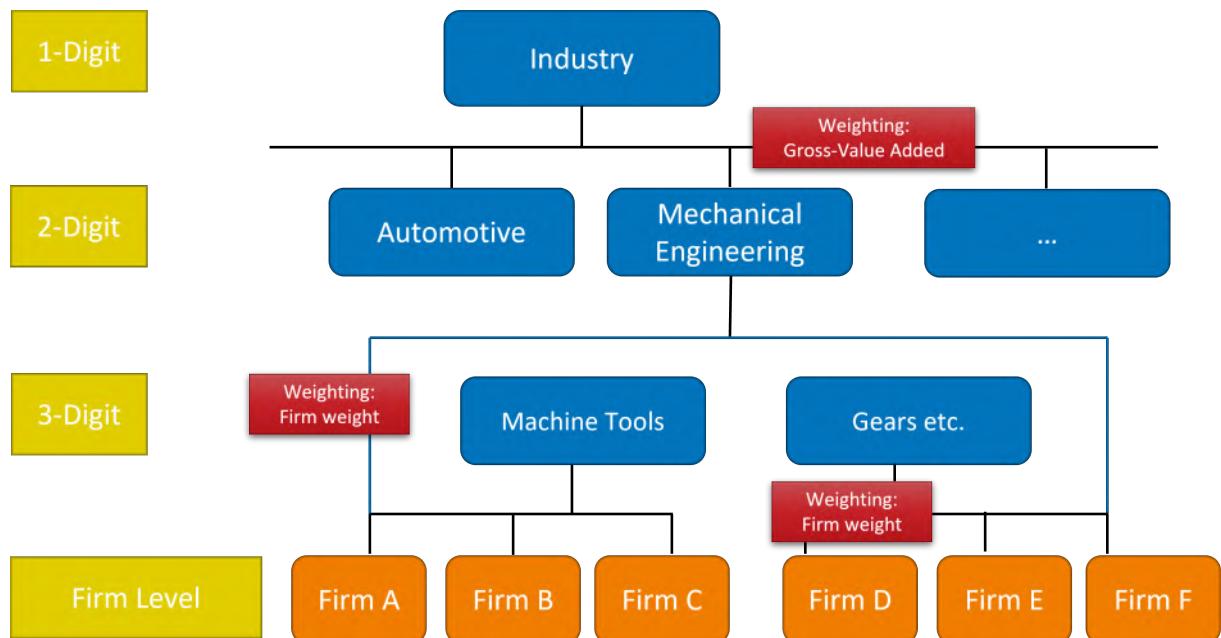


Figure 2.2: Aggregation of micro-data from April 2018



However, indexation is not without its drawbacks. For example, there is no natural reference value. For balances, this is the zero line. A positive balance corresponds to a positive economic development and vice versa. In an indexed series, it is sometimes incorrectly assumed that

the reference value for a positive or negative development is 100. However, this only applies in a certain exceptional case, namely if the mean value was 0 in the base year. The reference value is given with the mean value of the base year, which is, however, difficult to read from a graphical presentation. It is therefore recommended to look primarily at the change in the ifo Business Climate Index for Germany or other indexed time series and to compare it with its historical mean.

Another drawback of indexation is that the levels of different indices cannot be compared with each other because their mean values in the base year are usually different. For example, if the index for wholesale is larger than the corresponding index for retail, it could be assumed that wholesale is economically better off. However, this interpretation only applies if the difference between the base year averages is smaller than the difference in the level of the indices. When comparing different time series from the ifo Business Survey, it is therefore recommended to consider the corresponding balances.

2.2.4 Seasonal Adjustment

STEFAN SAUER

2.2.4.1 Introduction and Basic Approaches

In numerous economic time series, annual patterns are visible which overlap the interesting trend and cyclical structures. For example, the unemployment rate always peaks in the winter months, or retail sales increase significantly each year in the weeks before Christmas. Causes for such seasonal patterns can be, for example, weather differences or public holidays. To avoid wrong conclusions, these seasonal influences can be eliminated from the time series by seasonal adjustment. This is often necessary also for economic time series derived from surveys. This chapter explains the concept of seasonal adjustment and gives an outlook on its application for the ifo Business Survey.

A detailed summary of the historical development of seasonal adjustment procedures and their methodology can be found in Helleberg (1992). The basic idea is to split the original time series (O) into systematic components and an irregular component and then to remove the seasonal component. Each of these components has different influences on the time series (Table 2.4). The systematic components in the original values of the time series are usually a trend component (T), reflecting the long-term evolution of the time series, and a business cycle component (C), reflecting cyclical movements with a period of several years. These two components are usually combined to form the so-called trend business cycle component (TC). In addition, the seasonal component (S), an annual effect, is also one of the systematic influences. The component model can either be extended by a weather component (W), which explains exceptional weather conditions or the different intensities of snow and frost

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in winter, and/or by a working day component (D), which considers the number of working days in a month or quarter. The irregular component (I) includes all previously unrecorded, mainly short-term and random influences on the time series.

Table 2.4: Components of economic time series

Components	Causes
Smooth trend cycle component	Long-term trends and economic movements
Seasonal Component	Annual recurring patterns
Weather component (optional)	Exceptional weather conditions
Workday component (optional)	Different length and working day composition of months/quarters
Irregular component	Short-term fluctuations, singular effects

The individual components can be related to each other in different ways. The most common model approaches are additive time series decomposition, in which the components add up to the original series value O_t at any time t , and multiplicative decomposition:

$$\text{Additive decomposition : } O_t = TC_t + S_t + (W_t) + (D_t) + I_t \quad (2.1)$$

$$\text{Multiplicative decomposition : } O_t = TC_t \cdot S_t \cdot (W_t) \cdot (D_t) \cdot I_t \quad (2.2)$$

A seasonally adjusted series then contains only the trend cyclical component and the irregular component after removing the seasonal component and, where applicable, weather and/or working day effects. In the additive model this is done by subtracting the seasonal component, and in the multiplicative decomposition by division.

Since it is not possible to observe the exact characteristics of the individual components of a time series, there is also no objectively correct component decomposition. As a result, there are many different seasonal adjustment procedures, some of which have major methodological differences. The so-called Census models developed by the U.S. Bureau of the Census, which are based on moving averages, are the most frequently used by statistical offices and other institutions worldwide. In Germany, these procedures are applied, among others, by the Bundesbank, the Federal Statistical Office, and for the time series of the ifo Business Survey.

2.2.4.2 X-13ARIMA-SEATS

The basic approach of the Census models was developed with the X-11-method (Shiskin et al. 1967), which was updated in the X-11 ARIMA method (Dagum 1980). The option of forecasts

and backcasts from ARIMA models (Auto Regressive Integrated Moving Average) before the actual seasonal adjustment improved the properties at the edges of the time series. The ARIMA approach was further developed by the US Census Bureau in the X-12-ARIMA version, which offered additional diagnostic tools for assessing the performance of the seasonal adjustment. The latest version of the Census procedures is the X-13ARIMA-SEATS procedure (U.S. Bureau of the Census 2013), which is also used in the ifo Business Survey.

Seasonal adjustment with X-13ARIMA-SEATS is based on the following methodology: Apart from the choice of the linkage of the components (mostly additive or multiplicative), no explicit model specifications must be made. In a first step, the time series are extended at the edges by forecasts and backcasts using the ARIMA approach. This allows the seasonal adjustment to be carried out completely with symmetrical seasonal and trend filters, which helps to avoid the distortion of the results by asymmetrical filters. Before the actual seasonal adjustment begins, weather or working-day effects and extreme values – which could lead to an excessive influence of the irregular remainder and thus to distortions when determining the seasonal factors – can be eliminated from the time series using regression approaches.

The calculation of the time series components, which is the core of the seasonal adjustment, is based on various filtering methods using moving averages. First, the smooth component is estimated using a trend filter and removed from the time series, leaving only the seasonal and irregular components. These two components together are referred to as the raw seasonal component. From this raw seasonal component, a seasonal filter based on moving averages is used to eliminate the irregular component and to obtain an estimate of the seasonal component. By eliminating the seasonal component from the original time series, the seasonally adjusted time series is obtained. This procedure is repeated over several iterations until the final component decomposition and thus the seasonally adjusted time series is determined.

Finally, the X-13ARIMA-SEATS procedure offers various diagnostic instruments for the quality of the seasonal adjustment that provide indications of possible optimization potential in the selection of filters or other settings. Among other things, it is tested whether systematic patterns can still be identified in the adjusted series.

The Census procedures have numerous advantages. The various options for carrying out the individual steps offer a high degree of flexibility. At the same time, however, because of these numerous options the procedure is also sometimes criticised for a lack of clarity or even for a vulnerability to manipulation. Detailed documentation of the settings used is therefore fundamental.

Model Selection of the Component Decomposition

The component decomposition is usually chosen out of the two most common approaches: the additive or the multiplicative model. In the additive model, the individual components add up to the original time series. The seasonal components and the irregular remainder

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Table 2.5: Basic features of the X-13ARIMA-SEATS procedure

	Steps	Method
1. Preparatory steps	Extending the time series for the avoidance of end point bias problems	ARIMA approaches
	Optional elimination of weather and calendar effects, treatment of extreme values	Regression approaches
2. Core process (iterative)	Estimating the trend-cycle component	Trend filters with moving averages
	Calculating the raw seasonal component	Elimination of the estimated trend-cycle component from the unadjusted time series
	Estimating the seasonal component	Seasonal filters with moving averages
	Calculating the seasonally adjusted time series	Elimination of the estimated seasonal component from the unadjusted time series
3. Quality diagnosis	Searching for eventually remaining seasonal or calendar effects	Statistical tests and spectral analysis
	Examining the appropriateness of the chosen model options	Calculation of various indicators

are therefore absolute deviations from the level of the trend economic component. In the multiplicative model, however, the original time series is presented as a product. The individual components reflect relative influences. A seasonal factor of 1.05 in one month would raise the time series level by five percent. The absolute increase thus depends on the current level of the time series. The multiplicative model therefore implies a relationship between the seasonal fluctuation patterns and the time series level. If no evidence for this can be found, the additive model offers the advantage of easier interpretation of the individual time series components. Furthermore, the multiplicative model can only be applied to time series with exclusively non-negative values. This is not the case, for example, for many time series of the ifo Business Survey.

Selection of Trend and Seasonal Filters

To approximate the smooth trend-cycle component, various filters based on moving averages are used (Ladiray and Quenneville 2001). Moving averages of a time series X_t can be written in the following form:

$$M[X_t] = \sum_{k=-p}^{+f} \theta_k X_{t+k}$$

Decisive for the result of the filtering process are the choice of the weights and the definition of the parameters p and f . Usually a symmetrical range is chosen ($p = f$). The whole range then contains an odd number of values. As a default setting for the moving averages, 13 values are selected for monthly data ($p = f = 6$) to filter oscillations with periods of less than one year from the time series. The 2x12 moving average is used in the first iteration stages. This minimizes the distortion caused by any extreme values present in the series. On the last iteration, however, a Henderson filter is used (Henderson 1916). The variability of this depends decisively on the selected range: The shorter the range chosen, the less smooth is the trend economic component. The weights of these filters are shown in Table 2.6.

The filter for the calculation of the seasonal component is also based on moving averages. Therefore, 12 sub-series are first formed from the raw seasonal component, in which the values of the same calendar months are combined (for quarterly values, four sub-series are formed accordingly). For the estimation of month-specific seasonal vectors, 3x3, 3x5, 3x9, and 3x15 moving averages are available as standard. In addition, a stable seasonal filter is available, which calculates the average of all values for the same month. It assumes that the seasonal pattern is constant and does not change over the years. The weights of various filters are shown in Table 2.7. The advantage of bigger ranges is a better stability of the results with less revisions. However, the risk of not eliminating all seasonal patterns from the series also increases.

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Table 2.6: Moving averages for trend filters

Filter	2x12-moving average	13-term-Henderson-filter	9-term-Henderson-filter	7-term-Henderson-filter	5-term-Henderson-filter
θ_{t-6}	1/24	-0.019			
θ_{t-5}	1/12	-0.028			
θ_{t-4}	1/12	0.000	-0.041		
θ_{t-3}	1/12	0.066	-0.010	-0.059	
θ_{t-2}	1/12	0.147	0.118	0.059	-0.073
θ_{t-1}	1/12	0.214	0.267	0.294	0.294
θ_t	1/12	0.240	0.331	0.413	0.559
θ_{t+1}	1/12	0.214	0.267	0.294	0.294
θ_{t+2}	1/12	0.147	0.118	0.059	-0.073
θ_{t+3}	1/12	0.066	-0.010	-0.059	
θ_{t+4}	1/12	0.000	-0.041		
θ_{t+5}	1/12	-0.028			
θ_{t+6}	1/24	-0.019			

Table 2.7: Moving averages for seasonal filters

Filter	θ_{t-5}	θ_{t-4}	θ_{t-3}	θ_{t-2}	θ_{t-1}	θ_t	θ_{t+1}	θ_{t+2}	θ_{t+3}	θ_{t+4}	θ_{t+5}
3x3-Moving Average				1/9	2/9	3/9	2/9	1/9			
3x5-Moving Average			1/15	2/15	3/15	3/15	3/15	2/15	1/15		
3x9-Moving Average stable filter	1/27	2/27	3/27	3/27	3/27	3/27	3/27	3/27	3/27	2/27	1/27
Average of all values with the same calendar month											

Treatment of Weather Influences

Many time series are closely related to weather conditions. Especially in the construction industry, but also in other sectors – such as the transport industry or some trade sectors – weather can be an important factor. The influence can be estimated with simple regression calculations using the number of rain-days in a month or other weather indicators as dependent variables (Hielscher and Enkelmann 2014).

However, critics of weather adjustment argue that the influence of the weather should remain visible in the seasonally adjusted time series, as it is a key determinant in the economic assessment. The Statistical Office of the European Union also specifies in its guidelines on seasonal adjustment that weather influences should not be suppressed in the adjusted series (Eurostat 2009). Most economic time series, such as the official statistics published by the Federal Statistical Office, are therefore published without weather adjustment. Also in the ifo Business Survey the weather adjustment has been waived.

Treatment of Working-Day Influences

The different number of working days in a month can be another influence in economic time series (Bell and Hillmer 1983), since they can have a significant impact on production, orders, or sales. Therefore, an adjustment for working days is often useful. The resulting time series are then independent of the length or composition of the months or quarters (number of Mondays, Tuesdays, etc., and number of working days, weekends, and public holidays).

As with the weather component, the workday component is calculated using a regression approach. This is usually done by using the number of working days per month or quarter as an independent variable.

2.2.4.3 Evaluation of the Seasonal Adjustment

Since the “true” seasonal component can’t be observed in reality, the quality of a time series decomposition can only be assessed by means of comparative statistical criteria, such as the stability of the results or by analyzing the correlation with target time series (Goldrian and Lehne 1999). By definition, the most important characteristic of a seasonally adjusted time series is that it no longer contains any recognizable seasonal effects. In addition to purely graphical observations, which can already provide initial information about possible annually repeating structures, the results can be analyzed by spectral analysis or with an F-test for still existing seasonality (Higginson 1976). X-13ARIMA-SEATS, for example, performs these tests by default and issues a warning if necessary. The parameter settings of seasonal adjustment methods should therefore always be selected in such a way that no seasonal structures remain in the results.

There are some further desirable characteristics of seasonal adjustment. For instance, economic indicators should not be subject to major revisions after publication and should contain clear indications of the economic cycle. In all seasonal adjustment procedures, changes in the adjusted series vary in strength if new values are included. However, as values should normally change as little as possible after their first publication, the suitability of a seasonal adjustment procedure is assessed on the basis of criteria that aim, among other things, at the extent of revisions caused by the inclusion of current series values. The adjustment process must therefore ensure a high degree of stability of the results. In particular, any economic trends or turning points initially indicated should not change afterwards. This means that if, for example, a value rises from one month to the next, this development should continue even after any revisions. Various comparative measures can be used to quantify the extent of the revisions. These are discussed by Schips and Stier (1975).

Although the stability is a criterion with high priority, the effects on the informative value and the forecasting characteristics of the time series should not be disregarded. In particular, the correlation with interesting target figures, for example in the context of economic forecasts, is of great importance. However, forecasting quality and stability are usually contradictory

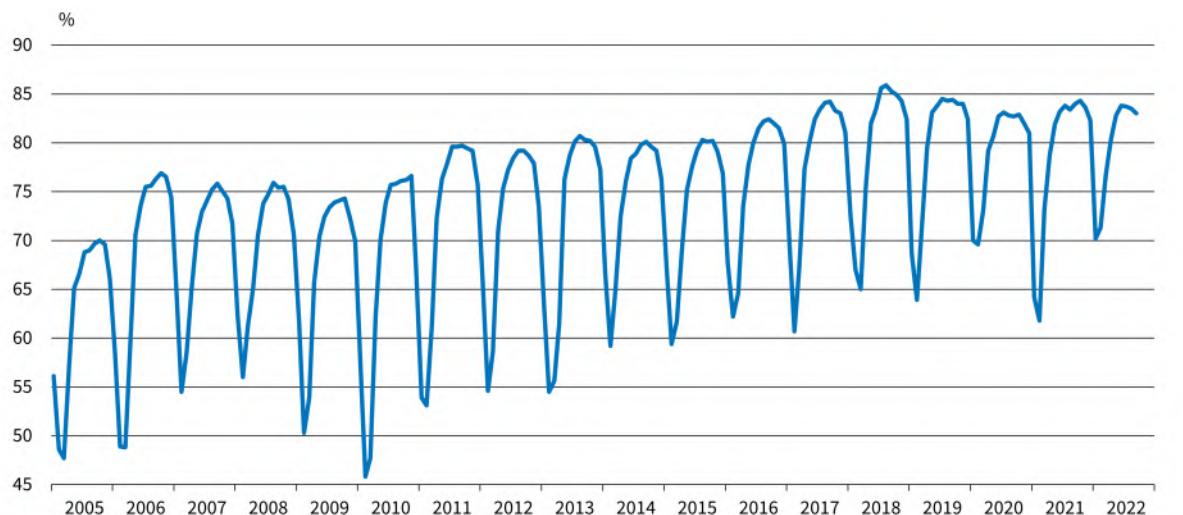
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objectives. Therefore, a compromise must be found choosing the settings of the seasonal adjustment procedure. The importance of the two criteria has to be defined individually depending on the issue at hand.

2.2.4.4 Seasonal Adjustment in the ifo Business Survey

Many time series from the ifo Business Survey show a clear seasonal pattern. Figure 2.3 shows the capacity utilization in the construction sector which decreases noticeably each year during the winter months and begins to rise again to a considerably higher level in spring, when the weather conditions are more favorable for construction activities. Due to such seasonal patterns, seasonal adjustment is necessary for a better interpretation of the time series. Therefore, the ASA-II method has been used for decades (Danckwerts et al. 1970). In 2015, however, the seasonal adjustment method was changed to the previously described X-13ARIMA-SEATS method (Sauer and Wohlrabe 2015). This increases the comparability with official statistics, while offering the advantage of being able to respond more flexibly to the individual characteristics of different time series, such as changing seasonal patterns.

Figure 2.3: Capacity utilization in the construction industry before seasonal adjustment



Source: ifo Business Survey.

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The seasonal filters can be chosen individually for all time series. They are chosen as widely as possible to ensure the greatest possible stability of the series in terms of revisions, provided that no seasonal patterns can be detected after the adjustment. Even the seasonal filter, which assumes a stable seasonal pattern, also proves to be appropriate for some time series. The filter settings are reviewed regularly and can be easily adjusted if necessary for the case of changing seasonal patterns.

According to international standards, weather adjustment is no longer part of the adjustment process. Due to the detection of calendar effects in some time series, however, the seasonal

adjustment also includes a working day adjustment, though these calendar effects are only detectable in some variables that refer to the current or previous month. The working day adjustment is therefore limited to the current business situation and the previous month's development of production and demand. Other variables, such as business expectations, production, or employment plans, which relate to future developments, do not have any visible working day effects and are therefore only seasonally adjusted.

Analyses of the adjustment procedure have revealed the excellent characteristics of the adjusted time series. These include a high stability in terms of revisions and a strong correlation with significant economic variables (Henzel 2015).

2.3 The ifo Business Survey in the Manufacturing Industry

JULIA FREUDING

2.3.1 Beginnings and Development of the Panel

The manufacturing industry is the economic sector that sets the pace for economic activity in Germany and, therefore, is one of the main drivers for the business cycle. Thus, information about current developments in this sector is valuable for business cycle analysis. The ifo Institute started its survey activity with this sector and introduced the monthly ifo Business Survey in the manufacturing industry in 1949.

Initially it only covered a few industrial sectors, such as mechanical engineering and manufacturing of motor vehicles. In 1968, the chemical industry, manufacturing of iron and steel, mineral oil processing, and non-ferrous metal industries were added. Over the years, the food and beverage industry and all other subdivisions of the manufacturing industry were added to the survey, so that it now covers the whole sector.

Sufficiently high numbers of participants made it possible to publish results not only for Germany but also for some federal states as a subset of the survey. In 1979, Bavaria was the first of these federal states to have its results published, followed by Baden-Wurttemberg in 1996. After the reunification of Germany, the new federal states were also included in the survey. Therefore, since 1991, the results of the survey have referred to Germany as a whole.

2.3.2 Descriptive Statistics

The classification of the companies participating in the ifo Business Survey is based on the classification of economic activities of the German Federal Statistical Office (German version of the European classification NACE). Currently, the classification of the year 2008 applies, the so-called WZ08. It identifies sections with letters; the manufacturing industry corresponds to the letter C. For further subdivisions, up to six digits are used. With each successive digit that is not zero, a subordinate level is indicated. Using this six-digit level, the ifo Institute assigns each individual participant to its main product or product group. This precise allocation even allows a company to obtain several questionnaires. For instance, specialised divisions of a company can participate in the survey while being assigned to different products.

If the German Federal Statistical Office updates the economic sector classification, these changes are promptly adopted by the ifo Institute. After an update of the classification, the ifo Institute calculates its time series back to the reunification of Germany, so that structural breaks can be excluded. By using the current economic sector classification, the results of the ifo Business Survey are closely linked to the official figures and are highly comparable.

Currently, there are about 3,100 participants in the ifo panel “Manufacturing industry”, distributed among 495 active products or product groups in the sector. In 2021, the response rate was 66.9% on average. About 80% of the answers are submitted via the online platform, the other respondents still prefer the paper questionnaire. Most of the answers come from companies belonging to the smallest employment size class. Table 2.8 gives an overview of the composition of the panel by firm size. However, if the answers are weighted according to the respective number of product-related employees, the top size category has the biggest influence on the overall result.

Table 2.8: Panel according to firm size

Firmsize	Employees	Share
1	1-99	53%
2	100-249	21%
3	250-499	11%
4	500-999	7%
5	> 1,000	8%

Due to voluntary participation, the ifo Business Survey is a partial survey, which means drawing a random sample is not possible. For this reason, special attention is paid to maintaining representativeness. Regarding professional representativeness, care is taken to ensure that all relevant areas of manufacturing are covered sufficiently. The subdivisions at the two-digit level are listed in Table 2.9. Due to their high number, the product groups cannot all be listed individually here, but results can be provided for all sub-areas with sufficient representation. Measured by the weighting variable “product employees”, the representativeness of the entire panel is currently around 25%.

2.3.3 Questionnaire

In general, the ifo Business Survey asks qualitative questions. Instead of asking for exact figures, (subjective) estimates are usually requested. Only the questions on capacity utilization and return on sales require quantitative information. The main advantage of asking for opinions and assessments instead of statistics is the reduced effort. Participants can complete the questionnaire in a relatively short time without having to look up exact numbers.

In general, the ifo Business Survey distinguishes between standard questions and special questions. Standard questions are those that are asked in the same form every month. A large part of the standard questions has been harmonized by EU requirements, with the aim of improving comparability across Europe. In contrast, special questions are asked at longer intervals. They can be divided into regular special questions and one-time supplementary questions: Regular special questions follow a fixed cycle, i.e. they are usually asked semi-annually or quarterly, so

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that time series are also available for analysis. One-time supplementary questions deal with current topics. If necessary, they are supplemented by a follow-up question in a later survey (Section 4.13). The Figures 2.7, 2.8 and 2.9 show the regular standard and special questions. The standard questions can be divided into three categories according to their time horizon: current situation, developments in the previous month and expectations for the next three or six months. Analogous to the respective categories, the focus is on the current state of knowledge, the past month, or future development.

The Corona crisis increased the need for data on its impact on businesses. This led to the creation of one-off as well as recurring Corona special questions. In particular, the effect on the business situation was surveyed monthly for almost two years, with a few exceptions. The same applies to the question about the estimated duration of the Corona restrictions. The information on working from home as well as on problems and possible threats for the companies' existence also became very relevant. Moreover, the already established regular special question on short-time work was expanded.

2.3.4 Methodology

2.3.4.1 Hierarchies

As mentioned above, each participant is assigned to the product or product group that it produces primarily. The aggregation of these products is defined in an aggregation hierarchy including the structure of the manufacturing sector based on the WZ08 and so-called industry weights. The aggregation always proceeds from the finest subdivision to broader areas. At the lowest level, the individual reports are combined into product group results. Table 2.9 lists all groups represented in the ifo Business Survey Manufacturing. These groups are aggregated to Section C "Manufacturing" using industry weights. Subsequently, the aggregate manufacturing industry is included in the ifo Business Climate Index Germany. For a detailed description of the aggregation of micro data into time series, see Section 2.2.3.

2.3.4.2 Weighting

Before the aggregation, each participant receives a participant weight, based on the number of employees. To ensure that the answers from large companies do not have an excessive impact, the weighting points increase disproportionately with the number of employees (x). These weights are calculated according to the formula $(\log(x))^e$. Table 2.10 shows an example of how the weighting points increase disproportionately due to the logarithm function.

In addition to the participant weights, so-called industry weights are used for the aggregation of higher hierarchy levels. The industry weights correspond to the gross value-added shares (at factor cost) of the individual industry. Thus, industries with a higher gross value added (e.g., manufacturing of motor vehicles, manufacturing of machinery) receive a higher weight than other industries. The industry weights are listed in Table 2.9.

Table 2.9: Covered branches in manufacturing with the respective weights

Aggregate number	Aggregate name	Relative weight
C100000	Manufacture of food products	6.8
C110000	Manufacture of beverages	1.1
C120000	Manufacture of tobacco products	0.2
C130000	Manufacture of textiles	0.8
C140000	Manufacture of wearing apparel	0.5
C150000	Manufacture of leather and related products	0.2
C160000	Manufacture of wood and of products of wood and cork (except furniture)	1.4
C170000	Manufacture of paper and paper products	2.1
C180000	Printing and reproduction of recorded media	1.8
C190000	Manufacture of coke and refined petroleum products	1.4
C200000	Manufacture of chemicals and chemical products	8.4
C210000	Manufacture of basic pharmaceutical products and pharmaceutical preparations	3.5
C220000	Manufacture of rubber and plastic products	5.0
C230000	Manufacture of other non-metallic mineral products	3.1
C240000	Manufacture of basic metals	4.1
C250000	Manufacture of fabricated metal products (except machinery and equipment)	9.6
C260000	Manufacture of computer electronic and optical products	5.3
C270000	Manufacture of electrical equipment	8.4
C280000	Manufacture of machinery and equipment	16.0
C290000	Manufacture of motor vehicles trailers and semi-trailers	15.3
C300000	Manufacture of other transport equipment	0.6
C310000	Manufacture of furniture	1.5
C320000	Other manufacturing	2.8
C332000	Installation of industrial machinery and equipment	0.2

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Table 2.10: Firm weights in manufacturing

Employee (x)	Points ($\log(x)$) ^e rounded
10	1
20	2
30	3
50	4
200	10
500	15
1000	20
5000	35

2.3.5 Results

The ifo Business Survey in the manufacturing sector covers the whole of Section C (except of C331000 Repair of fabricated metal products, machinery, and equipment). In principle, all subgroups are published where sufficient representation is guaranteed. However, this is not always the case, especially at the product level, which is why the depth of the publications varies.

Figure 2.4 shows the development of the business situation as well as the business expectations and the climate indicator for the manufacturing industry from 2000 to 2021. At this point it should also be mentioned that the business climate is not derived from a separate question, but is calculated as a transformed mean of the balances of the business situation and the expectations. In the illustration the regular business cycles can be seen as well as the financial crisis in 2009 and the Corona crisis with its start in Europe in March 2020.

A similar development can be seen in Figure 2.5 that shows export expectations and production plans for the next three months as well as the development of demand in the previous month. The synchronization of export expectations and production plans is an indication of the strong dependence of German industry on exports. Demand follows the same cyclical movements but has a certain lag. The reason for this is that the demand assessment looks at the previous month, while the other two questions have forecasting properties. In some cases, lead times of one quarter and more are achieved.

Figure 2.4: ifo Business Climate and its sub-indicators for the manufacturing sector

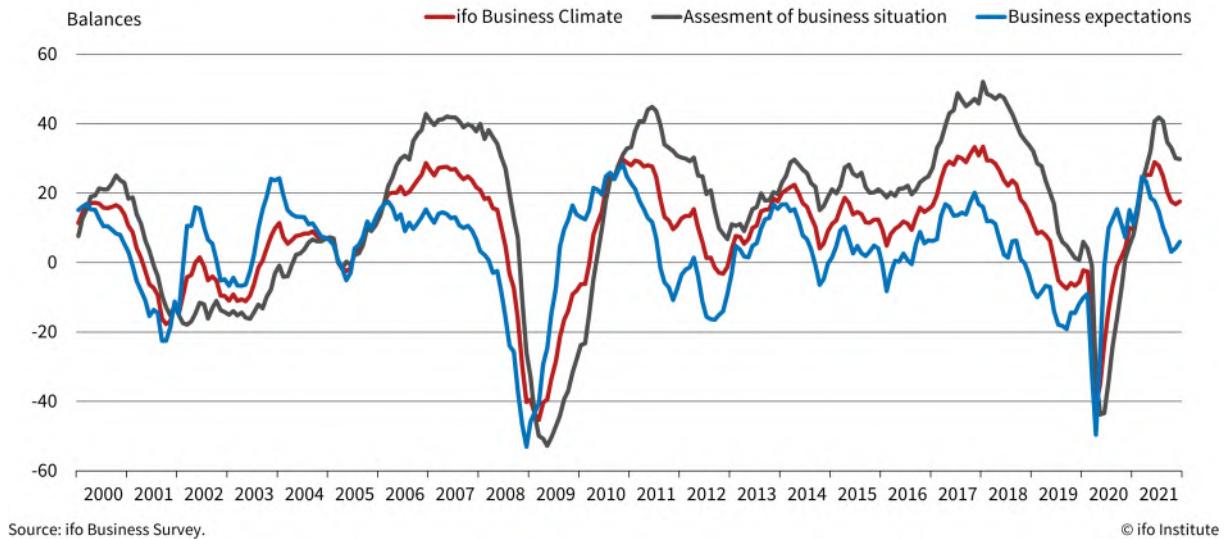


Figure 2.5: Export expectations, production plans, and demand (previous month) for the manufacturing sector

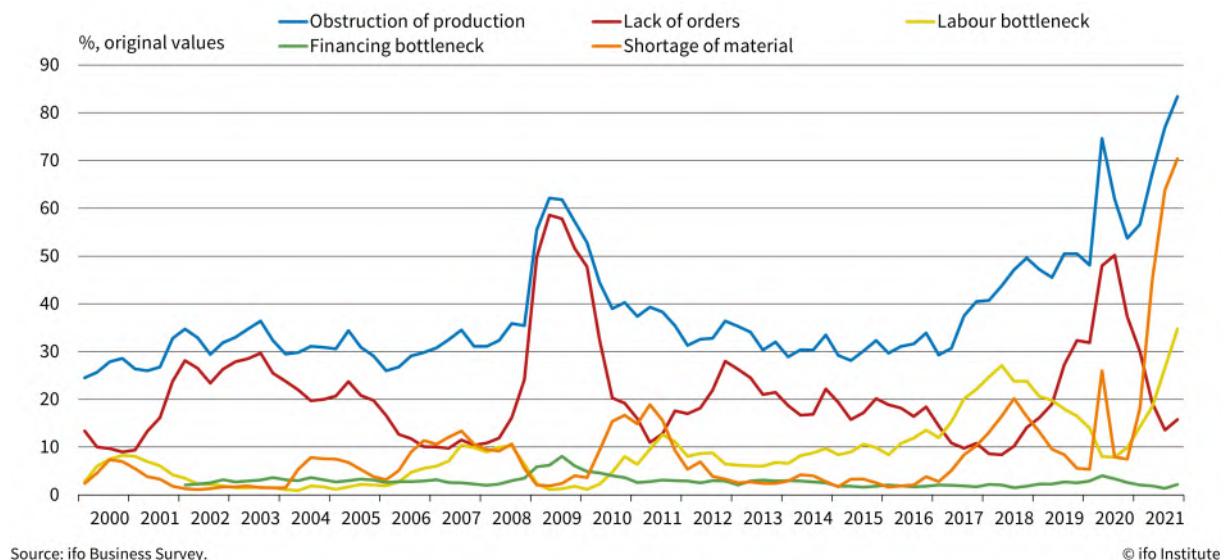


Figure 2.6 illustrates the quarterly questions on production constraints in manufacturing and their causes: lack of orders, labour bottlenecks, and material shortages. The time series for production constraints – like the business climate – clearly reflect the business cycles and crises. Lack of orders has been the main production constraint over most of the period shown. With one exception: the Corona crisis led to a so-called bottleneck recession. Companies

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were faced with many orders but lacked the necessary production resources. In particular, the Corona crisis was characterized by disrupted supply chains which lead to a lack of semiconductors, plastics, and metals, affecting industry across all sectors. Even wood and paper were in short supply, leading to a lack of packaging material in many places. In addition, the shortage of skilled workers has recently intensified. With the looming retirement of the baby boomer generation, this will become an even more serious problem.

Figure 2.6: Production constraints



Source: ifo Business Survey.

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2.3.6 Comparing ifo Time Series to Official Statistics

This section compares the results of the ifo Business Survey for the manufacturing industry to the official figures of the Federal Statistical Office. With the help of a cross-correlation analysis, it is shown that the results of the ifo Business Survey are not only suitable for tracing the development of central economic indicators ex-post but can also be used for short-term forecasts. This study is limited to a comparison of the official figures on production. The analysis shows that the correlations of the official time series with the results of the ifo Business Survey for manufacturing turn out to be very high and can thus trace or forecast its actual developments well.

Table 2.11 shows the cross-correlations between the different monthly standard questions in the manufacturing industry, where zero stands for “no” and one for “perfect” correlation. Overall, it can be noted that many of the standard questions show a high correlation. The business climate shows the highest and almost perfect positive correlation with the assessment of the business situation (0.92) and the assessment of the order backlog (0.91). The business situation also correlates highly with employment plans (0.95). Both business climate and business situation reveal a very strong negative correlation with the assessment of unsold

goods and inventories. Business expectations correlate most strongly with the development of demand in the previous month and production plans.

Table 2.11: Cross-correlations between the standard questions in the manufacturing industry

	BC	BS	BE	IA	OA	OD	DD	QD	PD	PE	QP	XE	EP
BC	1.00												
BS	0.92	1.00											
BE	0.75	0.44	1.00										
IA	-0.93	-0.89	-0.64	1.00									
OA	0.91	0.98	0.46	-0.92	1.00								
OD	0.86	0.67	0.87	-0.84	0.71	1.00							
DD	0.75	0.50	0.91	-0.69	0.53	0.95	1.00						
QD	0.86	0.70	0.83	-0.81	0.71	0.95	0.93	1.00					
PD	0.71	0.74	0.38	-0.80	0.82	0.62	0.44	0.58	1.00				
PE	0.64	0.64	0.39	-0.75	0.74	0.61	0.45	0.56	0.95	1.00			
QP	0.88	0.68	0.89	-0.83	0.71	0.94	0.90	0.92	0.64	0.65	1.00		
XE	0.87	0.67	0.88	-0.77	0.68	0.89	0.86	0.88	0.57	0.54	0.91	1.00	
EP	0.90	0.95	0.47	-0.91	0.94	0.70	0.55	0.74	0.73	0.70	0.76	0.68	1.00

BC: Business climate, BS: Business situation, BE: Business expectations, IA: Unsold goods inventory assessment, OA: Order backlog assessment, OD: Order backlog development, DD: Demand development, QD: Production development, PD: Price development, PE: Price expectations, QP: Production plans, XE: Export expectations, EP: Employment plans.

For the correlation analysis, annual and monthly growth rates were calculated from the seasonally adjusted values of the Federal Statistical Office and then compared with the results of the ifo Business Survey in the manufacturing industry. The correlation coefficients determined reflect the strength of the correlation. In addition, the time series were shifted in relation to each other to determine whether the correlation measure is higher if a time lead or lag of the ifo time series compared to the official data is assumed. This is examined both at the aggregate level for manufacturing and at the two-digit level. In this way, leads and thus forecast qualities can be precisely identified.

Table 2.12 lists the correlations between the annual growth rate of the production index and the ifo main indicators for manufacturing. The highest correlation of 0.83 is achieved with export expectations at a lead time of one month. For business expectations and the development of production, high correlations were also achieved at a lead time of four months and one month, respectively.

2 The ifo Business Survey

Table 2.12: Correlations between the annual growth rate of the production index and the ifo time series for manufacturing

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
BC	0.42	0.50	0.58	0.63	0.69	0.73	0.75	0.73	0.68
BS	0.16	0.25	0.34	0.41	0.49	0.56	0.63	0.56	0.49
BE	0.70	0.74	0.77	0.77	0.76	0.74	0.67	0.74	0.76
IA	-0.38	-0.45	-0.52	-0.56	-0.61	-0.65	-0.68	-0.64	-0.60
OA	0.19	0.28	0.36	0.43	0.50	0.56	0.61	0.56	0.49
OD	0.64	0.68	0.71	0.72	0.72	0.74	0.72	0.73	0.71
DD	0.68	0.71	0.73	0.73	0.71	0.71	0.68	0.71	0.71
QD	0.57	0.63	0.67	0.70	0.72	0.76	0.75	0.75	0.72
PD	0.09	0.18	0.26	0.33	0.41	0.47	0.52	0.46	0.38
PE	0.09	0.17	0.25	0.33	0.40	0.46	0.49	0.44	0.36
QP	0.58	0.63	0.67	0.70	0.73	0.75	0.71	0.74	0.72
XE	0.59	0.65	0.71	0.76	0.80	0.83	0.81	0.83	0.80

BC: Business climate, BS: Business situation, BE: Business expectations, IA: Unsold goods inventory assessment, OA: Order backlog assessment, OD: Order backlog development, DD: Demand development, QD: Production development, PD: Price development, PE: Price expectations, QP: Production plans, XE: Export expectations, EP: Employment plans.

Finally, the correlations between the time series on the ifo Business Climate Indicator and the production growth rate are also tested at the two-digit level. The annual production growth rate is shown in Table 2.13, the monthly growth rate in Table 2.14. The highest correlation coefficient of 0.51 is achieved for the annual growth rates for the sectors manufacture of wood and of products of wood and cork (except furniture) and manufacture of chemicals and chemical products – in each case without an index lag. In general, the analysis of the annual growth rates shows that the correlations are highest with no time lag across all two-digit groups. When analyzing monthly growth rates, this applies to a development of one month or also to no time lag. This shows that the ifo Business Climate is a powerful indicator for determining the economic situation in the manufacturing sector as well as at its two-digit level.

Table 2.13: Correlations between the annual growth rate of output and the ifo time series of the ifo Business Climate

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
C1000000	-0.29	-0.26	-0.25	-0.23	-0.21	-0.20	-0.12	-0.16	-0.19
C1100000	0.01	0.02	0.02	0.04	0.06	0.10	0.38	0.21	0.10
C1300000	-0.28	-0.26	-0.23	-0.21	-0.19	-0.17	-0.14	-0.16	-0.16
C1400000	-0.24	-0.24	-0.23	-0.24	-0.24	-0.23	-0.21	-0.22	-0.22
C1500000	-0.29	-0.28	-0.26	-0.23	-0.21	-0.17	-0.12	-0.15	-0.15
C1600000	0.00	0.06	0.14	0.21	0.29	0.37	0.51	0.45	0.44
C1700000	0.00	0.05	0.08	0.13	0.17	0.21	0.29	0.26	0.25
C1800000	0.25	0.28	0.30	0.34	0.37	0.41	0.48	0.46	0.47
C2000000	-0.10	-0.05	0.01	0.06	0.11	0.15	0.22	0.19	0.19
C2200000	-0.02	0.02	0.06	0.09	0.12	0.17	0.22	0.19	0.18
C2300000	-0.03	0.01	0.05	0.09	0.16	0.22	0.39	0.27	0.28
C2400000	-0.02	0.08	0.18	0.27	0.36	0.43	0.51	0.49	0.47
C2500000	-0.02	0.02	0.07	0.10	0.14	0.17	0.21	0.21	0.21
C2600000	-0.04	-0.02	0.01	0.03	0.05	0.07	0.10	0.10	0.11
C2700000	-0.01	0.05	0.10	0.15	0.19	0.23	0.28	0.27	0.28
C2800000	0.00	0.05	0.10	0.15	0.19	0.23	0.29	0.28	0.30
C2900000	0.00	0.03	0.04	0.03	0.04	0.08	0.11	0.06	0.04
C3100000	-0.13	-0.12	-0.10	-0.08	-0.07	-0.04	0.03	-0.01	0.00
C3200000	0.13	0.15	0.16	0.17	0.20	0.21	0.26	0.23	0.23

For the aggregate names of the two-digit groups see Table 2.9.

2 The ifo Business Survey

Table 2.14: Correlations between the monthly growth rate of output and the ifo time series of the ifo Business Climate

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
C1000000	-0.04	-0.04	-0.06	-0.03	-0.05	-0.11	0.06	-0.01	-0.04
C1100000	0.03	0.00	-0.02	0.02	-0.09	-0.30	0.29	0.09	-0.02
C1300000	-0.08	-0.10	-0.09	-0.08	-0.09	-0.12	0.01	-0.03	-0.03
C1400000	-0.04	-0.05	-0.05	-0.05	-0.06	-0.07	-0.02	-0.04	-0.05
C1500000	-0.06	-0.08	-0.09	-0.09	-0.12	-0.18	0.02	-0.03	-0.05
C1600000	-0.06	-0.11	-0.08	-0.09	-0.10	-0.22	0.21	0.10	0.09
C1700000	-0.06	-0.04	-0.08	-0.07	-0.06	-0.12	0.11	0.06	0.07
C1800000	0.01	0.01	0.00	-0.01	-0.03	-0.08	0.14	0.09	0.08
C2000000	-0.10	-0.12	-0.11	-0.11	-0.09	-0.14	0.11	0.05	0.07
C2200000	-0.07	-0.06	-0.06	-0.07	-0.08	-0.10	0.08	0.06	0.05
C2300000	-0.01	-0.04	-0.06	-0.08	-0.08	-0.24	0.23	0.07	0.08
C2400000	-0.18	-0.18	-0.21	-0.18	-0.15	-0.18	0.16	0.12	0.15
C2500000	-0.09	-0.09	-0.08	-0.07	-0.07	-0.08	0.06	0.06	0.05
C2600000	-0.06	-0.05	-0.06	-0.04	-0.03	-0.05	0.03	0.01	0.01
C2700000	-0.11	-0.09	-0.08	-0.07	-0.05	-0.08	0.07	0.05	0.06
C2800000	-0.07	-0.07	-0.06	-0.03	-0.04	-0.10	0.09	0.04	0.03
C2900000	0.00	0.00	0.02	0.00	-0.11	-0.21	0.02	0.06	0.04
C3100000	-0.03	-0.04	-0.05	-0.04	-0.04	-0.14	0.08	-0.01	0.00
C3200000	0.01	0.01	0.00	0.00	-0.01	-0.05	0.09	0.04	0.03

For the aggregate names of the two-digit groups see Table 2.9.

Figure 2.7: Standard questions in manufacturing

ifo - Business survey for manufacturing sector
ifo Institute – Center for Macroeconomics and Surveys

Please respond by ...

Your current information status November 2021

Please base responses only on domestic locations, stated sector/product, and disregarding purely seasonal fluctuations.

Sector/product: **123456 Manufacture of xxx**
Sector designation (if applicable)

CURRENT SITUATION	PLANS AND EXPECTATIONS FOR THE NEXT 3 MONTHS	SPECIAL QUESTIONS
<p>1. We characterize our current business situation as</p> <p><input type="checkbox"/> good <input type="checkbox"/> satisfactory <input type="checkbox"/> poor</p> <p>2. We characterize our inventories of unsold manufactured goods as</p> <p><input type="checkbox"/> too low <input type="checkbox"/> sufficient <input type="checkbox"/> too high <input type="radio"/> warehousing not customary</p> <p>3. Our order backlog (if customary) is</p> <p>a) <input type="checkbox"/> overall b) for export <input type="checkbox"/> comparatively large <input type="checkbox"/> <input type="checkbox"/> sufficient <input type="checkbox"/> <input type="checkbox"/> too low <input type="checkbox"/> <input type="checkbox"/> we don't export <input type="radio"/></p>	<p>9. We expect our production activity to</p> <p><input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease <input type="radio"/> no significant domestic production</p> <p>10. We expect our prices to</p> <p><input type="checkbox"/> rise <input type="checkbox"/> remain roughly the same <input type="checkbox"/> fall</p> <p>11. We expect the scope of our export business to</p> <p><input type="checkbox"/> widen <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease <input type="radio"/> we don't export</p> <p>12. We expect our workforce to</p> <p><input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease</p>	<p>ID No. 8123456-12.34/12-1234</p>
REVIEW – TRENDS IN OCTOBER	EXPECTATIONS FOR THE NEXT 6 MONTHS	
<p>4. Compared to September, the demand situation has</p> <p><input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened</p> <p>5. Compared to September, our order backlog has</p> <p><input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased</p> <p>6. Compared to September, our production activities have</p> <p><input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased <input type="radio"/> no significant domestic production</p> <p>7. Compared to September, our prices have</p> <p><input type="checkbox"/> risen <input type="checkbox"/> not changed <input type="checkbox"/> fallen</p> <p>8. Compared to September, our workforce has</p> <p><input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased</p>	<p>13. We expect our business situation to</p> <p><input type="checkbox"/> become more favorable <input type="checkbox"/> remain roughly the same <input type="checkbox"/> become less favorable</p> <p>14. The future development of our business situation is currently</p> <p><input type="checkbox"/> easy to predict <input type="checkbox"/> moderately easy to predict <input type="checkbox"/> moderately difficult to predict <input type="checkbox"/> difficult to predict</p>	

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Thank you for your input!

2 The ifo Business Survey

Figure 2.8: Special questions in manufacturing, part 1

ifo - Business survey for manufacturing sector
ifo Institute – Center for Macroeconomics and Surveys

Please respond by ...

ifo INSTITUT

Leibniz-Institut für Wirtschaftsforschung
an der Universität München e.V.
Postbox 86 04 60
81631 Munich

Your current information status 2021

Please base responses only on domestic locations, stated sector/product, and disregarding purely seasonal fluctuations.

Sector/product: **123456 Manufacture of xxx**
Sector designation (if applicable)

SPECIAL QUESTIONS		ANNUALLY																									
QUARTERLY		ANNUALLY																									
JANUARY - APRIL - JULY - OCTOBER		MARCH																									
A) Our order backlogs currently correspond to our average production in _____ month(s)	<input type="checkbox"/> yes <input type="checkbox"/> no If yes, more than usual <input type="checkbox"/> yes <input type="checkbox"/> no	A1) We are currently logging overtime <input type="checkbox"/> yes <input type="checkbox"/> no If yes, more than usual <input type="checkbox"/> yes <input type="checkbox"/> no	B1) Our investments in the past year were (2020 compared to 2019) <table border="1"><tr><th>2020</th><th>+</th><th>=</th><th>-</th></tr><tr><td>overall investment</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- buildings</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- equipment</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- software / databases</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- research / development</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table>	2020	+	=	-	overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2020	+	=	-																								
overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
B) Capacity utilization of our facilities is currently at (standard full utilization = 100%) <table border="1"><tr><td>30 %</td><td>70 %</td><td>90 %</td></tr><tr><td>40 %</td><td>75 %</td><td>95 %</td></tr><tr><td>50 %</td><td>80 %</td><td>100 %</td></tr><tr><td>60 %</td><td>85 %</td><td></td></tr></table> exceeds 100%, namely: _____ %	30 %	70 %	90 %	40 %	75 %	95 %	50 %	80 %	100 %	60 %	85 %			B1) We currently have short-time work <input type="checkbox"/> yes <input type="checkbox"/> no	B2) Over the next 3 months, we expect to have short-time work <input type="checkbox"/> yes <input type="checkbox"/> no												
30 %	70 %	90 %																									
40 %	75 %	95 %																									
50 %	80 %	100 %																									
60 %	85 %																										
C) Taking into account our current order backlog and our projected order intake for the coming 12 months, we consider our current technical capacity to be <input type="checkbox"/> more than sufficient <input type="checkbox"/> sufficient <input type="checkbox"/> insufficient		C) In the past 3 months, we have held loan negotiations with banks. <input type="checkbox"/> yes If yes, the banks were: <input type="checkbox"/> accommodating <input type="checkbox"/> normal <input type="checkbox"/> less accommodating <input type="checkbox"/> no If no: <input type="checkbox"/> bank loan not required <input type="checkbox"/> other reasons	B2) We expect our investments in the current year to be (2021 compared to 2020) <table border="1"><tr><th>2021</th><th>+</th><th>=</th><th>-</th></tr><tr><td>overall investment</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- buildings</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- equipment</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- software / databases</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>- research / development</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table>	2021	+	=	-	overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2021	+	=	-																								
overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																								
D) Our production activity is currently impeded <input type="checkbox"/> yes <input type="checkbox"/> no If yes, by the following factors: <input type="checkbox"/> too few orders <input type="checkbox"/> lack of skilled workers <input type="checkbox"/> lack of low-skilled workers <input type="checkbox"/> financial constraints <input type="checkbox"/> lack of raw / input materials <input type="checkbox"/> insufficient technical capacity <input type="checkbox"/> other factors		C) In the past 3 months, we have held loan negotiations with banks. <input type="checkbox"/> yes If yes, the banks were: <input type="checkbox"/> accommodating <input type="checkbox"/> normal <input type="checkbox"/> less accommodating <input type="checkbox"/> no If no: <input type="checkbox"/> bank loan not required <input type="checkbox"/> other reasons	MARCH - JUNE - SEPTEMBER - DECEMBER																								
E) Our competitiveness has, in the past 3 months (compared to the previous 3 months) a) in the domestic market <input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened		A1) Number of employees In the company overall, we employ (domestic operations only) _____ people	MAY																								
in foreign markets b) within the EU <input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened <input type="checkbox"/> we don't export	c) outside the EU <input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened <input type="checkbox"/> we don't export	A2) Of that number, the following work in manufacturing _____ people (or estimate based on sales share)	A1) Our company's earnings situation* - measured in terms of the operating result of usual business - a) can be currently characterized as <input type="checkbox"/> good <input type="checkbox"/> satisfactory <input type="checkbox"/> poor b) has in comparison to fall 2020 <input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened																								
* If you have received multiple questionnaires for different products, please provide answers to these special questions relating to the company as a whole on only one questionnaire.																											
A2) Our company's return on sales for 2020** was a) Surplus: <input type="checkbox"/> up to 1 % <input type="checkbox"/> 0 to -1 % <input type="checkbox"/> 1 to 2 % <input type="checkbox"/> -1 to -2 % <input type="checkbox"/> 2 to 3 % <input type="checkbox"/> -2 to -3 % <input type="checkbox"/> 3 to 4 % <input type="checkbox"/> -3 to -4 % <input type="checkbox"/> over 4 % <input type="checkbox"/> below -4 % namely approx. _____ % b) Loss: <input type="checkbox"/> 0 to -1 % <input type="checkbox"/> -1 to -2 % <input type="checkbox"/> -2 to -3 % <input type="checkbox"/> -3 to -4 % <input type="checkbox"/> below -4 % namely approx. _____ %																											
** Or in the financial year that fell predominantly in the year 2020.																											

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Thank you for your input!

Figure 2.9: Special questions in manufacturing, part 2

ifo - Business survey for manufacturing sector
ifo Institute – Center for Macroeconomics and Surveys

Please respond by ...

ifo INSTITUT

Leibniz-Institut für Wirtschaftsforschung
an der Universität München e.V.
Postbox 86 04 60
81631 Munich

Your current information status 2021

Please base responses only on domestic locations, stated sector/product, and disregarding purely seasonal fluctuations.

Sector/product: **123456 Manufacture of xxx**
Sector designation (if applicable)

ID No. 8123456-12.34/12-1234

SPECIAL QUESTIONS																																																																									
ANNUALLY																																																																									
SEPTEMBER		NOVEMBER		DECEMBER																																																																					
<p>A1) Our company's earnings situation*</p> <p>- measured in terms of the operating result from usual business -</p> <p>a) can be currently characterized as</p> <p><input type="checkbox"/> good <input type="checkbox"/> satisfactory <input type="checkbox"/> poor</p> <p>b) has in comparison to 2021 Q1</p> <p><input type="checkbox"/> improved <input type="checkbox"/> not changed <input type="checkbox"/> worsened</p>		<p>A1) Our investments in the current year (2021 compared to 2020)</p> <table border="1"> <thead> <tr> <th>2021</th> <th>+</th> <th>=</th> <th>-</th> </tr> </thead> <tbody> <tr> <td>overall investment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- buildings</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- equipment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- software / databases</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- research / development</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>		2021	+	=	-	overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>C1) Did you conduct R&D activities in 2021?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>a) In relation to manufacturing employees, the proportion of R&D employees was:</p> <p>_____ %</p> <p>b) In relation to manufacturing sales, the proportion of R&D expenditure was:</p> <p>_____ %</p>																																													
2021	+	=	-																																																																						
overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																						
- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																						
- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																						
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Thank you for your input!

Manufacturing sector – Special questions 2021 (reverse)

2.4 The ifo Business Survey Trade

SABINE RUMSCHEIDT, RAFFAELA SEITZ

2.4.1 Beginnings and Development of the Panel

In 1950, one year after the launch of the ifo Business Survey in the manufacturing industry, the ifo Institute extended the survey to the retailing sector. Data on current developments in this sector can, amongst other things, provide valuable information on private consumption in Germany. In 1951, the wholesale sector was included. Companies from this sector provide trade goods to the retail sector as well as to manufacturing and construction companies and are therefore closely linked to general economic development. The results of the ifo Business Survey trade are incorporated into the calculation of the ifo Business Climate Index for Germany. Since 1991, i.e., after reunification, survey results of the trade sector have been available for Germany as a whole, as well as for some federal states with a sufficient number of participating trade companies, such as Bavaria, Baden-Wurttemberg, and Saxony.

2.4.2 Descriptive Statistics

As in the other surveyed sectors, companies from all over Germany take part in the ifo Business Survey trade. However, persuading trade companies to participate in the voluntary survey tends to be more difficult compared to other economic sectors, e.g., the manufacturing industry. This may be because many companies in this sector operate in markets with narrow regional boundaries and are therefore less interested in the overall nationwide results. Nevertheless, the number of participants has increased continuously over the years. In 2021, questionnaires were sent out monthly to an average of around 2,550 companies in the trade sector. The response rate was approximately 65% which resulted in an average of 1,650 completed questionnaires per month. The number of companies is nearly equally divided between the wholesale and retail sector.

2.4.3 Questionnaire

Apart from an additional quarterly question on customer traffic in retail, the questionnaires for wholesale and retail do not differ. As in other sectors, the questionnaire is divided in monthly standard questions and special questions with quarterly, semi-annual, or annual rhythms as well as one-off supplementary questions.

The standard questions cover the current situation and developments in the previous month as well as expectations and plans for the near future. In total, the questionnaire for the trade sector includes nine standard questions (Figure 2.15). On a quarterly basis, in January, April, July, and October, the survey questionnaire contains additional questions around constraints

for the companies' sales activity. Moreover, in March, June, September, and December, the participants are asked about loan negotiations with banks (Section 4.6). Twice a year, in March and November, participants are asked about their investment activity. The investment question is subdivided into different areas, e.g. buildings and equipment (Section 4.7). At the end of the chapter Figures 2.16 and 2.17 show the exact wording of all questions. Over time, there have been only slight changes in the content and wording of the questionnaires. These changes mainly resulted from the harmonization of the surveys at the European level, as suggested by the EU.

In addition to the regularly recurring questions, one-off supplementary questions can also be asked. These supplementary questions mainly deal with current economic policy issues or cover variables that are interesting for research projects. Supplementary questions can be cross-sectoral (i.e. they are simultaneously asked in manufacturing, construction and the service sector) or only relate to trade-specific issues (e.g. questions on online trade). The results are usually presented in research papers or as a summary in the ifo Schnelldienst. For more information on supplementary questions see Section 4.13.

2.4.4 Methodology and Aggregation

The procedure of the monthly Business Survey trade follows the processes as described in Section 2.2. The surveyed trade areas are based on the Statistical classification of economic activities by the Federal Statistical Office Federal Statistical Office (2009). The trade sector can be found in Section G (Trade). Specific digits are used for further subdivision of the trade sector. Each additional digit that is not zero indicates that the level is a subordinate level (for example, G47.00 is retail trade, G47.50 is retail trade with household equipment, G47.51 is retail trade with textiles).

Each participating company is assigned to a trade area from the official classification of economic activities. If a company sells different products or product groups, it is assigned to the product group that generates the highest sales. Alternatively, companies can answer several questionnaires that are explicitly assigned to different product groups.

All relevant areas of the retail and wholesale trade sector are covered in the ifo Business Survey trade. Only maintenance and repair of motor vehicles (G45.2) and wholesale on a fee or contract basis (G46.1) are excluded. Table 2.15 lists all areas covered (3-digit) in the survey with the respective percentage weight. Due to the large number of products, the individual product groups that are more detailed than the 3-digit range cannot all be listed here. A detailed list can be found in the official economic branch classification, see Federal Statistical Office (2009).

Results are calculated for all trade areas with a sufficient number of participants (also for trade areas more detailed than the 3-digit level). In addition to the trade areas from the official classification, results are also calculated according to functional trade aspects (Table 2.16).

2 The ifo Business Survey

Table 2.15: Covered trade areas

2-Digit	3-Digit	Description
G46		Wholesale trade (including motor vehicles and motorcycles)
	G46.2	Wholesale of agricultural raw materials and live animals
	G46.3	Wholesale of food, beverages and tobacco
	G46.4	Wholesale of household goods
	G46.5	Wholesale of information and communication equipment
	G46.6	Wholesale of other machinery, equipment and supplies
	G46.7	Other specialised wholesale
	G45.1	Wholesale trade of motor vehicles, motorcycles, and parts
G47		Retail trade (including motor vehicles and motorcycles)
	G47.1	Retail sale in non-specialised stores
	G47.2	Retail sale of food, beverages and tobacco in specialised stores
	G47.3	Retail sale of food, beverages and tobacco in specialised stores
	G47.4	Retail sale of food, beverages and tobacco in specialised stores
	G47.5	Retail sale of other household equipment in specialised stores
	G47.6	Retail sale of cultural and recreation goods in specialised stores
	G47.7	Retail sale of other goods in specialised stores
	G47.9	Retail trade not in stores, stalls or markets
	G45.2	Retail trade of motor vehicles, motorcycles, and parts

For the aggregation, each company first receives an individual weight based on their annual turnover. Therefore, the companies are asked to classify themselves into predefined turnover size classes when they first join the survey and once a year thereafter. Table 2.17 shows the relationship between the turnover size classes and the weighting factor. The weighting points increase disproportionately to the weighting characteristic (sales) to mitigate the oversubscription of results by large companies.

Subsequently, the bottom-up aggregation of the companies' answers is carried out along the aggregation hierarchy that represents Group G of the official classification of economic activities. The answers from the lowest level of the hierarchy (product level) go into the next

Table 2.16: Functional trade areas

Wholesaling	Retailing
Production related trade	Durable consumer goods
• Intermediate goods	Non-durable consumer goods
• Capital goods	Food and beverages
Consumer goods	
• Durable consumer goods	
• Non-durable consumer goods	
• Food and beverages	

Table 2.17: Company weights in the trade sector based on turnover

Turnover/year (in million €)		Weighting factor
	< 0.25	1
0.25	< 0.5	2
0.5	< 1.0	3
1.0	< 2.5	4
2.5	< 5.0	5
5.0	< 12.5	6
12.5	< 25.0	7
25.0	< 50.0	8
50.0	< 1,000	9
	> 1,000	10

higher group until the 2-digit level (wholesale and retail). Finally wholesale trade (61%) and retail trade (39%) are weighted together to form results for the whole trade sector.

2.4.5 Results

The first results of the ifo Business Survey trade were published in 1950 (retail trade) and 1951 (wholesale trade) and have been of widespread interest ever since. The results are published monthly in graphic and tabular form in the “ifo Konjunkturperspektiven” and in a press release. Sector specific graphic and tabular reports are also provided for all participating companies as well as for economic decision-makers, the press, and other interested institutions or persons.

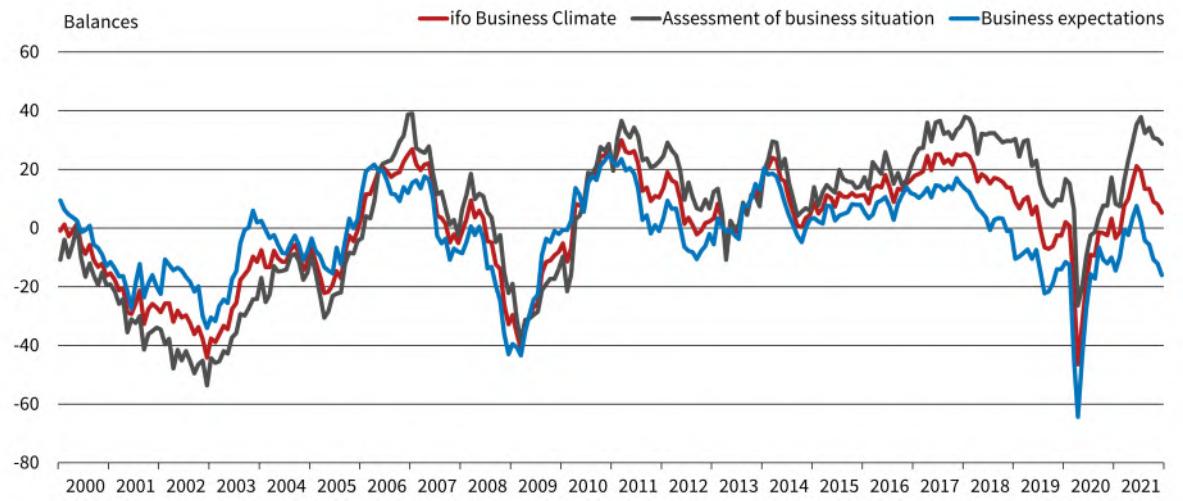
Figure 2.10a shows the balances for the current business situation, business expectations, and business climate in wholesale trade from 2000 to December 2021. Until around 2005, the participating companies rated their business situation and business expectations more often as “bad” or “less favourable” than “good” or “more favourable”. As of 2005, an increase in positive assessments can be seen: Between 2006 and 2007, all the presented indicators reached a positive value. The economic crisis of 2008/2009 is clearly visible. In particular, business expectations declined with a time lead: A negative value was already reached in November 2007, while the balance of the current business situation remained positive until autumn 2008. In early 2010, the business climate turned positive again and the responses settled at a higher level overall. During the following decade the indicators settled at this higher level, bar some fluctuations, for example during the euro crisis in 2013. In 2019, Brexit and trade conflicts had a negative impact. The outbreak of the Covid pandemic and the resulting lock-downs and restrictions had a widely negative impact on the economy, which was also clearly visible in the business climate for the wholesale sector.

As shown in Figure 2.10b for retail trade, the results show a very similar development compared

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Figure 2.10: ifo Business Climate and its sub-indicators

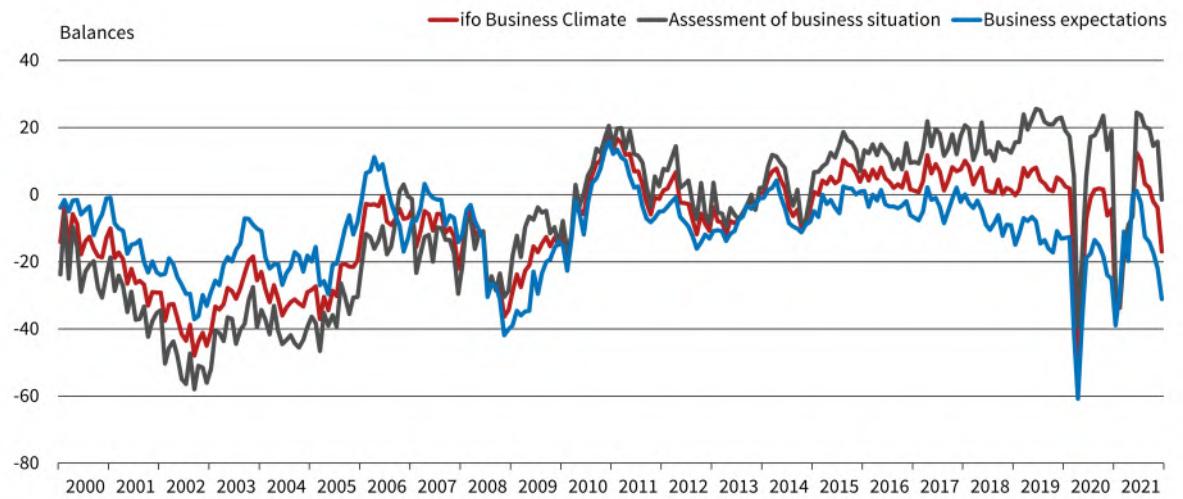
(a) Wholesale



Source: ifo Business Survey.

© ifo Institute

(b) Retail



Source: ifo Business Survey.

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to wholesale trade. Here, after the financial and economic crisis, the results also remained at a significantly higher level. Strikingly, following this turning point, the current situation was consistently rated better than the business expectations in both retail trade and in wholesale trade; before the 2008/2009 crisis, the opposite was the case.

2.4.6 Relationship between the Standard Questions

Figures 2.11a and 2.11b show the development of the following indicators for wholesale and retail trade: stock assessment, price expectations, order plans and employment plans. The indicators employment plans and order plans show a similar development. According to the results of the ifo Business Survey, inventory levels tend to be considered “too high” when respondents expect sales prices to fall. Similarly, the propensity to order and the willingness to hire employees tends to decrease when stock levels are considered “too high” and vice versa. In wholesale and retail trade the price expectations started to rise in Spring 2021. They then settled at a higher level and eventually reached their historic record level.

Table 2.18 shows the cross-correlation between the main indicators of the ifo Business Survey in wholesale and retail trade. There is a very strong correlation between most indicators. In wholesale trade, there are especially strong correlations between the business climate, the business situation, the order expectations and the employee plans. The same is true for the retail trade.

2.4.7 Special Evaluations and Analyses

The results of the ifo Business Survey are regularly summarized and analyzed in the journal “ifo Schnelldienst”. The series ifo “Branchen im Fokus” deals with the development of individual trade sectors (e.g. Demmelhuber 2021) or with all kinds of questions posed in the ifo Business Survey (Demmelhuber et al. 2022).

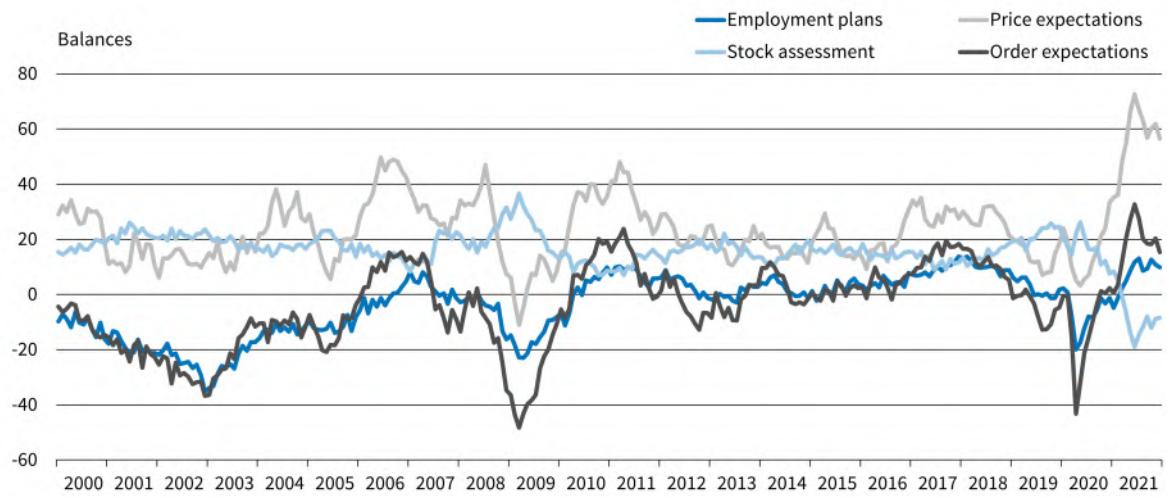
Rumscheidt (2017) compared the indicators of the ifo Business Survey in wholesale trade with the official monthly statistics of the Federal Statistical Office, in order to examine whether the data collected by the ifo Institute could reflect the real development in wholesale trade. A correlation analysis was carried out to determine the extent to which the ifo indicators correspond to the official monthly statistics. As the great advantage of the ifo data is the prompt publication of the results at the end of each month, the indicators from the ifo Business Survey in wholesale trade were also tested for their forecasting characteristics and suitability as early indicators. The time series were therefore shifted in time to determine when the correlation was stronger, one question being, for example, whether it could be assumed that the ifo time series is one to three months ahead of the official data.

The analysis showed that the quality of the ifo indicators for wholesale trade is high and that they reflect the real economic development well. As can be seen in Figures 2.12, 2.13, and 2.14, many indicators collected by the ifo Institute in the wholesale sector show a similar

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Figure 2.11: Stock assessment, price, employee and ordering expectations in trade

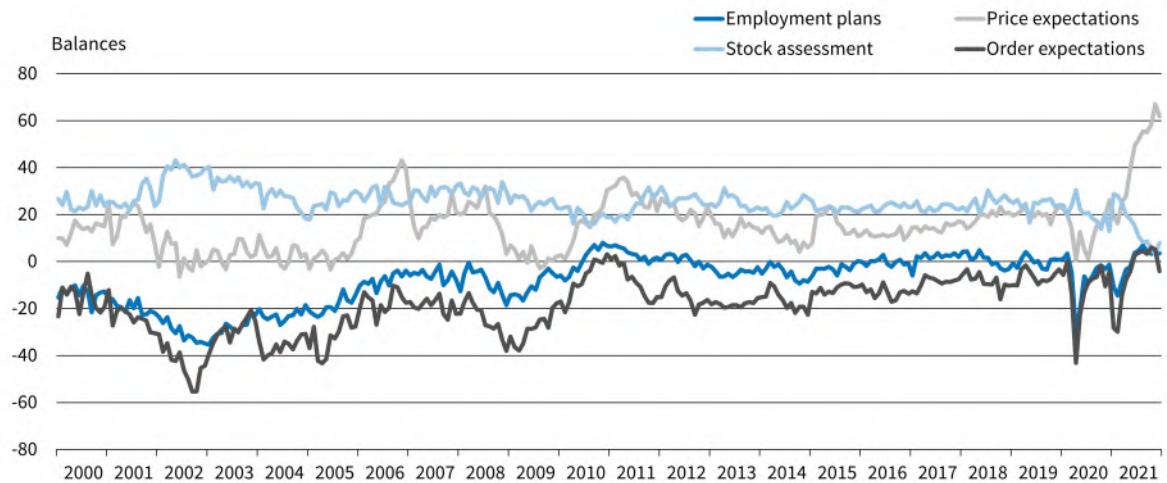
(a) Wholesale



Source: ifo Business Survey.

© ifo Institute

(b) Retail



Source: ifo Business Survey.

© ifo Institute

Table 2.18: Cross-correlation between the main indicators of the ifo Business Survey in the trade sector

Wholesale									
	BC	BS	BE	ST	PD	TO	PE	EP	OE
BC	1.000								
BS	0.950	1.000							
BE	0.873	0.677	1.000						
ST	-0.612	-0.593	-0.523	1.000					
PD	0.589	0.597	0.462	-0.770	1.000				
TO	0.848	0.851	0.674	-0.658	0.693	1.000			
PE	0.588	0.558	0.520	-0.773	0.944	0.671	1.000		
EP	0.933	0.967	0.689	-0.585	0.546	0.783	0.518	1.000	
OE	0.949	0.903	0.830	-0.773	0.721	0.856	0.722	0.890	1.000
Retail									
	BC	BS	BE	ST	PD	TO	PE	EP	OE
BC	1.000								
BS	0.949	1.000							
BE	0.831	0.612	1.000						
ST	-0.603	-0.647	-0.369	1.000					
PD	0.465	0.477	0.324	-0.452	1.000				
TO	0.838	0.880	0.546	-0.571	0.426	1.000			
PE	0.512	0.512	0.380	-0.491	0.892	0.458	1.000		
EP	0.923	0.928	0.672	-0.636	0.576	0.804	0.598	1.000	
OE	0.915	0.886	0.734	-0.689	0.615	0.781	0.653	0.876	1.000

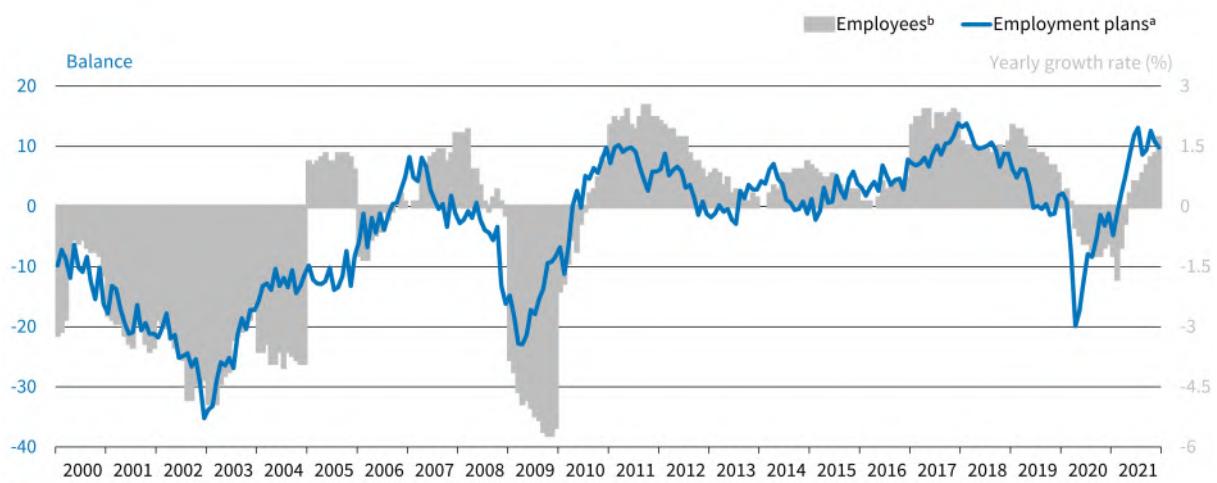
BC: Business climate, BS: Business situation, BE: Business expectations, ST: Stocks, PD: Price development, TO: Turnover, PE: Price expectations, EP: Employment plans, OE: Order expectations.

Source: ifo Business Survey; calculations of the ifo Institute.

2 The ifo Business Survey

trend to the official monthly wholesale statistics, such as the number employed (Figure 2.12), sales prices (Figure 2.13), and turnover (Figure 2.14). Tables 2.19, 2.20, and 2.21 show the correlation measures calculated in each case. Table 2.21 shows the results by branch. As can be seen, in some cases, very strong correlations were found between the data collected by the ifo Institute and the official statistics.

Figure 2.12: Employee development in wholesale trade vs. the corresponding ifo time series



^a ifo Institute. ^b Official numbers.

Source: Federal Statistical Office; ifo Business Survey; calculations by the ifo Institute.

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Table 2.19: Cross-correlation between employees in wholesale trade and the corresponding time series from the ifo survey

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
BC	0.814	0.817	0.810	0.797	0.780	0.760	0.733	0.763	0.785
BS	0.818	0.826	0.829	0.826	0.821	0.813	0.800	0.815	0.823
BE	0.645	0.639	0.619	0.592	0.559	0.523	0.477	0.524	0.563
ST	-0.567	-0.535	-0.503	-0.467	-0.423	-0.379	-0.334	-0.385	-0.431
TO	0.660	0.660	0.665	0.652	0.647	0.636	0.612	0.639	0.652
EP	0.835	0.844	0.852	0.854	0.853	0.842	0.824	0.843	0.855
OE	0.793	0.790	0.783	0.768	0.747	0.722	0.685	0.726	0.753

Highest value in bold.

BC: Business climate, BS: Business situation, BE: Business expectations, ST: Stocks, TO: Turnover, EP: Employment plans, OE: Order expectations.

Source: Federal Statistical Office; ifo Business Survey; calculations by the ifo Institute.

Figure 2.13: Sales prices in wholesale trade vs. the corresponding ifo time series

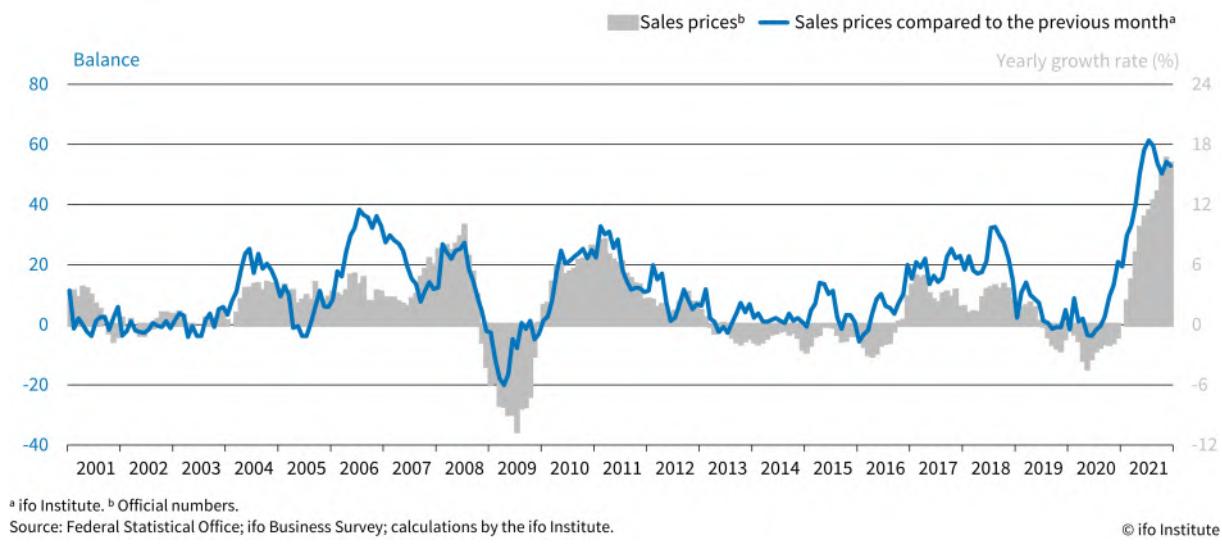
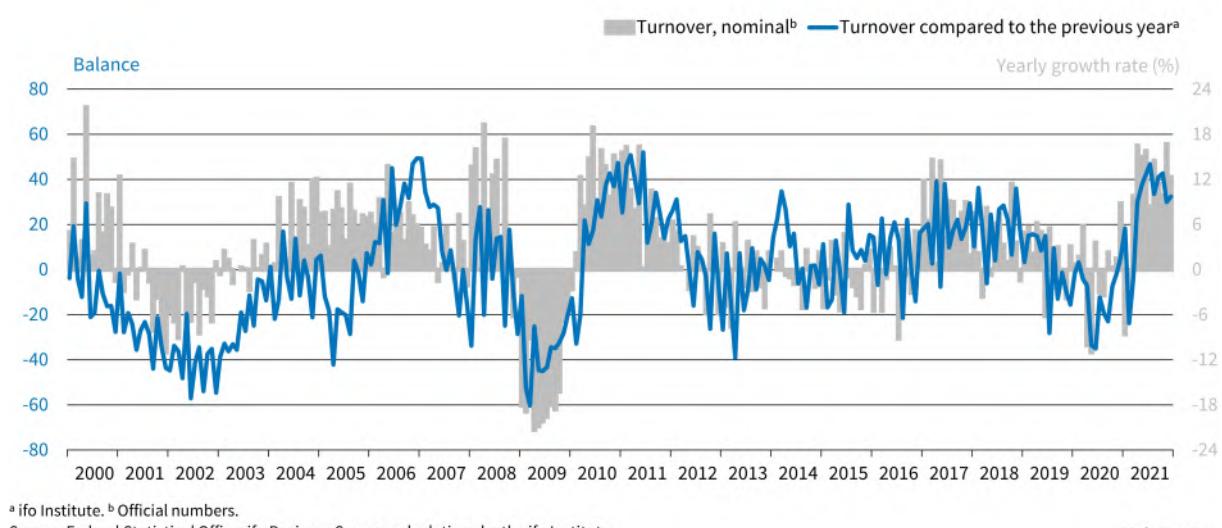


Figure 2.14: Turnover in wholesale trade



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Table 2.20: Cross-correlation between wholesale sales prices and the corresponding time series from ifo Business Survey

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
BC	0.291	0.330	0.358	0.371	0.380	0.377	0.362	0.372	0.371
BS	0.181	0.229	0.268	0.294	0.319	0.338	0.348	0.344	0.333
BE	0.404	0.426	0.431	0.421	0.404	0.369	0.316	0.346	0.362
ST	-0.641	-0.672	-0.684	-0.672	-0.657	-0.630	-0.593	-0.647	-0.688
PD	0.562	0.637	0.696	0.738	0.767	0.789	0.788	0.797	0.785
TO	0.258	0.328	0.379	0.408	0.448	0.478	0.501	0.483	0.459
PE	0.585	0.649	0.704	0.747	0.783	0.799	0.793	0.804	0.797
OE	0.414	0.464	0.499	0.517	0.530	0.532	0.517	0.535	0.539

Highest value in bold.

BC: Business climate, BS: Business situation, BE: Business expectations, ST: Stocks, PD: Price development, TO: Turnover, PE: Price expectation, OE: Order expectations.

Source: Federal Statistical Office; ifo Business Survey; calculations by the ifo Institute.

Table 2.21: Cross-correlation between turnover in wholesale trade the corresponding time series from the ifo Business Survey

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
BC 46	0.353	0.406	0.452	0.486	0.539	0.575	0.594	0.586	0.540
BC 46.3	0.199	0.191	0.239	0.217	0.240	0.247	0.218	0.309	0.222
BC 46.42	0.079	0.082	0.094	0.082	0.133	0.202	0.288	0.321	0.288
BC 46.43	0.320	0.374	0.424	0.446	0.485	0.549	0.603	0.639	0.573
BC 46.44	-0.026	-0.050	-0.023	-0.008	0.001	0.043	0.015	0.048	0.060
BC 46.46	-0.354	-0.250	-0.177	-0.160	-0.162	-0.052	-0.063	-0.061	-0.065
BC 46.47	0.114	0.103	0.123	0.082	0.133	0.231	0.300	0.369	0.338
BC 46.62	0.283	0.385	0.452	0.488	0.568	0.623	0.638	0.680	0.672
BC 46.72	0.229	0.287	0.339	0.392	0.441	0.486	0.501	0.519	0.518
BC 46.73	0.291	0.331	0.380	0.445	0.496	0.549	0.637	0.684	0.619
BC 46.75	0.328	0.423	0.490	0.538	0.601	0.611	0.596	0.578	0.526

Highest value in bold.

BC: Business climate, the numbers afterwards are WZ08-digits.

46: Wholesale trade, 46.3: Wholesale of food, beverages and tobacco, 46.42: Wholesale of clothing and footwear, 46.43: Wholesale of electrical household appliances, 46.44: Wholesale of china and glassware and cleaning materials, 46.46: 'Wholesale of pharmaceutical goods, 46.47: Wholesale of furniture, carpets and lighting equipment, 46.62: Wholesale of machine tools, 46.72: Wholesale of metals and metal ores, 46.73: Wholesale of wood, construction materials and sanitary equipment, 46.75: Wholesale of chemical products.

Source: Federal Statistical Office; ifo Business Survey; calculations by the ifo Institute.

Figure 2.15: Standard questions in trade

ifo - Business survey for retail / wholesale sector
 ifo Institute – Center for Macroeconomics and Surveys
 Please respond by ...

ifo INSTITUT
 Leibniz-Institut für Wirtschaftsforschung
 an der Universität München e.V.
 Postbox 86 04 60
 81631 Munich

Your current information status November 2021

Please base responses only on domestic locations and disregarding purely seasonal fluctuations.

Sector: 123456 Retail or wholesale with xxxx

ID No. 6123456-12.34/12-1234

CURRENT SITUATION	EXPECTATIONS FOR THE NEXT 6 MONTHS
1. We characterize our current business situation as <input type="checkbox"/> good <input type="checkbox"/> satisfactory <input type="checkbox"/> poor	9. We expect our business situation to <input type="checkbox"/> become more favorable <input type="checkbox"/> remain roughly the same <input type="checkbox"/> become less favorable
2. We characterize our inventories as <input type="checkbox"/> too low <input type="checkbox"/> sufficient <input type="checkbox"/> too high <input type="checkbox"/> warehousing not customary	10. The future development of our business situation is currently <input type="checkbox"/> easy to predict <input type="checkbox"/> moderately easy to predict <input type="checkbox"/> moderately difficult to predict <input type="checkbox"/> difficult to predict
REVIEW – TRENDS IN OCTOBER	
3. Compared to October 2020, our sales in October 2021 <input type="checkbox"/> rose <input type="checkbox"/> remained the same <input type="checkbox"/> fell	
4. Compared to September, our sales prices have <input type="checkbox"/> risen <input type="checkbox"/> not changed <input type="checkbox"/> fallen	
5. Compared to September, our workforce has <input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased	
PLANS AND EXPECTATIONS FOR THE NEXT 3 MONTHS	
6. We expect our sales prices to <input type="checkbox"/> rise <input type="checkbox"/> remain roughly the same <input type="checkbox"/> fall	
7. We expect our order intake to <input type="checkbox"/> increase <input type="checkbox"/> remain unchanged <input type="checkbox"/> decrease	
8. We expect our workforce to <input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease	

2 The ifo Business Survey

Figure 2.16: Special questions in trade, part 1

ifo - Business survey for retail / wholesale sector
 ifo Institute – Center for Macroeconomics and Surveys
 Please respond by ...

ifo INSTITUT
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 an der Universität München e.V.
 Postbox 86 04 60
 81631 Munich

Your current information status 2021

Please base responses only on domestic locations and disregarding purely seasonal fluctuations.

Sector: 123456 Retail or wholesale with xxxx

SPECIAL QUESTIONS		
QUARTERLY	ANNUALLY	
JANUARY - APRIL - JULY - OCTOBER		
A) Our sales activity is currently impeded		
<input type="checkbox"/> yes <input type="checkbox"/> no		
If yes, by the following factors:		
<input type="checkbox"/> low demand <input type="checkbox"/> lack of skilled workers <input type="checkbox"/> lack of low-skilled workers <input type="checkbox"/> financial constraints <input type="checkbox"/> lack of suitable premises / commercial spaces <input type="checkbox"/> insufficient business equipment, vehicles, etc. <input type="checkbox"/> unfavorable weather conditions <input type="checkbox"/> other factors		
JANUARY - APRIL - JULY - OCTOBER - RETAIL ONLY		
B) In the past quarter, average customer traffic was ...		
a) at local location	b) online	
<input type="checkbox"/> high <input type="checkbox"/> normal for the season <input type="checkbox"/> low <input type="checkbox"/> no local location	<input type="checkbox"/> high <input type="checkbox"/> normal for the season <input type="checkbox"/> low <input type="checkbox"/> no online presence	
MARCH - JUNE - SEPTEMBER - DECEMBER		
A) In the past 3 months, we have held loan negotiations with banks.		
<input type="checkbox"/> yes If yes: The banks were: <input type="checkbox"/> accommodating <input type="checkbox"/> normal <input type="checkbox"/> less accommodating	<input type="checkbox"/> no If no: <input type="checkbox"/> no need for a bank loan <input type="checkbox"/> other reasons	
FEBRUARY		
A1) Number of employees		
In our operation, we employ (incl. family workers, trainees, temporary staff)		
approx. _____ people		
A2) Our total sales* (in euros) for the past financial year were		
<input type="checkbox"/> below 0.25 million <input type="checkbox"/> 0.25 to 0.5 million <input type="checkbox"/> 0.5 to 1.0 million <input type="checkbox"/> 1.0 to 2.5 million <input type="checkbox"/> 2.5 to 5.0 million		<input type="checkbox"/> 5.0 to 12.5 million <input type="checkbox"/> 12.5 to 25.0 million <input type="checkbox"/> 25.0 to 50.0 million <input type="checkbox"/> 50 million to 1.0 billion <input type="checkbox"/> over 1.0 billion
MARCH		
A1) Our investments in the past year (2020 vs. 2019) were		
2020 + = -		
overall investment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- buildings <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- equipment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- software / databases <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- research / development <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
A2) We expect our investments in the current year (2021 compared to 2020) to		
2021 + = -		
overall investment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- buildings <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- equipment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- software / databases <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
- research / development <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		

Your responses will be handled in strictest confidence. Legal data protection is fully guaranteed.
 Privacy policy: www.ifo.de/en/Datenschutz-Umfragen

Thank you for your input!

Figure 2.17: Special questions in trade, part 2

ifo - Business survey for retail / wholesale sector
 ifo Institute – Center for Macroeconomics and Surveys
 Please respond by ...

ifo INSTITUT
 Leibniz-Institut für Wirtschaftsforschung
 an der Universität München e.V.
 Postbox 86 04 60
 81631 Munich

Your current information status 2021

Please base responses only on domestic locations and disregarding
 purely seasonal fluctuations.

Sector: 123456 Retail or wholesale with xxxx

SPECIAL QUESTIONS			
ANNUALLY			
NOVEMBER			
A1) Our investments in the current year (2021 compared to 2020) are		A2) We expect our investments in the coming year (2022 compared to 2021) to	
2021	+	=	-
overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2022	+	=	-
overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your input!

Trade sector – Special questions 2021 (reverse)

2.5 The ifo Business Survey in the Construction Industry

FELIX LEISS

2.5.1 Beginnings and Development of the Panel

The ifo Business Survey in the manufacturing industry was introduced in 1949. It was quickly supplemented by the ifo Business Survey retail trade in 1950 and the ifo Business Survey wholesale trade in 1951. The monthly ifo Business Survey in the construction industry (conventional construction without the finishing trades) followed in 1956, with the first surveys taking place in the federal state of North Rhine-Westphalia before being gradually extended to the entire territory of the Federal Republic of Germany. Setting up the survey, the ifo Institute received support from several regional and national construction associations.

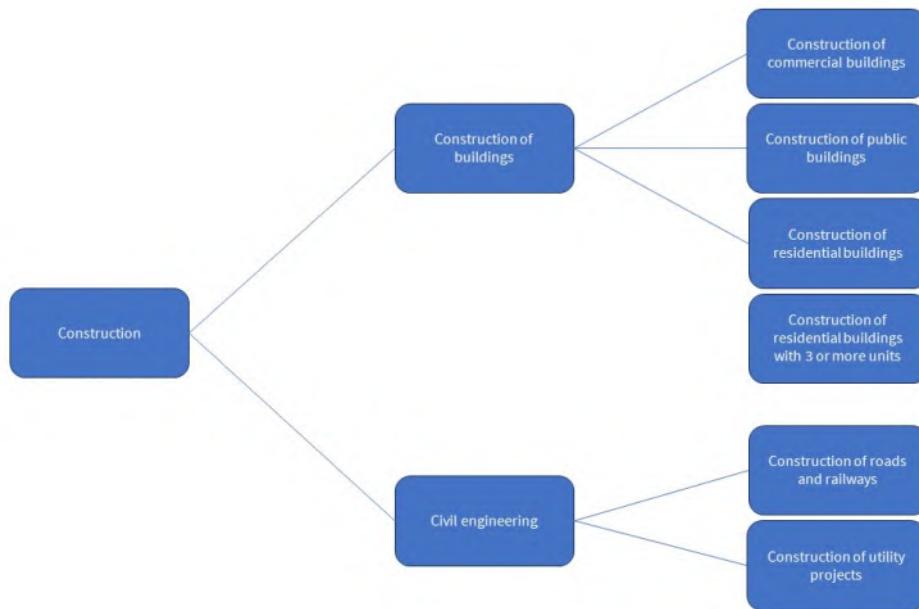
Following German reunification, the construction industry had its highest share of gross value added in 1994, at 7.1%. In the following years, this share fell continuously until 2006, when it reached its lowest point at 3.8%. Thereafter, the construction sector regained importance. In 2017 it generated 4.9% of Germany's gross value added. Within the construction sector, about 60% of gross value added is accounted for by construction and about 40% by the finishing trades.³ The finishing trades, however, have not yet been included in the ifo Business Survey.

2.5.2 Hierarchies in the Construction Industry

The ifo Business Survey in the construction industry has some distinctive features. Instead of being subdivided according to economic branches as in the official classification of economic activities of the German Federal Statistical Office (WZ08), the classification is based on the different construction types according to building reports of the official statistics. As can be seen in Figure 2.18, the construction of buildings sector is divided into the construction of public buildings, construction of commercial buildings, and construction of residential buildings. In construction of residential buildings, buildings with more than three residential units are again recorded separately. In civil engineering, a distinction is made between construction of roads and railways and construction of utility projects.

As most enterprises are active in several of the above-mentioned sectors, the questionnaire for the construction sector differs from those for the other sectors: All six construction types are surveyed on one questionnaire side-by-side: The participants only fill in the columns that are relevant for them and thus classify themselves in the corresponding sub-areas of the construction industry (divisional reports). Some questions, however, relate to the entire company, to construction of buildings, or to civil engineering (see Figure 2.24).

³ For companies with 20 or more employees.

Figure 2.18: Hierarchy of the construction industry

2.5.3 Descriptive Statistics

For the ifo Business Survey in the construction industry, approximately 1,200 companies receive a questionnaire each month. Typically, about 850 responses can be expected at the company level. On average, construction companies state that they are active in 2.5 of the surveyed construction types. This results in about 2,100 reports. Of the approximately 1,200 companies surveyed, around 650 are currently (2022) taking part online.

2.5.4 Questionnaire

In total, the questionnaire for the construction industry comprises 14 monthly standard questions. These relate to the current situation, past developments, and expectations or plans for the coming months. The topics of the questions are construction activity, order backlog, construction prices, construction constraints, the business situation in general, and capacity utilization (Figures 2.23 and 2.24). In addition to these 14 monthly standard questions, special questions are also asked at regular intervals (Figure 2.25). Their topics include short-time work, the use of sub-contractors, the scope of activity of the company, the execution of orders, the use of rental equipment, special difficulties, and the availability of loans. The wording and periodicity of some of these questions are defined in the context of harmonizing business surveys in the European Union. In addition to the monthly standard questions and the regularly repeated questions ifo also asks supplementary questions that are of current relevance or cover other aspects of interest. These supplementary questions are asked as

2 The ifo Business Survey

required (see Section 4.13).

2.5.5 Methodology and Weighting

The answers of each company receive individual weights based on the number of company employees. For this purpose, the participants report the average number of persons employed per year at the end of each year. The weighting points are assigned according to the scheme shown in Table 2.22.

Table 2.22: Weighting points in the construction sector

Number of persons employed	Weighting Points
1 - 99	1
100 - 199	2
200 - 349	3
250 - 499	4
500 - 699	5
700 - 999	6
1,000 - 1,499	8
1,500 - 1,999	10
2,000 and more	13

The disproportionately low increase of points in the number of employees ensures that large companies are not overrepresented. In the case of questions concerning the entire company, as well as companies that report for one construction type only, the weights described above are directly applicable for weighting the individual reports. In the case of companies that are active in several sectors of the construction industry, the weighting points are split between their reports. For this purpose, the share of turnover of the individual construction types in the total corporate turnover is surveyed annually. The weight of the individual reports is determined as follows:

$$\text{Construction type weight} = \text{Company weight} * \frac{\text{Share of turnover}}{100}$$

The weighting for each construction type is rounded up to the next whole number. For example, a construction company with 800 employees, which generates half of its turnover in construction of residential buildings, would thus receive a divisional weight of 3 for the report on construction of residential buildings. The weighted calculation of the results for higher aggregates (construction of buildings, civil engineering, construction industry) is based on the respective shares of turnover of the individual construction sector. These are taken from the official construction statistic, which shows the share of turnover both by economic sector

(WZ2008) and by type of building. The subdivision by type of building in the official statistic corresponds to the classification chosen by the ifo Institute. Nationwide, civil engineering is weighted at 42.5%. Construction of buildings receives a relative weight of 57.5%.

2.5.6 Results and Interpretation

2.5.6.1 Cross Correlations between the Questions

Table 2.23 shows the correlation between some of the central indicators of the standard questionnaire. It shows that there is a high positive correlation between the assessment of the order backlog and the assessment of the current situation. The general business expectations of the participants correlate strongly with the expectations for future construction prices, but even more strongly with the recent development of construction prices.

Table 2.23: Cross-correlation between some of the survey indicators in construction

	BC	BS	BE	CD	CE	OA	PD	PE
BC	1.000							
BS	0.990	1.000						
BE	0.938	0.880	1.000					
CD	0.753	0.754	0.686	1.000				
CE	0.850	0.821	0.847	0.644	1.000			
OA	0.970	0.980	0.863	0.769	0.833	1.000		
PD	0.931	0.903	0.921	0.726	0.802	0.883	1.000	
PE	0.852	0.804	0.895	0.621	0.751	0.751	0.942	1.000

BC: Business climate, BS: Business situation, BE: Business expectations, CD: Construction activity development, CE: Construction activity expectations, OA: Order backlog assessment, PD: Price development, PE: Price expectations.

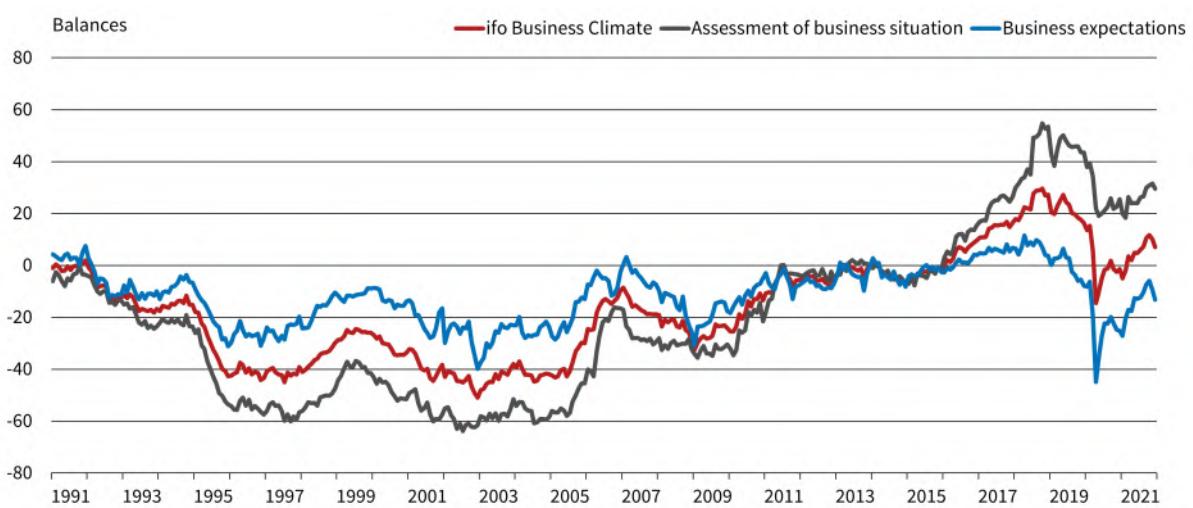
2.5.6.2 Long-term Development

The construction industry stands out in comparison with the other sectors of the ifo Business Survey due to its long-term negative average values. The historical average (from January 1991 to December 2021) of the climate indicator is -16.2 points, while the corresponding indicator in the manufacturing industry has a long-term average of $+4.7$ points. The indicator for the current business situation in the construction industry is on average only -19.8 balance points (Figure 2.19). Two questions arise: 1. Should current indicator values be interpreted in relation to the actual zero line or to their average values? 2. Is the current absolute value of the indicators or their distance from the respective long-term average more suitable for assessing the economic condition of the industry? In order to answer these questions, it must be clarified whether the low average values are a product of a pessimistic sentiment or a long

2 The ifo Business Survey

phase of economic downturn.

Figure 2.19: ifo Business Climate and its sub-indicators in the construction industry



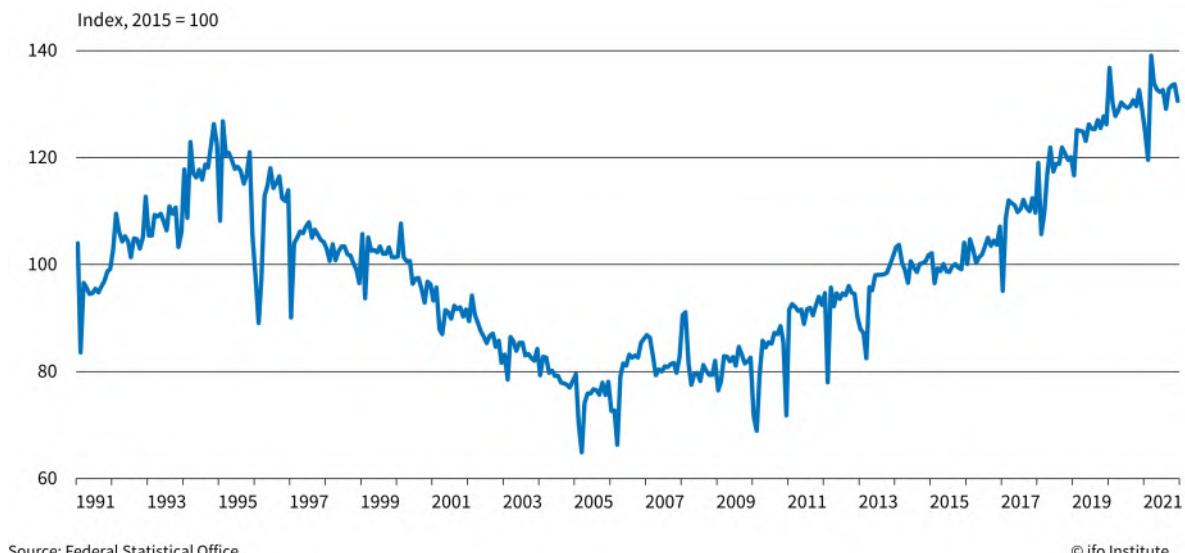
Source: ifo Business Survey.

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Looking at the results of the ifo Business Survey, it is possible to track the development of the German construction industry. Starting from reunification, the business situation indicator initially moved sideways on a slightly negative level (Figure 2.19). The first major declines occurred in mid-1992, after which the indicator stabilized at around -20 balance points. However, the next slump followed in 1995, so that at the end of the year the indicator reached below -50 balance points for the first time. In the years that followed, the indicator remained below this mark for the most part. One exception to this was the moderate phase of recovery from the second half of 1998 until the end of 2000, although even there the balance did not rise above -35 points. In October 2002, the lowest point was reached with -66.4 points. It was not until the second half of 2004 that the picture changed, and a strong rebound ended the downward slide. This trend has continued to this day (as of December 2021), only being interrupted by the financial crisis in 2008/2009, the euro crisis, and the Covid-19 pandemic.

To gain an impression of the long-term economic development and the current situation in the construction industry, it is also advisable to look at the working day and seasonally adjusted production index of the Federal Statistical Office for companies with 20 or more employees. It is obvious that declining construction output not only leads to poorer utilization of existing capacities, but also to greater competitive pressure and thus to falling margins. Such framework conditions make it very difficult to operate profitably and pose difficulties for many companies. Conversely, increasing building production forms the basis for the flourishing of the trade. The highest level of construction activity for the companies surveyed was already reached in 1995. After a ten-year period of declining construction output – with the exception of the year 1999, in which a small increase was reported – activity reached its lowest point in 2005. Within ten years, the recorded production had decreased by 36%. The Data

Figure 2.20: Production index for the construction industry

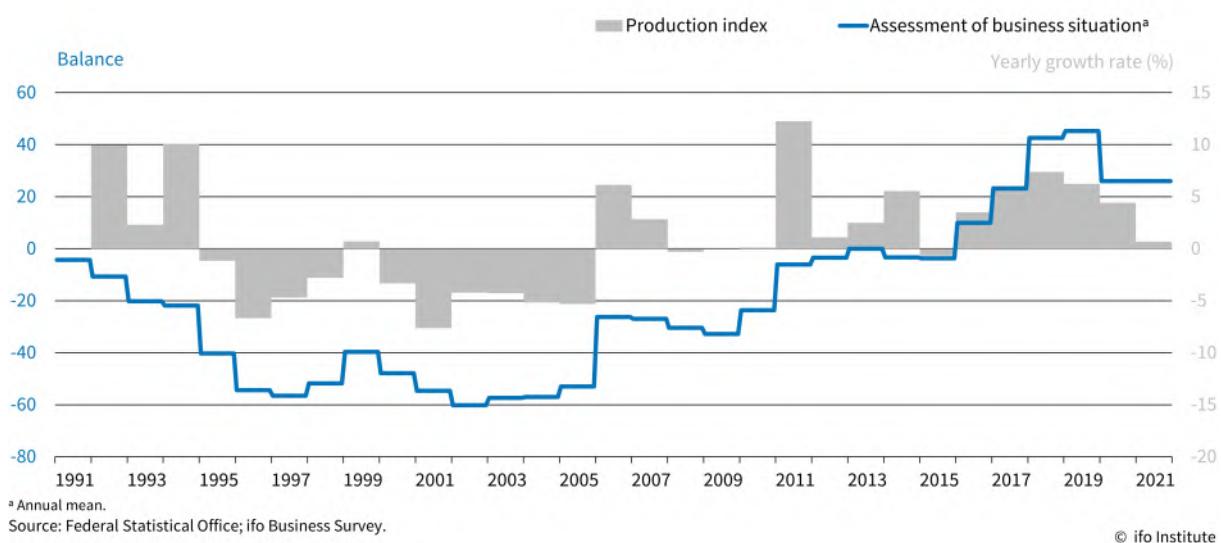


Source: Federal Statistical Office.

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also shows that, despite the significant increases of recent years, current construction output has still not reached the level of the record years 1994 and 1995. The development of the construction industry after 1991 was thus quite turbulent. Reunification was followed by about five years of growth. The following ten years were characterized by declining construction output. After the low point was reached in 2005, a longer recovery phase began, which culminated in a construction boom.

Figure 2.21: Comparison between the assessment of the business situation and the annual growth rate of the production index

^a Annual mean.

Source: Federal Statistical Office; ifo Business Survey.

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2 The ifo Business Survey

Figure 2.22: Development of construction activity in the construction industry and rates of changes of the production index

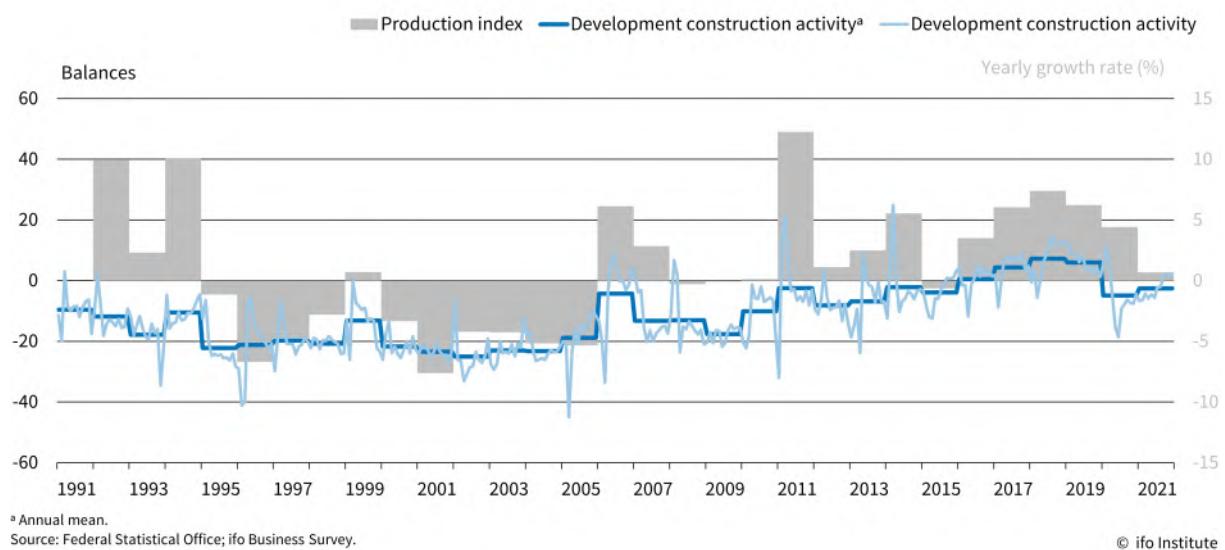


Figure 2.21 shows both the balanced assessments of the current business situation of the construction companies on an annual average and the percentage rate of change of the annual average of the production index for the construction industry. It is striking that the worst results of the ifo Business Survey fall, as expected, between 1995 and 2005. In the ten-year period beginning January 1995, the average value of the business situation indicator was -52.1 balance points. Looking at all other years since reunification, the situation indicator averaged -2.1 balance points. The strongly negative mean values of the ifo indicators for the construction industry are therefore likely to be attributable to this long and harsh economic downturn. However, even in years with rising construction output, the business situation indicator has regularly failed to achieve a positive value. A certain amount of systematic pessimism in the construction industry can therefore not be ruled out. A further indication of a possible bias is provided by another indicator of the ifo Business Survey: Each month, the participants are asked whether construction activity has risen, remained the same, or fallen in the past three months. If the balance of this variable is compared with the annual rate of change in the construction output recorded by the Federal Statistical Office (Figure 2.22), it is noticeable that the indicator was often able to briefly climb above the zero line in years with rising construction output, while mostly retaining a negative annual average. The average for these years is 7.6 balance points. In years with declining construction output, on the other hand, the average realization of the variable was -19.8 balance points. In summary, it can be said that the strongly negative average values in the construction industry are primarily attributable to a long phase of the economic decline, though a certain systematic pessimism in the response behavior cannot be ruled out either. An interpretation of the current indicator values in relation to the historical mean values is therefore not appropriate. Nevertheless,

with balances in the slightly negative range, it should not necessarily be assumed that the current situation is unfavorable or that construction activity is declining.

2 The ifo Business Survey

Figure 2.23: Standard questions in construction, front

ifo - Business survey for construction sector

ifo Institute – Center for Macroeconomics and Surveys

Please respond by ...

ifo INSTITUTE

Leibniz Institute for Economic Research
at the University of Munich

Please base responses only on domestic locations and disregarding purely seasonal fluctuations.

Please fill in only the columns that apply to your work area.

ID No. 1123456-123.12.1234

Your current information status

November 2021

Road construction	Other underground construction	Public buildings	Commercial buildings	Total residential construction	Residential buildings Buildings with at least 3 dwellings
-------------------	--------------------------------	------------------	----------------------	--------------------------------	--

CURRENT SITUATION

1. We characterize our current business situation as

<input type="checkbox"/>	good					
<input type="checkbox"/>	satisfactory					
<input type="checkbox"/>	poor					

2. Our order backlog (if customary for the industry) is

<input type="checkbox"/>	comparatively large					
<input type="checkbox"/>	sufficient					
<input type="checkbox"/>	too low					

3. Our order backlog currently correspond to our average production in:

<input type="checkbox"/>	month(s)					
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	----------

4. Our prices

<input type="checkbox"/>	more than cover our costs					
<input type="checkbox"/>	cover our costs					
<input type="checkbox"/>	no longer cover our costs					

5. Our construction activity is currently impeded

<input type="checkbox"/>	yes					
<input type="checkbox"/>	no					

If yes, by the following factors:

<input type="checkbox"/>	too few orders					
<input type="checkbox"/>	order cancellations					
<input type="checkbox"/>	lack of skilled workers					
<input type="checkbox"/>	lack of low-skilled workers					
<input type="checkbox"/>	financial constraints					
<input type="checkbox"/>	scarcity of materials / insufficient technical equipment					
<input type="checkbox"/>	unfavorable weather conditions					
<input type="checkbox"/>	other factors					

REVIEW

6. Our construction activity in the past 3 months has

<input type="checkbox"/>	increased					
<input type="checkbox"/>	stayed about the same					
<input type="checkbox"/>	decreased					

7. Compared to September, our level of building contracts in October

<input type="checkbox"/>	increased					
<input type="checkbox"/>	remained roughly the same					
<input type="checkbox"/>	decreased					

8. Compared to September, our prices in October have

<input type="checkbox"/>	risen					
<input type="checkbox"/>	not changed					
<input type="checkbox"/>	fallen					

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Please turn over

Figure 2.24: Standard questions in construction, back

Road construction	Other underground construction	Public buildings	Commercial buildings	Total residential construction	Residential buildings Buildings with at least 3 dwellings
PLANS AND EXPECTATIONS FOR THE NEXT 3 MONTHS					
9. We expect our construction activity to <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> increase <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> remain roughly the same <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> decrease					
10. We expect our prices to <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> increase <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> remain roughly the same <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> decrease					
EXPECTATIONS FOR THE NEXT 6 MONTHS					
11. We expect our business situation to <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> become more favorable <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> stay the same <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> become less favorable					
12. The future development of our business situation is currently <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> easy to predict <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> moderately easy to predict <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> moderately difficult to predict <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> difficult to predict					
CAPACITY UTILIZATION			EMPLOYEES		
13. Utilization of our machine capacity is currently at (standard full utilization = 100%) 30 40 50 60 70 75 80 85 90 95 100 more than 100%, namely: <input type="checkbox"/> <input type="checkbox"/> _____ all equipment <input type="checkbox"/> <input type="checkbox"/> _____ equipment for undgr. constr. <input type="checkbox"/> <input type="checkbox"/> _____ equipment for buildings			14. In the next 3 months, we expect our workforce to a) in total b) skilled tradespeople c) office empl. <input type="checkbox"/> increase <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> stay about the same <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> decrease <input type="checkbox"/> <input type="checkbox"/>		
			15. Compared to September, in October our workforce has a) in total b) skilled tradespeople c) office empl. <input type="checkbox"/> increased <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> stayed about the same <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> decreased <input type="checkbox"/> <input type="checkbox"/>		

2 The ifo Business Survey

Figure 2.25: Special questions in construction

ifo - Business survey for construction sector
 ifo Institute – Center for Macroeconomics and Surveys
Please respond by ...

Please base responses only on domestic locations and disregarding purely seasonal fluctuations.
 Please fill in only the columns that apply to your work area.

ifo INSTITUTE
 Leibniz Institute for Economic Research
 at the University of Munich

ID No. 1123456-123.12.1234

Your current information status
2021

Road construction	Other underground construction	Public buildings	Commercial buildings	Total residential construction	Residential buildings Buildings with at least 3 dwellings
SPECIAL QUESTIONS					
QUARTERLY			ANNUALY		
MARCH - JUNE - SEPTEMBER - DECEMBER			AUGUST		
A) In the past 3 months, we have held loan negotiations with banks. <input type="checkbox"/> yes <input type="checkbox"/> no If yes: The banks were: <input type="checkbox"/> accommodating <input type="checkbox"/> no need for a bank loan <input type="checkbox"/> normal <input type="checkbox"/> other reasons <input type="checkbox"/> less accommodating			A) We had job vacancies in the past 6 months: <input type="checkbox"/> yes <input type="checkbox"/> no If yes: a) We were looking for specialists in the following fields: <input type="checkbox"/> skilled trades <input type="checkbox"/> commercial professions <input type="checkbox"/> industrial managers <input type="checkbox"/> civil engineering <input type="checkbox"/> apprentice tradespeople		
HALF-YEARLY			DECEMBER		
APRIL - SEPTEMBER			A) Did you have any problems in the last 6 months? <input type="checkbox"/> yes <input type="checkbox"/> no If yes, the following: <input type="checkbox"/> order cancellations <input type="checkbox"/> customers defaulting on payment <input type="checkbox"/> poaching of employees <input type="checkbox"/> violation of VOB regulations including: <input type="checkbox"/> customer put up hurdles to construction <input type="checkbox"/> delayed acceptance of work by the customer contracts <input type="checkbox"/> awarded to lowest bidder, not the most commercially viable		
A) As a basis for weighting your responses in 2022, we would ask you to indicate how the sales you have generated so far in 2021 are distributed among the following sectors. (estimates are fine)					
Road construction	Other undgr. constr.	Public buildings	Commercial buildings	Residential buildings	
%	%	%	%	%	
100 %					
B) On average, our workforce in 2021 totaled: _____ workers _____ employees total					
A1) For equipment-intensive work, we sometimes rent equipment and/or we hire specialist companies as subcontractors. <input type="checkbox"/> yes <input type="checkbox"/> no					
A2) Approx. _____% of our equipment capacity in 2020 was attributable to rented equipment.					

Thank you for your input!

Construction sector – Special questions 2021

2.6 The ifo Business Survey in the Service Sector

PRZEMYSŁAW BRANDT, RAFFAELA SEITZ

2.6.1 Beginnings and Development of the Panel

When the ifo Institute first launched the ifo Business Survey in 1949, only companies from the manufacturing industry were surveyed. In the following years, the survey was extended to the retail and wholesale sector as well as to the construction industry. At the time, surveying these sectors was sufficient to trace the business cycle and the development of the German economy. However, with the service sector still missing, the largest part of the German economy was not covered. By around 2000, the gross value-added share of the service sector (excluding wholesale and retail trade) in Germany had risen to almost 60%. This growth meant that information about the entire sector and its various sub-sectors also became more important.

Thus, a monthly survey for the service sector was set up in the early 2000s. Over several years, a panel of participating companies was built, and aggregation hierarchies were defined. Since 2005, the results of the ifo Business Survey in the service sector have been published monthly. It should be noted that before the introduction of the ifo Business Survey in the service sector, individual areas of the sector were covered by regular surveys, although these were neither carried out monthly nor comprehensive. Examples of these were a business survey of architects, a survey of IT service providers, and a business survey of leasing companies. Furthermore, the questionnaire was adapted to the respective area and therefore varied considerably between these individual surveys. A survey with a standardized questionnaire now covers all service sectors except public service providers (education, health and social services, and government administration and defence) and the finance sector; it thus generates comparable results. Due to the relatively short time series in 2005, the values were initially published in unadjusted form. The publication of the seasonally adjusted values started when the time series had reached a sufficient length. The results for the service sector are now also included in the ifo Business Climate Index for Germany.

2.6.2 Descriptive Statistics

In 2022, the monthly number of participants in the ifo Business Survey in the service sector was on average 2,500, though that year 4,500 companies received the monthly questionnaire. This corresponds to an average response rate of 56%. This relatively low rate can be explained by the fact that new companies are continuously being recruited, while only a certain proportion of the originally recruited participants always answer the surveys. Companies that have not participated in the survey for twelve months or longer are removed from the panel. Panel mortality is a major challenge for a monthly survey and therefore constant recruitment of new companies is essential.

2.6.3 Questionnaire

In total, the questionnaire for the service providers consists of twelve monthly standard questions, which are nearly the same as the standard questions for the other sectors, such as the manufacturing industry. The topics of these questions are mostly core variables of the companies, such as the business situation, turnover, employment, or prices; they refer to the current month, developments in the previous month, and plans or expectations for the upcoming months. The wording of the questions is based on the guidelines for the harmonization of business surveys in the European Union. The questionnaire is shown in Figure 2.28 at the end of this chapter.

In addition to these monthly standard questions, other questions are asked on a regular basis, quarterly or semi-annually. Topics here are, for example, business constraints, capacity utilization, investment activity, the banks' willingness to grant credits, or short-time work. Figures 2.29 and 2.30 show an overview of these questions. Furthermore, supplementary questions can be included in the questionnaire whenever needed. These questions mainly relate to current relevant economic developments or cover certain aspects of interest. Section 4.13 presents a selection of these supplementary questions and their results.

2.6.4 Methodology, Hierarchies and Weighting

The calculations of the companies' answers to aggregated time series follows the same scheme as described in detail in Subsection 2.2.3. Before the calculations can be performed, each company receives a weighting factor based on its annual turnover. This differs from the manufacturing and construction sectors, in which the firm weights are based on the number of employed persons. This difference is due to the fact that the number of employees does not necessarily reflect the economic size of the companies in the service sector. There are big differences between the various service sectors. For example, turnover in personal services generally develops linearly with the number of employees, while turnover in business-related services can vary significantly from the development of the number of employees. Table 2.24 shows the corresponding allocation schemes for the firm weights. These firm weights reflect the higher impact of larger companies on the economy. Accordingly, the responses of a company with annual sales of more than 25 million Euros receive a ten times higher weight in the calculations than those with annual sales of less than 50,000 Euros. After the individual responses of the enterprises have been weighted at the micro data level, the balance calculations and aggregations can be executed.

In addition, each company is assigned to a branch. This occurs at the bottom level of the current classification of economic activities of the German Federal Statistical Office; the so-called WZ2008. If a company provides various services, the classification is based on the company's principal activity.

Table 2.25 shows all covered service industries that are included in the aggregation for the

Table 2.24: Firm weights in the service sector

Turnover/year (in million €)		Weighting factor
	< 0.05	1
0.05	< 0.10	2
0.10	< 0.25	3
0.25	< 0.50	4
0.50	< 1.0	5
1.0	< 2.0	6
2.0	< 5.0	7
5.0	< 10.0	8
10.0	< 25.0	9
	≥ 25.0	10

entire service sector. The sections “K - Financial and insurance activities”,⁴ “O - Public administration and defence; compulsory social insurance”, “P - Education”, and “Q - Human health and social work activities” as well as Veterinary activities (WZ-2008: 75.00) are part of the service sector according to the official classification, but are not included in the ifo Business Survey. The trade sector is also not included as the separate ifo Business Survey trade already exists (Section 2.4). In addition, the sections “D - Electricity, gas, steam, and air conditioning supply” and “E - Water supply; sewerage and waste management and remediation activities”, which are not part of the service sector according to the official classification, are surveyed but not taken into account in the calculation of the results for the entire service sector.

For the calculation of the aggregated results hierarchies are used. These hierarchies assign bottom-up which service industries go into higher-level aggregates. The service industries on the 2-digit level⁵ are then aggregated to the overall service sector based on the individual sector weights. These sector weights are based on the shares of the respective WZ-2-digits of the total gross value added of all covered industries covered by the ifo Business Survey in the service sector. The weights are adjusted at least every five years to account for changes in these shares. Table 2.25 shows the currently applicable weights.

⁴ An exception to this rule are the enterprises engaged in "equipment leasing" (WZ-2008: 64.91). Although they are surveyed, they are not taken into account in the calculation of the overall indicator for the service sector.

⁵ The WZ-2-digits designate the second hierarchical level of the economic branch classification. Higher ranked are only the “economic sections”, which are marked with letters.

2 The ifo Business Survey

Table 2.25: Industries included in the overall service sector and their respective weights

WZ08 Code	Description	Weight
H	Transportation and storage	
49	Land transport and transport via pipelines	4.51
50	Water transport	1.07
51	Air transport	0.68
52	Warehousing and support activities for transportation	4.50
53	Postal and courier activities	1.42
I	Accommodation and food service activities	
55	Accommodation	1.44
56	Food and beverage service activities	3.02
J	Information and communication	
58	Publishing activities	0.42
59	Motion picture, video and tv production; sound recording and music publishing	0.48
60	Programming and broadcasting activities	0.65
61	Telecommunications	3.14
62	Computer programming, consultancy and related activities	3.45
63	Information service activities	0.73
L	Real estate activities	
68	Real estate activities	35.93
M	Professional, scientific and technical activities	
69	Legal and accounting activities	3.98
70	Activities of head offices; management consultancy activities	2.02
71	Architectural and engineering activities; technical testing and analysis	3.74
72	Scientific research and development	1.15
73	Advertising and market research	1.83
74	Other professional, scientific and technical activities	0.36
N	Administrative and support service activities	
77	Rental and leasing activities	6.06
78	Employment activities	2.40
79	Travel agency, tour operator and other reservation service and related activities	0.73
80	Security and investigation activities	0.33
81	Services to buildings and landscape activities	1.75
82	Office administrative, office support and other business support activities	2.64
R	Arts, entertainment and recreation	
90	Creative, arts and entertainment activities	0.80
91	Libraries, archives, museums and other cultural activities	0.09
92	Gambling and betting activities	1.59
93	Sports, entertainment and recreation activities	1.50
S	Other service activities	
94	Activities of membership organisations	1.29
95	Repair of computers and personal and household goods	1.04
96	Other personal service activities	5.26

Note: The sections “G - Trade”, “K - Financial and insurance activities”, “O - Public administration and defence; compulsory social insurance”, “P - Education”, and “Q - Human health and social work activities” as well as Veterinary activities (WZ-2008: 75.00) are not included in the results for the overall service sector.

Apart from the results for the entire service sector, results are calculated for all service industries covered in the hierarchies that have a sufficient number of participants. In addition, there are also other aggregates calculated by other hierarchies. Examples of such aggregates are service providers related to consumption, business related service providers, or the event industry. Moreover, there are results separately calculated for regions or firm-size classes.

2.6.5 Results

The results of the ifo Business Survey in the service sector have been published since 2005. As an example, Figure 2.26 shows the three most important time series for the service sector (business climate, assessment of business situation, and business expectations). In the period between 2005 to 2007, the evaluation of the current situation was increasingly positive. The business expectations were also positive. Thus, the business climate in the service sector improved. At the beginning of 2007, however, optimistic expectations gradually gave way to neutral and pessimistic outlooks. During the economic crisis, the balance of the current business situation was for some months even negative, with business climate and business expectations reaching their lowest levels in December 2008. The business situation followed the development of the business expectations and reached its lowest value in July of 2009. By the end of 2010, the indicators had recovered to the same level as before the financial crisis. The euro crisis of 2012 can also be seen in the data. At the end of 2017, the business climate indicator rose to a new record level, unchallenged until now. However, it had already been fluctuating at a high level since mid-2015 with values between 24 and 32 points. At the end of 2018, the indicator started to decline. The outbreak of the Corona pandemic and the resulting lockdowns and restrictions marked the strongest decline of the business climate. A long recovery followed. In 2022, geopolitical crises and uncertainties related to energy supply led to pessimistic business expectations. However, the business situation was still mainly assessed positive.

A comparison with the manufacturing sector shows that the development of the business climate indicators of the two sectors was similar until 2011 (Figure 2.27). According to the business climate, however, the manufacturing industry felt the effects of the economic crisis more strongly. Similarly, the decline of the climate indicator in the years 2011 to 2012 was much more pronounced in the manufacturing sector than in the service sector. In the period between 2011 to 2016 the business climate was consistently more positive in the service sector than in the manufacturing industry. Afterwards, the two time series almost converged in 2017, and followed an almost identical trajectory until April of 2018. Subsequently, the business climate of the manufacturing industry declined and in 2019 became negative. One reason was growing uncertainty surrounding the economic development due to Brexit and growing trade conflicts. Meanwhile, the climate of the service sector maintained its level and only started to decline in the second half of 2019. During the Corona pandemic, some service industries (e.g., accommodation, food service activities, travel agencies) were hit especially hard by governmental restrictions. Therefore, the recovery of the business climate after the

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Figure 2.26: ifo Business Climate and its sub-indicators in the service sector

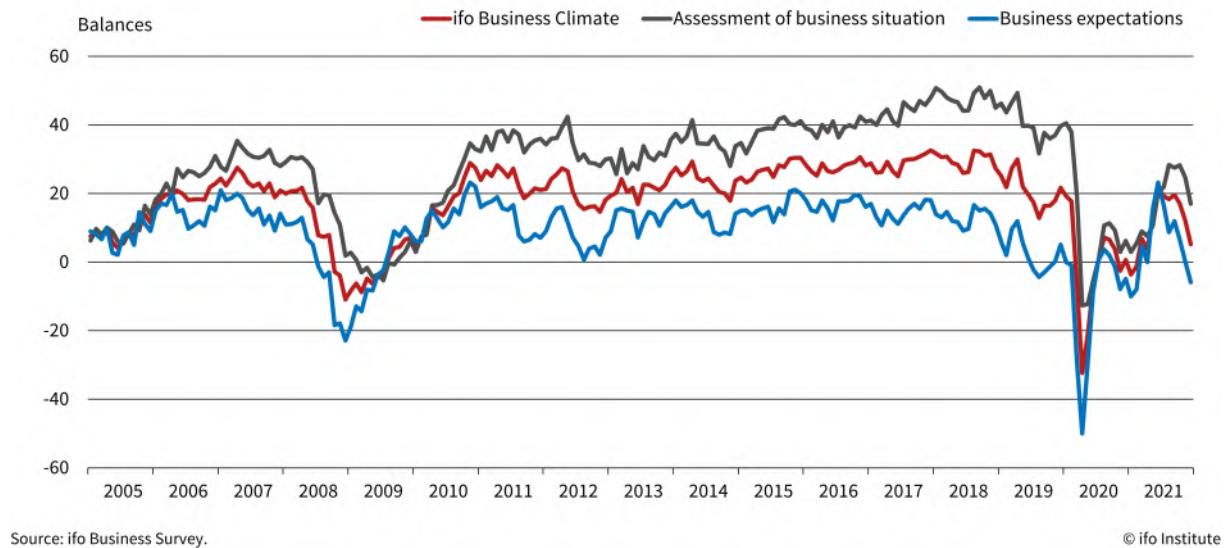
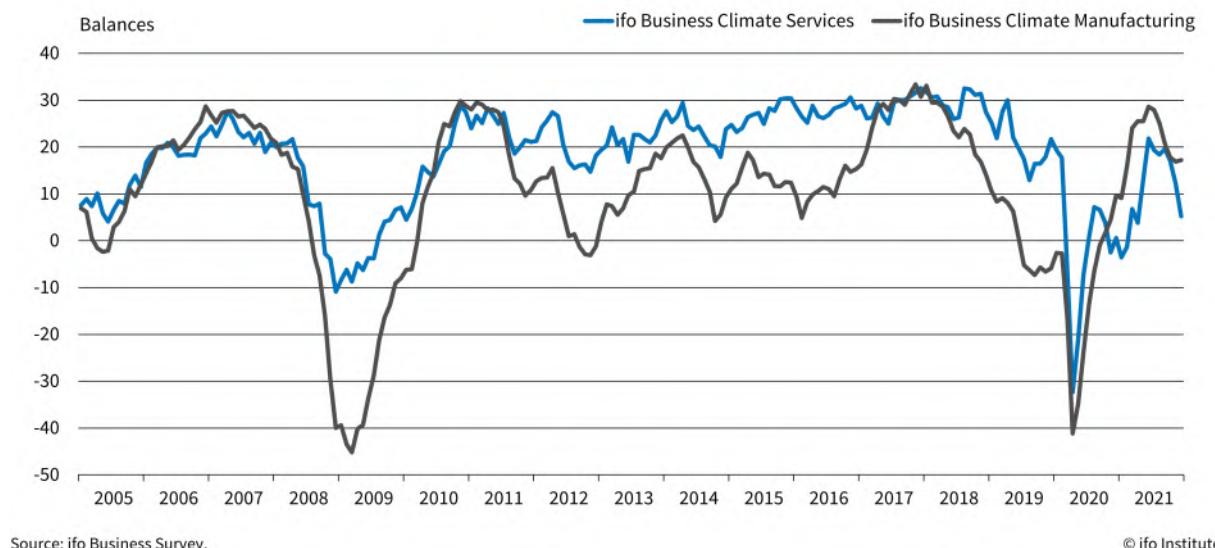


Figure 2.27: ifo Business Climate of the service sector compared to the manufacturing industry



first lockdown was not as smooth as in the manufacturing industry.

Table 2.26 shows the correlations of the standard time series of the service sector. The highest correlation is achieved by the time series for the business situation and for the order backlog assessment. In addition, the business climate indicator shows high correlations with its two sub-components and the employee plans. Moreover, the employment plans seem to show a certain synchronism with the business climate and the business situation and order backlog assessments. The price expectations show the highest correlations when compared with the time series for the employee plans and order backlog assessment. The turnover compared to last year and last month also show a high correlation.

Table 2.26: Contemporaneous correlation between the monthly standard questions

	BC	BS	BE	EP	PE	TE	TY	TD	OA
BC	1.000								
BS	0.922	1.000							
BE	0.861	0.597	1.000						
EP	0.888	0.896	0.665	1.000					
PE	0.688	0.782	0.399	0.838	1.000				
TE	0.831	0.716	0.787	0.836	0.661	1.000			
TY	0.826	0.849	0.600	0.818	0.688	0.693	1.000		
TD	0.848	0.785	0.729	0.794	0.594	0.772	0.893	1.000	
OA	0.851	0.966	0.495	0.891	0.827	0.694	0.809	0.725	1.000

BC: Business climate, BS: Business situation, BE: Business expectations, EP: Employment plans, PE: Price expectations, TE: Turnover expectations, TY: Turnover development compared to the same month last year, TD: Turnover development in the previous month, OA: Order backlog assessment.

Source: ifo Business Survey.

2 The ifo Business Survey

Figure 2.28: Standard questions in services

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81631 Munich

Your current information status November 2021

Please base responses only on domestic locations and disregarding purely seasonal fluctuations.

Sector: 1234567 Provision of services xxx

ID No. 19-12345-12345

CURRENT SITUATION		PLANS AND EXPECTATIONS FOR THE NEXT 3 MONTHS	
1. We characterize our current business situation as	<input type="checkbox"/> good <input type="checkbox"/> satisfactory <input type="checkbox"/> poor	8. We expect our sales ** to	<input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease
2. Our order backlog (if customary for the industry) is	<input type="checkbox"/> comparatively large <input type="checkbox"/> sufficient <input type="checkbox"/> too low	9. We expect our workforce to	<input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease
3. Compared to September, in October our workforce	<input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased	10. We expect our prices to	<input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease
4. Compared to September, our prices in October have	<input type="checkbox"/> risen <input type="checkbox"/> not changed <input type="checkbox"/> fallen	11. We expect our business situation to	<input type="checkbox"/> become more favorable <input type="checkbox"/> stay the same <input type="checkbox"/> become less favorable
5. Compared to September, in October our order backlog	<input type="checkbox"/> increased <input type="checkbox"/> remained roughly the same <input type="checkbox"/> decreased	12. The future development of our business situation is currently	<input type="checkbox"/> easy to predict <input type="checkbox"/> moderately easy to predict <input type="checkbox"/> moderately difficult to predict <input type="checkbox"/> difficult to predict
6. In the past 3 months, our business situation	<input type="checkbox"/> improved <input type="checkbox"/> remained unchanged <input type="checkbox"/> worsened	EXPECTATIONS FOR THE NEXT 6 MONTHS	
7a. In the past 3 months, our sales *	<input type="checkbox"/> increased <input type="checkbox"/> remained the same <input type="checkbox"/> decreased	13. We expect our workforce to	
7b. Compared to October 2020, our sales ** in October 2021	<input type="checkbox"/> increased <input type="checkbox"/> remained the same <input type="checkbox"/> decreased	<input type="checkbox"/> increase <input type="checkbox"/> remain roughly the same <input type="checkbox"/> decrease	

* sales development over the course of three months
including international sales

** including international sales

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Figure 2.29: Special questions in services, part 1

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SPECIAL QUESTIONS																																																		
QUARTERLY	ANNUALLY																																																	
JANUARY - APRIL - JULY - OCTOBER																																																		
<p>A) Our business activity is currently impeded</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>if yes, by the following factors:</p> <p><input type="checkbox"/> too few orders / insufficient demand <input type="checkbox"/> lack of skilled workers <input type="checkbox"/> lack of low-skilled workers <input type="checkbox"/> financing constraints <input type="checkbox"/> insufficient technical capacity <input type="checkbox"/> lack of space / business equipment <input type="checkbox"/> unfavorable weather conditions <input type="checkbox"/> other factors</p> <p>B) Could you currently meet a rise in demand with the existing capacity at your company?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>If yes: We could expand our business activities by %. (please round percentage to whole number)</p>	<p>A1) Our investments in the past year (2020 vs. 2019) were</p> <table border="1"> <thead> <tr> <th>2020</th> <th>+</th> <th>=</th> <th>-</th> </tr> </thead> <tbody> <tr> <td>overall investment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- buildings</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- equipment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- software / databases</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- research / development</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>A2) We expect our investments in the current year (2021 compared to 2020) to</p> <table border="1"> <thead> <tr> <th>2021</th> <th>+</th> <th>=</th> <th>-</th> </tr> </thead> <tbody> <tr> <td>overall investment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- buildings</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- equipment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- software / databases</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>- research / development</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	2020	+	=	-	overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2021	+	=	-	overall investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- software / databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- research / development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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2 The ifo Business Survey

Figure 2.30: Special questions in services, part 2

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ID No. 19-12345-12345

SPECIAL QUESTIONS																																													
ANNUALLY	EVERY 2 YEARS																																												
NOVEMBER	SEPTEMBER																																												
B1) Our investment activities have the following objectives: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 10%;">2021</th> <th style="width: 10%;">2022</th> </tr> </thead> <tbody> <tr> <td>extension of capacity</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>rationalization (increase in efficiency)</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>replacement procurement</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>other investment objectives</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>we do not invest</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>			2021	2022	extension of capacity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	rationalization (increase in efficiency)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	replacement procurement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	other investment objectives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	we do not invest	<input checked="" type="checkbox"/>	<input type="checkbox"/>																										
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*Sales excluding VAT: Please report only external sales (excluding internal company sales) or, depending on the sector, fee revenue (lawyers), commissions (brokers), new business (leasing companies), etc.

**Employees: Persons including owners, family workers, part-time workers, trainees, and workers in minor employment

Thank you for your input!

Service sector – Special Questions 2021 (reverse)

2.7 On the Representativeness of the ifo Business Survey

MAGDOLNA HIERSEMENZEL, STEFAN SAUER, KLAUS WOHLRABE

2.7.1 Introduction

From the results of the ifo Business Survey, one should be able to draw the most reliable and robust conclusions possible about developments in the German economy. This applies to both the analyses at the aggregate level with the business cycle indicators and to scientific evaluations at the level of the anonymized micro data. To ensure this, the panel of survey participants must meet various requirements in order to provide as accurate a picture as possible of the business landscape in Germany. Though full surveys of all companies would be desirable, they are neither practical nor feasible. Moreover, participation in the ifo surveys is voluntary. Therefore, the ifo Business Survey is based on a sample of companies active in Germany. The sample size must be of a certain size to provide solid results. In this context, it is important to cover all the important economic sectors (professional representation) as well as a sufficiently large share of companies (company representation). Furthermore, so-called selection effects, which would lead to systematic distortions of the results, must be avoided. Therefore, it is important to ensure that both the regional composition of the participants and the distribution of the companies by size and economic sector roughly reflect the composition of all German companies. Generally, the sample has to accurately reflect the essential properties of the population of all German companies.

2.7.2 Panel Size and Representativeness by Economic Sector

The panel of participating companies is designed to obtain meaningful results and to draw accurate conclusions not only for the overall economy, but for various economic sectors as well. Table 2.27 provides an overview of the average monthly number of participants in 2021 for all economic sectors covered by the ifo Business Survey.⁶ It also shows how many employees the participating companies have, compared to all companies in Germany. The survey panels for manufacturing and construction, for example, cover around 15% of all employees in these sectors. For manufacturing of motor vehicles, more than 50% of the workforce is covered in the sample of surveyed companies. The figures for retail and wholesale trade are at 9% and 10% respectively. In the service sector, the ifo Business Survey covers 4.5% of the workforce. Within the service sector, the information and communication sector has the highest coverage of the workforce, at 17%.

⁶ Strictly speaking, it is the number of questionnaires received and not the number of companies that is shown here. In the construction sector, there are many companies that fill out several questionnaires per month because they cover different types of construction. This is also true for some large companies in manufacturing, if they cover different sectors.

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Table 2.27: Number of participants and coverage by industries

Sector	Participants in the ifo Business Survey	Employees covered	Employees total	Coverage rate
<i>Manufacturing</i>	2,105	1,049,355	6,833,142	15.4%
Food, beverages, tobacco	117	18,196	727,118	2.5%
Textiles, wearing apparel, leather	66	6,603	115,980	5.7%
Wood, paper, printing	210	27,217	353,102	7.7%
Chemicals, coke and petroleum, pharmaceutical products	141	84,232	525,524	16.0%
Rubber, plastic, glass, non-metallic mineral products	271	58,587	597,659	9.8%
Basic metals and metal products	431	82,051	1,067,512	7.7%
Computer, electronic and optical products	120	19,920	415,809	4.8%
Electrical equipment	166	47,499	354,330	13.4%
Machinery	401	140,591	1,045,778	13.4%
Motor vehicles	81	466,857	906,571	51.5%
Manufacturing of other products	101	97,602	723,759	13.5%
Electricity, water, waste management	55	7,808	516,550	1.5%
<i>Construction</i>	2,754	83,526	550,652	15.2%
<i>Trade</i>	1,651	351,517	4,013,504	8.8%
Motor vehicles	104	5,344	313,270	1.7%
Wholesale trade	812	122,306	1,195,800	10.2%
Retail trade	735	223,867	2,504,434	8.9%
<i>Service sector</i>	2,274	508,034	11,329,199	4.5%
Transportation and storage	216	79,264	1,917,373	4.1%
Accommodation and food service activities	219	9,799	1,026,749	1.0%
Information and Communication	343	210,935	1,241,842	17.0%
Financial and insurance activities	66	14,088	976,730	1.4%
Real estate	71	4,786	297,216	1.6%
Professional, scientific and technical activities	803	101,173	2,406,856	4.2%
Administrative and support service activities	308	74,642	2,317,457	3.2%
Arts, entertainment and recreation	103	4,693	294,955	1.6%
Others	145	8,654	850,021	1.0%

Note: Monthly averages for the year 2021.

Sources: ifo Business Survey; Federal Statistical Office.

Overall, the ifo Business Survey focuses on industries that are particularly cyclical and thus provide good signals for general economic developments. This is especially true for the manufacturing sector. By contrast, other sectors, such as agriculture, public services, finance, or healthcare, are hardly or not at all covered by the surveys. They are characterized less by cyclical than by structural developments. However, information from surveys can also be very valuable for less cyclical economic sectors, especially in crisis situations such as the Covid-19 pandemic. For this reason, the ifo Institute aims to further increase the number of participants in areas that have not been so well covered to date. Furthermore, there are plans to include additional sectors, such as finishing trades in the construction sector, that have not so far been part of the survey.

Table 2.28 shows the distribution of companies in the ifo survey by industry in relation to the distribution of companies in Germany as a whole, the number of employees, and gross value added (GVA) for 2021.⁷ It can be seen that the distribution is in part very close to the comparative figures. For example, in manufacturing the number of firms is relatively overrepresented in the ifo survey, but also relatively close to the values of the GVA and the number of employees. In the trade sector this is to some extent reversed: The number of companies is relatively well represented and the GVA is slightly underrepresented.

Table 2.28: Distribution of the survey participants compared to the population in Germany

	ifo Business Survey Count	Distribution of German firms by		
		Count	Employees	Value Added
Manufacturing	32.6	8.2	26.2	34.5
Electricity, water, waste management	0.9	3.2	2.2	4.7
Construction	11.9	14.6	8.4	6.9
Trade	26.9	22.3	20.9	17.6
Transportation and storage	3.5	4.1	7.5	6.1
Accommodation and food service activities	3.6	9.2	8.0	2.8
Information and Communication	5.1	4.9	4.8	7.2
Real estate	1.2	6.2	1.8	3.8
Professional, scientific and technical activities	11.0	18.9	8.8	9.1
Administrative and support service activities	3.2	8.4	11.3	7.3

Note: Monthly averages for the year 2021.

Sources: ifo Business Survey; Federal Statistical Office.

2.7.3 Coverage by Firm Size

Table 2.29 shows the shares of participants in the panel of the ifo Business Survey by company size compared to all German companies.⁸

⁷ The percentage distribution of companies differs somewhat from that in Table 2.27 because it counts the number of companies, rather than the number of responses.

⁸ The official figures are provided by the Federal Statistical Office in the statistics for small and medium-sized enterprises (code 48121). The data here is limited to the manufacturing, energy, water, and waste disposal sectors,

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Table 2.29: Distribution of the ifo Business Survey panel by industry and size

	small	medium	large
Manufacturing	12.7	12.2	7.8
Electricity, water, waste management	0.5	0.3	0.1
Construction	6.4	4.5	1.0
Trade	18.5	6.5	1.9
Transportation and storage	1.8	1.2	0.6
Accommodation and food service activities	2.5	1.0	0.1
Information and Communication	3.3	1.5	0.4
Real estate	0.8	0.3	0.1
Professional, scientific and technical activities	8.3	2.2	0.4
Administrative and support service activities	1.8	1.0	0.4
Total	56.6	30.8	12.6
Distribution of German firms by			
Count	96.8	2.6	0.6
Employees	39.7	16.6	43.7
Value Added	26.4	15.7	58.0

Notes: Definition of size classes: small = 1-49 employees, medium = 50-249 employees, large = 250+ employees, shares in %. Monthly averages for the year 2021.

Sources: ifo Business Survey; Federal Statistical Office.

It can be seen that the distribution in the ifo Panel is between the actual distribution in the overall population and the weighted distributions according to the number of employees and gross value added, so that even without weighting a very good picture of the German economy emerges. This is an excellent compromise, since an enormous number of small companies would be needed for an exact representation of the size class distribution. The focus of the panel composition was more on achieving the greatest possible coverage of gross value added and workforce in the overall economy, as well as in the various sectors of the economy. Since gross value added tends to increase with company size, the focus is usually more on large and medium-sized companies. As a result, self-employed persons and micro-enterprises account for a smaller share in the panel of the ifo Business Survey than in the overall economy. They are generally not considered a driving force for overall economic developments. However, in order to provide even more in-depth results for this group in the future, which can be of great interest especially in times of crisis, the ifo Institute is currently systematically expanding the number of participating micro-enterprises and self-employed

as well as construction, trade, accommodation, and food services, and business-related service providers.

persons (Section 4.3). In conclusion, however, it can be emphasized that at the sector level sufficient numbers of survey participants are already available for all company size classes.

2.7.4 Regional Numbers of Participants

A further essential property of the panel is the regional distribution of the participating companies. To obtain a picture of the entire German economy, it is important that all regions are sufficiently represented in the sample. Table 2.30 shows the average monthly number of participants in 2021 for all 16 German federal states. It illustrates that the regional distribution of companies in the panel is relatively close to the distribution of all companies within Germany. German states with a high share of Germany's gross domestic product, such as Bavaria, North Rhine-Westphalia, and Baden-Wurttemberg, are also most strongly represented in the business surveys.

A sufficiently large number of participants in all sectors even makes it possible to calculate business cycle indicators at the federal state level (Lehmann et al. 2019, 2022). Thus, monthly results are calculated for the states of Baden-Wurttemberg, Bavaria, Hesse, Lower Saxony, North Rhine-Westphalia and Saxony (for more information see Section 4.1).

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Table 2.30: Monthly participants in the ifo Business Survey by regions and survey areas

	Total	Manufacturing	Construction	Trade	Service sector	Share in panel	Share in Germany	GDP share
Bavaria	1841	405	612	349	475	21.0%	18.8%	18.5%
Northrhine-Westphalia	1776	477	466	354	479	20.2%	20.2%	20.5%
Baden-Wurttemberg	1227	386	333	213	295	14.0%	13.7%	15.0%
Lower Saxony	751	154	281	158	158	8.5%	8.7%	8.8%
Hesse	569	131	122	124	192	6.5%	7.6%	8.5%
Saxony	487	141	189	53	104	5.5%	4.4%	3.8%
Thuringia	362	116	156	42	48	4.1%	2.2%	1.8%
Rhineland Palatinate	306	63	108	67	68	3.5%	4.7%	4.5%
Schleswig Holstein	293	44	116	63	70	3.3%	3.6%	3.0%
Saxony-Anhalt	240	58	99	46	37	2.7%	1.9%	1.9%
Brandenburg	207	49	65	47	46	2.4%	2.8%	2.2%
Hamburg	206	16	28	41	121	2.3%	2.8%	3.5%
Mecklenburg Western Pomerania	179	28	90	20	41	2.0%	1.7%	1.4%
Berlin	173	15	41	19	98	2.0%	5.0%	4.6%
Saarland	94	14	25	38	17	1.1%	1.0%	1.0%
Bremen	73	8	23	17	25	0.8%	0.7%	1.0%

Notes: All figures refer to year 2021.

Sources: ifo Business Survey; Federal Statistical Office.

2.7.5 Conclusion and Outlook

In summary, various criteria apply for the representativeness of a panel for business surveys. Compiling the panel of the ifo Business Survey, all these criteria were taken into consideration, including good representativeness both for the calculation of business cycle indicators and for economic analyses at the level of the anonymized microdata.

Nevertheless, the ifo Institute is striving for a continuous expansion of the survey panel. The panel will be increased in the economic sectors already covered, and sectors that are not yet covered will be added. The panel with self-employed persons and microenterprises will also be expanded, enabling even greater in-depth analyses in the future.

Besides the representativeness of the panel, it is also very important that competent person(s) within the participating companies fill out the questionnaire. They should be at the top of the companies' hierarchy and therefore have all the information they need to answer the questions at any given time. The next chapter shows that the participants at the ifo Business Survey also fulfill this requirement.

2.8 The Mood from the Boardroom – Who answers the Questionnaires of the ifo Business Survey?

JONAS HENNREICH, STEFAN SAUER, KLAUS WOHLRABE

To be able to draw meaningful and reliable conclusions about the German economy and its various sectors, the survey results of the ifo Business Survey must meet several criteria. Among other things, the questions posed must ask for suitable variables and be formulated in a neutral and comprehensible way. In addition, the panel of participating companies must be large enough and roughly reflect the actual structure of the German economy in terms of economic sectors, regions, and company sizes. This must be the case to avoid distortions in the results. Section 2.7 shows that the ifo Business Survey meets these conditions and that the panel is representative of the German economy.

The person(s) within a firm answering the questionnaire play another crucial role. They should be in a position in the company hierarchy that makes it possible for them to access the relevant information and data for answering all questions without much effort. It is also important for research based on microdata that the decision-makers in the companies answer the questions. Current scientific analyses using the microdata of the ifo Business Survey are for example Link et al. (2023) and Dovern et al. (2023a).

The media coverage of the ifo Business Climate Index for Germany frequently refers to the mood in German boardrooms or the mood in the German economy in general. The ifo Institute has also used this formulation in its press releases (ifo Institute 2023). This section answers whether this formulation is accurate by examining who fills in the questionnaires of the monthly ifo Business Survey.

Sauer and Wohlrabe (2019) already showed that 77.3% of the responses at the end of the year 2018 came directly from the management of the participating companies and that more than 80% of the respondents were owners, CEOs, authorized officers, or board members. The ifo Institute is making great efforts to expand the panel of participants. Therefore, since 2018, especially a lot of small enterprises and self-employed workers have been added (Sauer and Wohlrabe 2022b). For this reason, a supplementary question was asked again in May 2023 to get information on the department and position of the persons completing the survey. This was done to identify any changes in the results obtained at the study from 2019. The exact questions were as follows:

1. In which area of your company / operation is the questionnaire for the ifo Business Surveys usually filled out?

- Management

- Finance / Controlling / Accounting
- Sales / Marketing
- Production⁹
- other, namely: _____

2. Which designation mostly corresponds to the position of the person usually filling in?

- Owner
- CEO / Authorized Officer / Board member
- Head of Department
- Team Leader
- Clerk
- other, namely: _____

When evaluating these questions, no weighting of the responses by firm size was applied. In addition, the responses of self-employed workers were not considered. Table 2.31 shows the distribution of responses by department of the persons completing the survey. Clearly the largest share of answers comes from management (79.8%). This share is even slightly higher than in 2018, which means that most questionnaires are still answered at the company management level. In trade (87.9%) and in service (85.0%) the values are even higher, while in manufacturing (70.8%) and in construction (75.2%) they are somewhat below the total value. With 14.7%, the second highest number of responses originate from the areas of finance, controlling, and accounting, perhaps explained by the fact that employees in these areas generally have easy access to the information they need to answer the survey. In these areas, the response rate in manufacturing (19.8%) and construction (21.3%) is higher than in trade (8.9%) and the service sector (11.2%). In some major industries like mechanical engineering, car manufacturing, and electrical engineering, a quarter of the answers come from this area. The shares of responses from the departments of sales and marketing (3.0%), production (0.4%), and other departments (2.0%) are comparatively low.

Table 2.31: Distribution of responses by department

	Total	Manufacturing	Construction	Trade	Service
Management	79.8%	70.8%	75.2%	87.9%	85.0%
Finance / Controlling / Accounting	14.7%	19.8%	21.3%	8.9%	11.2%
Sales / Marketing	3.0%	6.3%	0.7%	2.0%	1.3%
Production	0.4%	1.1%	0.5%	0.0%	0.0%
Other	2.0%	2.0%	2.3%	1.2%	2.5%

⁹ The production category was only offered for selection in the manufacturing and construction sector. The category was omitted in the trade sector and in the service sector.

2 The ifo Business Survey

In addition, the supplementary question examines which position the person completing the survey has within the company (Table 2.32). It is evident that the questionnaire is predominantly filled out by the owner of the company. It is also apparent that owners represent the largest share of respondents in each economic sector. This is especially the case in the service sector (57.4%), trade (63.4%), and retail which stands out with an owner share of 72%. In manufacturing the reports almost equally often originate from the owner as well as from the management level (40%). The second highest number of responses come from CEOs, authorized officers, or board members. Taking these two categories together as the company management level, we arrive at a share of around 86%. For the remaining responses, heads of department (6.7%), team leaders (1.3%), clerks (4.2%), or workers in other positions (2.1%) are responsible.

Table 2.32: Distribution of responses by position

	Total	Manufacturing	Construction	Trade	Service
Owner	51.9%	40.3%	46.6%	63.4%	57.4%
CEO / Authorized Officer / Board Member	33.8%	40.0%	33.4%	28.6%	31.5%
Head of Department	6.7%	9.9%	7.0%	4.0%	5.1%
Team Leader	1.3%	2.0%	1.7%	0.6%	1.1%
Clerk	4.2%	5.5%	9.1%	1.9%	2.7%
Other	2.1%	2.3%	2.2%	1.6%	2.3%

Differences become evident as soon as a distinction according to size classes is made (Figure 2.31)¹⁰. Owners of large enterprises answer the questionnaires significantly less often (27.0%) than their counterparts at small and medium-sized enterprises (SMEs) with 57.6%. Accordingly, at large companies CEOs, authorized officers, or board members provide the responses more frequently (46.4%) than at SMEs (30.9%). When aggregated to the entire management level, it is consequently less likely that the answers come from executives at large companies (73.4%) than at small and medium-sized companies (88.5%). Instead, at large companies it is more likely that department heads or team leaders fill in the questionnaire (15.4%) than at SMEs (6.3%). This can be partly explained by the fact that the ifo Business Survey is conducted at the product level of the companies. This means that a large company with multiple divisions or locations may submit multiple reports. For these branches of the company, department heads or team leaders are more likely to fill in the questionnaire.

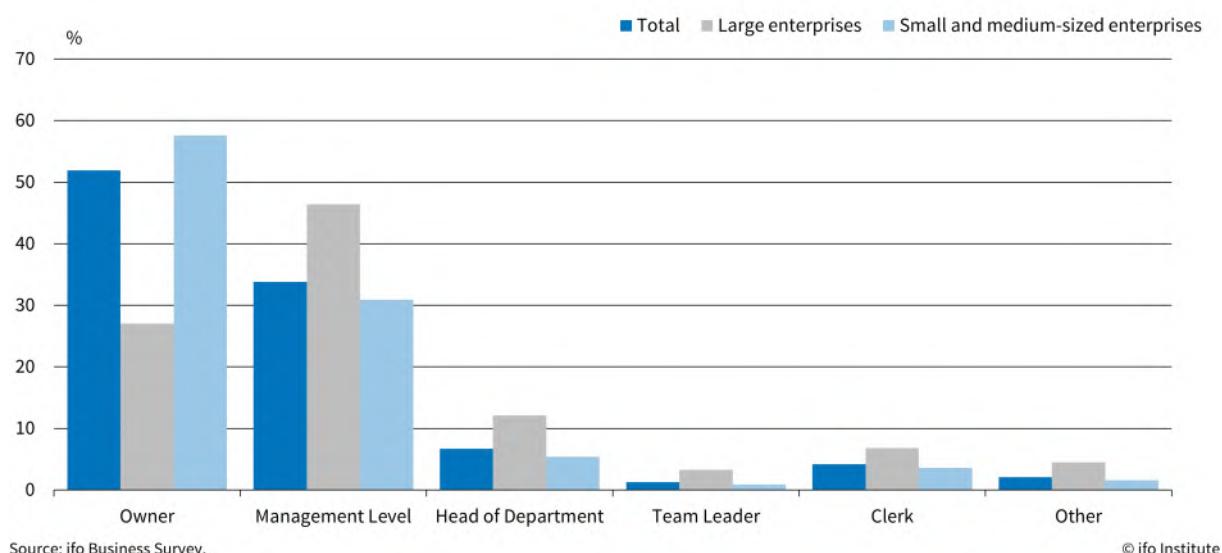
About three-quarters of the companies participating in the ifo Business Survey describe themselves as family businesses. The results of the supplementary question show that for

¹⁰ Depending on the economic sector, the distinction between large enterprises and small and medium-sized enterprises is based on characteristics surveyed annually as part of the ifo Business Survey. Accordingly, large enterprises are enterprises with: manufacturing: > 500 employees; construction: > 200 employees; trade and service: > €25 m annual sales (Borger and Sauer 2019).

these businesses, mainly the owners respond (61.4%), since they are usually much more involved in operations in these contexts. This share is noticeably higher than for non-family businesses from which there are more responses from CEOs, authorized officers, and board members (43.1% vs. 28.1% owners).

Overall, it can be stated that mainly people from the top management of the participating companies answer the questionnaires of the ifo Business Survey. This applies across all economic sectors. Compared with previous results from 2018, the results of the supplementary question from May 2023 even show a slight increase in the response rate from the management level. This means that an important prerequisite for reliable responses that can be aggregated into valid economic indicators has been met, and that the description of the mood from the boardrooms is in fact appropriate.

Figure 2.31: Distribution of responses by size classes



3 The ifo Business Climate Index for Germany and its Applications

3.1 The ifo Business Climate Index for Germany

KLAUS WOHLRABE

3.1.1 Concept and Calculation

The ifo Business Climate Index for Germany consists of two components: the assessment of business situation and the business expectations for the next six months.¹ It is thus a combination of a status quo (situation) with an ex-ante variable (expectations). Likewise, a question referring to a level (situation) is linked to a change variable (expectations). The ifo Business Climate Index is thus a simple version of an overall indicator (Oppenländer and Poser 1989a), in which several survey indicators are combined. Its principal intention is to describe the economic development as compactly as possible.

The “business climate” is the geometric mean of the balances of the two sub-indicators “business situation” and “business expectation”:

$$\text{Business climate} = \sqrt{(Balance \text{ of business situation} + 200)(Balance \text{ of business expectation} + 200)} - 200$$

As the balances statistic ranges between -100 and $+100$, they are initially increased by 200 in order to obtain real values in the root expression. By subtracting 200 at the end, these terms cancel each other out again. The geometric mean leads to a certain smoothing of the extreme values. This may be relevant if the number of observations in certain branches in the survey is rather small. In the main levels of aggregation, the differences between the arithmetic and the geometric mean are minor. The differences usually concern the amplitude, but not the turning points of the time series. Since the individual indicators are collected in all economic sectors in the monthly ifo Business Survey, the business climate is also available for all covered branches.

The ifo Business Climate Index for Germany currently (2023) is composed of the business climate of the “service sector” (weight: 50.5%), “manufacturing industry” (30.2%), “wholesale trade” (7.1%), “retail trade” (6.2%), and “construction industry” (6.0%). The original series are aggregated and then seasonally adjusted and indexed (base year since April 2018 is 2015).²

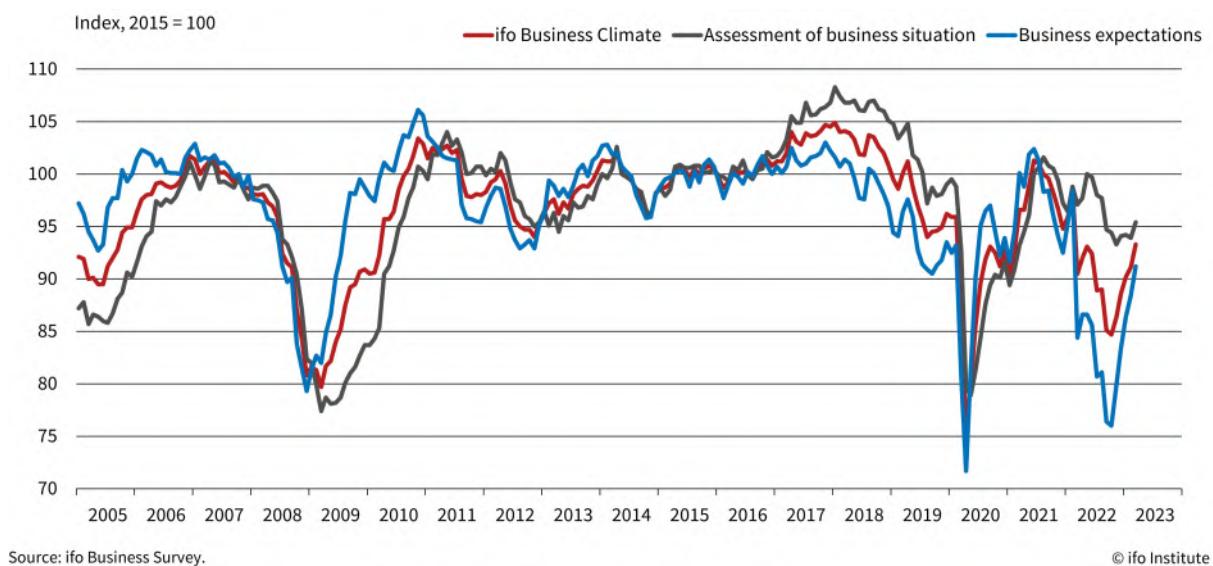
¹ See also the chapters on the individual survey areas and the corresponding questionnaires.

² Before April 2018, the ifo Business Climate Index for Germany’s industrial economy (“Gewerbliche Wirtschaft”)

3 The ifo Business Climate Index for Germany and its Applications

Figure 3.1 shows the ifo Business Climate Index for Germany and its sub-indices from 2005 onwards.³ By definition, the ifo Business Climate Index always lies between the situation index and the expectations index. Between 2014 and 2016, the indices moved very close together, but since 2017 they have diverged. In March 2020, the impact of the Corona crisis is clearly visible: The ifo Business Climate Index reached a historic low.⁴

Figure 3.1: ifo Business Climate Index for Germany and its sub-indices



The ifo Business Climate Index for Germany is published monthly and is one of the most well-known and widely cited indicators for the German economy. It also moves financial markets and provokes immediate price reactions, e.g., for the Euro-Dollar exchange rate or the German DAX (Mittnik et al. 2013a,b). For this reason, the calculation and publication of the ifo Business Climate Index for Germany follows a strict protocol:

- The aggregation of the micro-data and the calculations are carried out on the night of the publication day. The final value is saved on a strictly protected folder.
- Starting at 07:30 a.m., the head of the ifo surveys prepares a draft of the press release.
- From 08:45 to 09:45, the press release is discussed in both German and English by the ifo President, the head of ifo surveys, the head of the ifo business cycle forecasting unit, the press officer, and a translator.
- At 10:00 a.m., the values of the ifo Business Climate Index and its sub-indices are announced via telephone conference. Only news agencies accredited with the European

was published. This indicator did not include the service sector and the base year was 2005. See Sauer and Wohlrabe (2018a) for more information.

³ Values before 2005 are not available because the results of the service sector are only published from that year onwards.

⁴ For analyses concerning the impact of Corona on the survey results see Sauer and Wohlrabe (2020b), Litsche et al. (2020), or Sauer and Wohlrabe (2020c).

Central Bank may participate. They publish the values directly on their own news tickers. The ifo Business Climate Index for Germany is now public.

- From 10:00 a.m., information packages with the new values are sent to customers and the press. The index is published on the ifo website at 10:30 a.m.

Adherence to this protocol ensures that the ifo Business Climate Index for Germany is only accessible to a small circle of ifo employees before it is published.

3.1.2 The ifo Business Climate Index for Germany and the German Economy

The success and popularity of the ifo Business Climate Index for Germany can be explained by its high level of correlation with the German economic development. The ifo Business Climate Index has also been a component of a multiplicity of scientific investigations. Abberger and Wohlrabe (2006), Seiler and Wohlrabe (2013b), and have more recently Lehmann (2023b) provided extensive studies on its forecasting power.

In the following section, the relationship between the ifo Business Climate Index for Germany and the German (real) Gross Domestic Product (GDP) is illustrated as an example. There is broad agreement among economic analysts that the latter is a suitable, though not perfect, measure of the economic performance of an economy. However, real GDP itself is a so-called non-stationary quantity that follows an undefined, mostly upward trend. By contrast, a “business cycle” is understood to be a stationary process in which GDP fluctuates around the trend over time. Ideally it follows a sinusoidal oscillation. In practice, economic development is often depicted in the form of the rate of change of real GDP, which deviates from the ideal oscillation and is much more uneven.

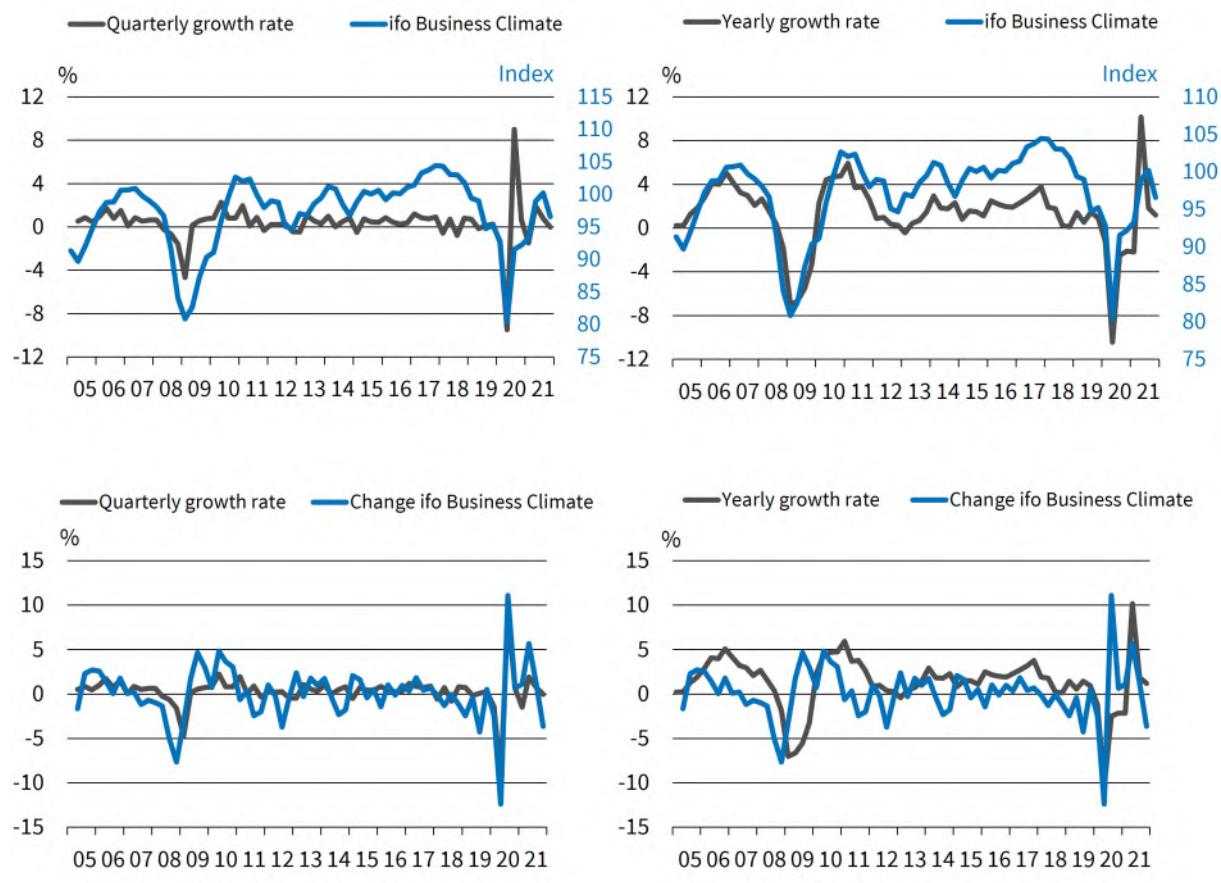
Since the German Federal Statistical Office follows international standards and publishes GDP on a quarterly basis within the framework of national accounts, the focus of economic monitoring is on the rates of change in quarterly data on real GDP. While the graphic illustration of the economy usually shows the rate of change of real GDP against the previous year, the focus of any economic forecast is on the rate of quarterly change. This is calculated as a percentage change over the previous quarter and not – as with the previous year’s rate of change – over the same quarter of the previous year. The advantage of looking at rates of change from the previous year is that they are smoother. This is because the rate of change of the previous year in a given quarter is only approximately calculated as the sum of the four rates of change of the annual period under consideration.

Figure 3.2 shows the ifo Business Climate Index for Germany and the corresponding GDP growth rates.⁵ In addition to the level of the ifo Business Climate Index, first differences are also shown. This can be traced back to Wohlrabe and Wollmershäuser (2017), who show that the previous month’s differences of the ifo Business Climate Index can also be a very

⁵ In order to get a quarterly value for the ifo Business Climate Index, quarterly averages were calculated.

3 The ifo Business Climate Index for Germany and its Applications

Figure 3.2: Real gross domestic product and ifo Business Climate Index



Source: ifo Business Survey; Federal Statistical Office.

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good indicator. In general, Figure 3.2 shows a moderate to good lead time and synchronous development of the ifo Business Climate Index compared to GDP. The quarterly GDP growth rate is noticeably more erratic than the corresponding annual rate of change and thus more difficult to forecast. The graphical comparison should be supplemented by a correlation analysis. Table 3.1 shows the corresponding coefficients with a lead time of up to four quarters. It turns out that the ifo Business Climate Index is a good predictor of the quarterly growth rate. This is especially true for the first difference of the Business Climate Index: The synchronous development turns into a lead when the intra-quarterly information of the Business Climate Index is used. Additionally, the first estimate of GDP is released about five weeks after the end of the quarter. The correlation is even more pronounced when the annual growth rate of GDP is considered. In this case, the rate of change has a lead of about three quarters. All in all, the ifo Business Climate Index is confirmed to be an excellent indicator for the German economy.

3 The ifo Business Climate Index for Germany and its Applications

Table 3.1: Cross-correlations between ifo Business Climate Index and the real GDP

ifo Business Climate	GDP Growth Rate	Lead in Quarters				Current Quarter
		-4	-3	-2	-1	
Level	Quarterly	-0.232	-0.059	-0.033	-0.031	0.396
First Difference	Quarterly	-0.067	0.307	0.054	0.008	0.748
Level	Yearly	-0.207	0.179	0.402	0.590	0.772
First Difference	Yearly	0.191	0.687	0.394	0.321	0.312

3.2 Turning Points and the ifo Business Cycle Traffic Light

KLAUS ABBERGER, WOLFGANG NIERHAUS

3.2.1 Problem Outline

Experience shows that it is particularly difficult to foresee cyclical turning points, i.e., changes in the direction of economic development. Vital for such predictions are leading indicators, where the directional change of a leading indicator serves as a signal for a pending change in the economic regime (here: “*expansion*” or “*contraction*”) and thus for a turning point.

However, in order to avoid generating too many turning point signals, not every change in direction of a leading indicator is considered a sufficiently valid signal. In many cases, *rule-based decision criteria* are used to classify the empirically observed changes in direction. According to the well-known “*three times rule*”, for example, an economic turning point is only signaled when a leading indicator has indicated a new direction *three times in succession* (Nierhaus and Abberger 2014, Vaccara and Zarnowitz 1978). Alternatively, the numerical extent of the change in direction of an indicator can also serve as a decision criterion: If the change in the indicator is sufficiently large, this criterion signals a cyclical turning point from one economic regime to another. *Markov switching models (MS models)* can provide important information for this non-trivial decision, since they enable the translation of changes of a leading indicator into real-time probabilities for economic regimes (Hamilton 1989). For example, if an economy is in an expansion phase, a current decline in the leading indicator may still be within the usual fluctuation range and therefore be in line with the expansion phase. However, it could also be big enough to signal an imminent regime change towards a contractionary phase. MS models are designed to help with this decision.

In the following sections, the leading behavior of the ifo Business Climate Index at turning points in the German economy on a quarterly basis is first discussed. Subsequently, the monthly ifo Business Climate Index is modelled using an MS model.

3.2.2 Real GDP and ifo Business Climate Index

As early as the 1960s, the ifo Business Climate was defined as the geometric mean of the balances of the two survey components “business situation” and “business expectations for the next six months”. The starting point for the approach of combining information on the current situation and the business outlook into a common aggregate was the assessment that neither variable alone adequately reflects the cyclical situation (Strigel 1971). This is because the assessment of the current situation should be supplemented by the companies’ expectations of future developments in order to correctly capture the cyclical forces. Conversely, every observation of the business expectations should be enhanced by an assessment of the current

situation.

For the statistical assessment of the leading characteristics of the ifo Business Climate at cyclical turning points, a reference series from official statistics must be selected. The cyclical component of the quarterly-, seasonally-, and calendar-adjusted real gross domestic product (GDP) is used as a macroeconomic reference series.⁶ The gross domestic product is the most comprehensive aggregated measure of the economic performance of an economy. To adjust for trends in seasonally adjusted real GDP, the Hodrick-Prescott filter was used with the parameter value $\lambda = 1600$, as is customary for quarterly data. The remaining irregularities in the series were eliminated by additional HP filtering with the parameter value $\lambda = 1$. The HP filter is thus used as a bandpass filter (Artis et al. 2003).

The analysis of the turning point signals from the ifo Business Climate Index is based on the seasonally- and calendar-adjusted time series published by the ifo Institute. It is therefore not a so-called real-time analysis, in which the data published at the respective points in time are used. Although the survey results of the ifo Business Survey are not usually revised, statistical adjustment for seasonal patterns can lead to subsequent changes in the seasonally-adjusted time series. However, in the Census X-13ARIMA-SEATS procedure used by the ifo Institute, the revisions are usually minor (Sauer and Wohlrabe 2015). Therefore, in the following procedure, one vintage of the ifo Business Climate Index is used. The real-time conditions mentioned in the following sections should therefore be understood in the sense of pseudo-real time.

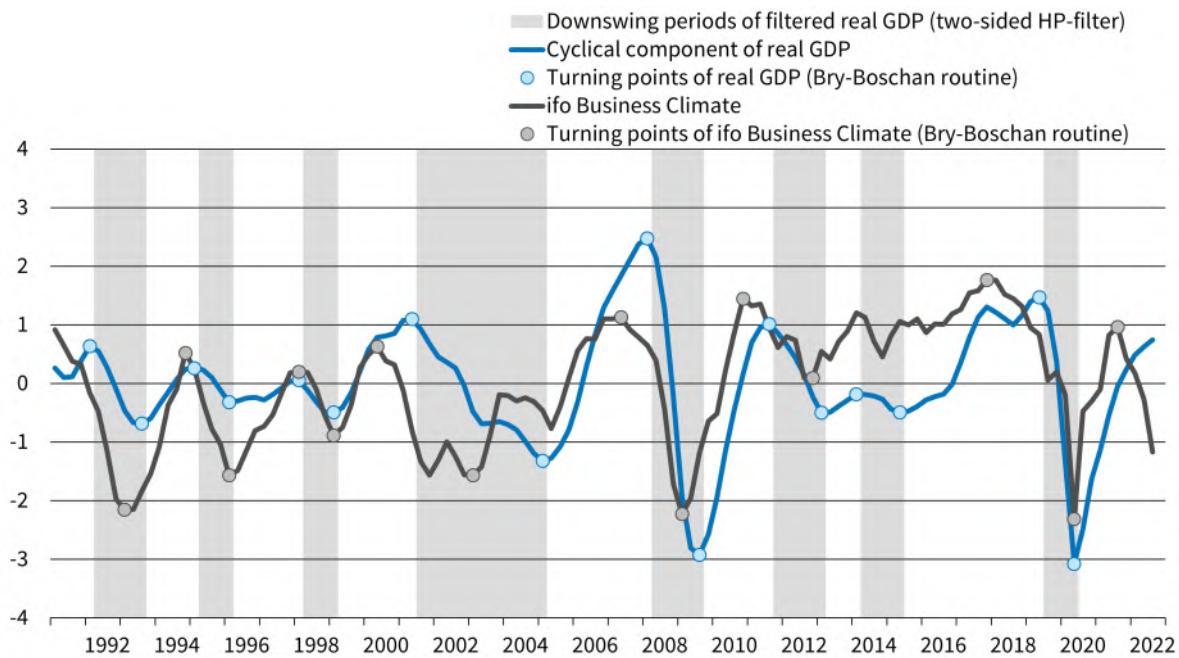
In order to assess the turning point signals of the ifo Business Climate Index, historical turning points of the filtered real GDP must be dated. In Germany, unlike in the US, for example, there is no official cycle-dating. The chronological dating of economic turning points is therefore carried out here using the Bry-Boschan method (Bry and Boschan 1971). This algorithm determines the turning points of a time series following a sequential decision process and delivers intersubjectively comparable and therefore verifiable results.

The grey areas in Figure 3.3 mark the Bry-Boschan (BB) dated contract phases of the filtered quarterly real GDP. According to the BB procedure, there are a total of eight contraction phases in the period 1991 to 2022. A contraction phase averages 6.3 quarters (time span from the upper turning point to the subsequent lower); an expansion phase (time span from the lower turning point to the subsequent upper) averages 9.0 quarters. The periods between two consecutive upper/lower turning points average 15.5 quarters each.

⁶ The usual transformation of GDP into rates of change over the previous year (year-on-year growth) is omitted here. Comparisons with year-on-year growth are the result of asymmetrical filtering and therefore phase-shifted. The phase-shift increases with the period of oscillation of the movement components. If the cyclical dynamics have a relatively high share in the variance of a series, the average phase-shift can reach several months (e.g., for a series with a cyclical oscillation period of 48 months, the phase-shift is exactly 6 months). The asymmetrical filtering shifts the transformed GDP series and its cyclical turning points backwards on the time axis, thus masking the actual leading behavior of the ifo Business Climate Index for the growth cycle. In this case, the lead time ifo Business Climate Index's lead time can be restored by transforming it to year-on-year growth rates and thus passing it through the same asymmetric filter as GDP (Goldrian 2005).

3 The ifo Business Climate Index for Germany and its Applications

Figure 3.3: Turning points of the German Business Cycle, ifo Business Climate Germany and cyclical component of real GDP (two-sided HP-filter), standardized values



^aManufacturing, service sector, trade and construction. For 1991 - 2004: Manufacturing, trade and construction.
Seasonally adjusted with Census X-13ARIMA-SEATS.

Source: Federal Statistical Office; ifo Business Survey; representation of the authors.

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Figure 3.3 shows that the seasonally adjusted ifo Business Climate Index, aggregated to quarterly averages, correlates with the cyclical component of seasonally adjusted real GDP. Calculated over all data points, the closest correlation (0.59, measured at the maximum of the cross-correlation function) of the ifo Business Climate Index is found for a lead time of two quarters. In addition, it is clear that the ifo Business Climate Index is able to signal almost all turning points of the filtered real GDP at least coincidentally or – and this is true in the vast majority of cases – with a lead time (an exception is the extra cycle of real GDP between 2013 and 2015). For the economic analysis, it is also important that the statistical lead time of the ifo Business Climate Index is extended by a technical lead time due to the different publication dates: The ifo results for the respective past quarter are published two months before the official GDP data. Furthermore, they are not subject to larger revisions. For the first publications of GDP by the Federal Statistical Office, the official data basis is still incomplete. The results will therefore be revised several times.

3.2.3 Markov Switching and the ifo Business Climate Index

The early detection of turning points is particularly important for business cycle analysis. The estimation results of Markov switching models can provide important information for

this purpose. In this model class, the parameters depend on stochastic regime variables. A linear model becomes more flexible with this approach because the parameters can take on different values depending on the regime in which the time series is located. Thus, it can be considered that the dynamics vary over time. In the following section, the first differences of the seasonally adjusted ifo Business Climate Index are modelled using a Markov switching approach (Abberger and Nierhaus 2008b, Abberger and Nierhaus 2010).

The first differences $\Delta y_t = y_t - y_{t-1}$ of the ifo Business Climate Index are modelled depending on an unobservable state variable s_t which is called state or regime at time ($t = 1, \dots, T$; time variable). The modelling of the first differences implies that the change of the ifo Business Climate Index is considered. The aim is to assess whether a movement of the index indicates a change of regime or whether it is still in line with the previous regime. If the economy is in an expansion phase, for example, a falling ifo Business Climate Index may still be within the usual fluctuation range and therefore be in line with the previous regime. However, it can also already indicate a regime change. The MS model is designed to help with precisely this assessment.

In the present study, the number of regimes is limited to two. For $s_t = 1$ state 1 applies (on average, increasing climate), which is here equated with “expansion”, for $s_t = 2$ state 2 applies (on average, decreasing climate; “contraction”). The probability with which the regime changes (or persists) from one period to another is, according to the assumption, time-invariant and depends only on the state of the previous period s_{t-1} (Markov assumption):

$$p(s_t = j \mid s_{t-1} = i) = p_{i,j}, i, j = 1, 2$$

In a Markov process with two states there are a total of four transition probabilities. For this, $p_{11} + p_{12} = p_{22} + p_{21} = 1$. The state variable s_t thus follows a first-order Markov process. The distribution of Δy_t (at given state i) is determined by density function:

$$f(\Delta y_t \mid s_t = i, \mu_i, \sigma^2) = \frac{1}{(2\pi\sigma^2)^{\frac{1}{2}}} e^{-\frac{(\Delta y_t - \mu_i)^2}{2\sigma^2}}$$

i.e. Δy_t is normally distributed with state-dependent mean value μ_i and constant⁷ variance σ^2 . For state 1, μ_1 applies, otherwise μ_2 . The symbol θ is used to represent the vector of the total parameters $(p_{11}, p_{22}, \mu_1, \mu_2, \sigma^2)$ of the MS model to be estimated.⁸ The model can be estimated with the maximum likelihood method, whereby numerical optimization procedures are used due to non-linearities (Krolzig 1995). Beside the estimation of θ the MS model also provide estimates for so-called *smoothed regime probabilities* and *filtered regime probabilities*. These two probabilities differ in terms of the amount of information taken into account in the respective estimates.⁹ The smoothed probabilities include the entire amount of information

⁷ The variance can also be modelled in a state dependent manner. This generalization is not necessary, however, for the present application.

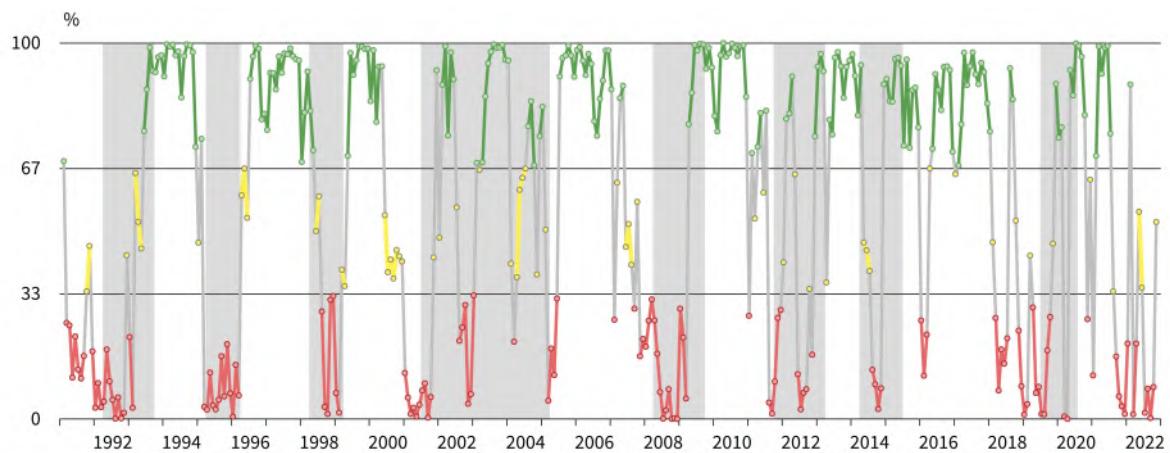
⁸ The unknown probability p_{12} follows from the relationship $1 - p_{11}$, the probability p_{21} from $1 - p_{22}$.

⁹ However, this only applies to the adjustment of the state probabilities. For the estimation of the parameter

3 The ifo Business Climate Index for Germany and its Applications

about the indicator, i.e., the entire time series. Thus, the available subsequent time series values are also used to estimate this probability at a certain point in time. In contrast, the filtered probabilities only focus on the amount of information available up to a certain point in time. These filtered probabilities are particularly interesting from a real-time perspective. In this chapter, therefore, the filtered probabilities are used.

Figure 3.4: ifo Business Cycle Traffic Light Germany - monthly probabilities for the expansion phase



^a Manufacturing, service sector, trade and construction. 1991 - 2004: Manufacturing, trade and construction.
^b Green = high, yellow = medium, red = low. Calculated on the basis of monthly movements in the ifo Business Climate Index Germany. Grey areas: Contraction phases of the filtered real GDP (two-sided HP-Filter).

Source: Federal Statistical Office; ifo Business Survey; representation of the authors.

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To simulate real-time conditions as far as possible, the MS model is estimated on a monthly basis. Figure 3.4 presents the filtered monthly regime probabilities for the period 1991 to November 2022 (*ifo Business Cycle Traffic Light Germany*).¹⁰ However, rules still need to be established for the economic classification of the estimated probabilities. A simple symmetrical classification rule is to speak of expansion/contraction whenever the corresponding regime probabilities are over/under 50%. A modified rule is used here: An expansion phase is present if the regime probabilities for this are greater than two thirds. Conversely, a contraction phase is present if the regime probability for this is less than one third. With probabilities between one third and two thirds, a situation of high uncertainty is assumed and no cyclical classification is made. Between January 1991 and November 2022, the ifo Business Cycle Traffic Light signals “expansion” in 51% of cases, “contraction” in 34% of cases and “Indifference” in only 15% of cases. The selectivity with regard to the two economic regimes is therefore considerable. Signals for economic turning points are found where the regime probabilities for the phases of expansion/contraction exceed the two-thirds mark for the first time. With

values μ_i and σ^2 the whole information is used.

¹⁰ For the estimation of the filtered regime probabilities of the quarterly ifo Business Climate Index for the dating of the turning points according to Bry-Boschan, the software tools Grocer (version 1.81) and Scilab (version 6.0.2) were used. Grocer can be obtained from <http://dubois.ensae.net/grocer.html> and is a contribution to the Scilab program package (<http://scilab.org>).

probabilities between one third and two thirds, there is no cyclical classification and thus no turning point signal (Abberger and Nierhaus 2008b, p. 29).

Based on the monthly estimation approach, however, the ifo Business Traffic Light not only identifies the comparatively low-frequency GDP growth cycle, but also shows higher-frequency oscillations up to special economic developments. One example of this is the comparatively volatile development of regime probabilities in the years 2001 to 2005, which can be attributed to the shocks and uncertainties that occurred in a period which includes the 9/11 terrorist attacks in the USA in 2001 and the escalation of the Iraq conflict in 2003.

3.2.4 Conclusion

The ifo Business Climate Index can be modelled using a Markov switching approach. The monthly regime probabilities – shown in the ifo Business Cycle Traffic Light – provide interesting additional information for its interpretation. This is because the movement of the ifo Business Climate Index is converted by the MS model into probabilities for the two economic regimes of expansion and contraction, enabling timely turning-point forecasts for the overall economic situation. For example, the upper turning point of the cyclical component of real GDP in the third quarter of 2011 was diagnosed by the ifo Institute in autumn of the same year (Abberger and Nierhaus 2011a, p. 38). With the early signals provided by the MS model, a small number of false signals can even be accepted. In comparison, the traditional three-times-rule for early detection of turning points, which does not use any cardinal information from the indicator series, and is therefore somewhat more robust, is more conservative and signals economic turning points relatively late. This is because the three-times-rule means that you have to wait three months before a turning point is signaled for the first time. On the contrary, an MS model can set a turning point signal as early as the following month, assuming a correspondingly large change in direction of the indicator series. For this reason, non-linear approaches such as Markov switching models are now standard for forecasting turning points.

3.3 The ifo Business Cycle Clock

KLAUS ABBERGER, WOLFGANG NIERHAUS

3.3.1 Motivation

The purpose of economic indicators is to describe cyclical economic activity as timely and accurately as possible. Economic indicators can be divided into leading, coincident, and lagging indicators according to their temporal relationship with the cycle. The leading indicators are of particular importance for business cycle analysis. A good leading indicator is characterized by the fact that its turning points signal the turning points in the development of the economy early and as clearly as possible (i.e., without false alarms). In addition, the lead time should be stable so that it can be assessed with relative certainty how early the signal from the indicator will occur. Furthermore, the indicator values should be available punctually and not subject to major revisions after publication (Abberger and Wohlrabe 2006).

A particularly reliable leading indicator of economic development in Germany is the ifo Business Climate Index (Abberger and Nierhaus 2007). This is calculated as the geometric mean value of the two components “Business Situation” and “Business Expectations for the coming six months”. The geometric averaging slightly dampens the fluctuations of the ifo Business Climate Index at extreme values compared to arithmetic averaging. The two components regarding the current situation and the business outlook were combined by the ifo Institute to visualize from which economic situation a certain assessment is made. For instance, the anticipation ‘to remain roughly the same’ has a different meaning in a boom phase than in a recession (Goldrian and Strigel 1989).

The ifo Business Climate Index was first published in 1971, but initially only for the manufacturing industry. One year later, the data for all sectors covered by the ifo Business Survey – manufacturing, construction, and wholesale and retail trade – were combined into the overall ifo Business Climate Index for Industry and Trade. This was in response to a diffusion indicator presented two years earlier by the German Council of Economic Experts for the assessment of overall economic development. In 2018, the new ifo Business Climate Index for Germany replaced the previous index. In addition to the manufacturing sector, the construction industry, and wholesale and retail trade, the service sector was integrated in this new index. Furthermore, the base year for the index calculation was adjusted from 2005 to 2015.

The ifo Business Cycle Clock presents a four-quadrant scheme for the cyclical relationship between the business situation and the business expectations. It was first published in spring 1993, although, at that time, the movement of the variables in the scheme was still counter-clockwise due to a different assignment of axes (Nierhaus and Leibfritz 1993). The current clockwise presentation was introduced in 1999 (and then named the ifo Business Cycle Clock).

In this diagram, the business cycle – visualized as a situation-expectation graph – crosses the quadrants labelled “upswing”, “boom”, “downturn” and “recession”, provided that the expectation indicator sufficiently leads the business situation indicator. The names of the quadrants are not to be interpreted as strict classifications of the economic situation. They rather reflect the relationship between the development of the current situation and the expectations for the next months, i.e., the two components of the ifo Business Climate Index.

3.3.2 The Ideal Business Cycle Clock

Business cycles can be defined on the basis of fluctuations of cyclically relevant variables over time. Cycles consist of expansion and contract phases, whereby the individual phases are connected by lower and upper turning points. Figure 3.5 shows an artificial ifo Business Climate Index with its two components – business situation and business expectations – whereby the economic dynamics in the concrete example are generated by a two-year sinusoidal oscillation. The expectation indicator leads the situation indicator by exactly six months; the business climate as an average of the situation and expectations thus has a constant lead time of three months before the business situation.

A complete expansion phase – measured here by the course of the situation indicator – spans from a lower turning point to an upper turning point. After the lower turning point has passed, the business situation improves, but it is still bad on balance (i.e., negative). Only after the zero level is exceeded does the situation become good (i.e., positive) on balance. The two sub-phases are given the placative names “upswing” and “boom”. A contraction phase ranges from an upper turning point to the lower turning point of the business situation. Here, too, two sub-phases can be distinguished and given placative names: “downturn” and “recession”. In a downturn, the situation worsens, but on balance is still good (i.e., positive). In the recession, the business situation is bad on balance (i.e., negative) and deteriorates further. Since the current situation and the expectations indicators are not subject to any trend, all four economic phases are of equal length, i.e., exactly six months for the two-year sine wave assumed here.

The underlying idea of the ifo Business Cycle Clock is to allocate the respective business expectations reported by the respondents to the business situation. The abscissa of the ifo Business Cycle Clock is therefore the situation indicator, and the ordinate the corresponding value of the expectation indicator. The crosshairs of the two zero lines divide the diagram into four quadrants, which – measured against the concrete course of the business situation – mark the four phases: upswing, boom, downturn, and recession (see Figure 3.6) (Abberger and Nierhaus 2008a).

If the companies’ assessments of the current situation and expectations are bad on balance, i.e., negative, the economy is in recession (bottom left quadrant). If the expectation indicator moves into the positive area (with an improving but on balance still negative business situation), one enters the “upswing” phase (upper left quadrant). If the balances of the business

3 The ifo Business Climate Index for Germany and its Applications

Figure 3.5: Business situation, business expectations and business climate in the economic cycle

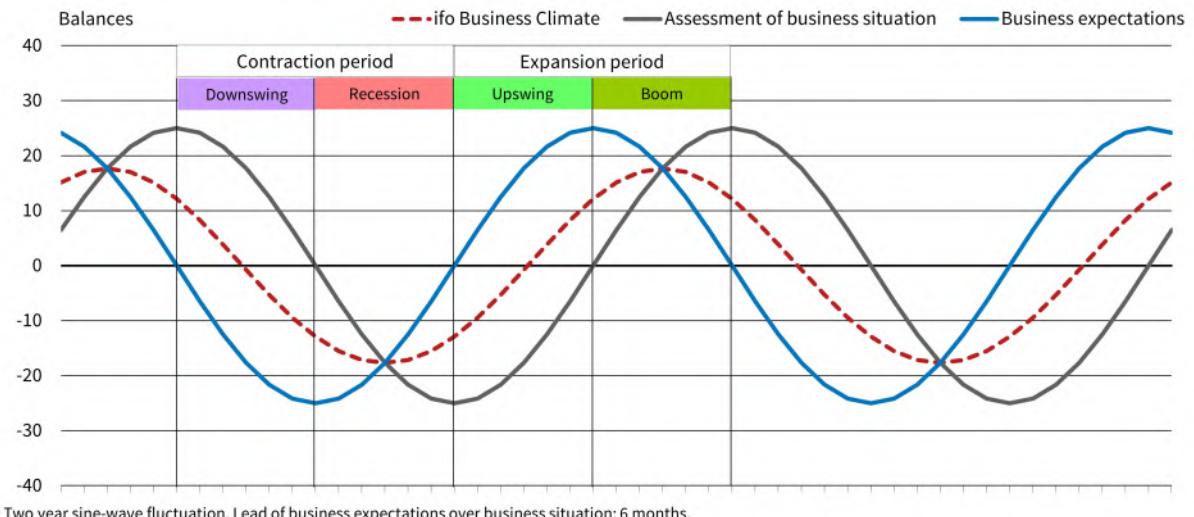
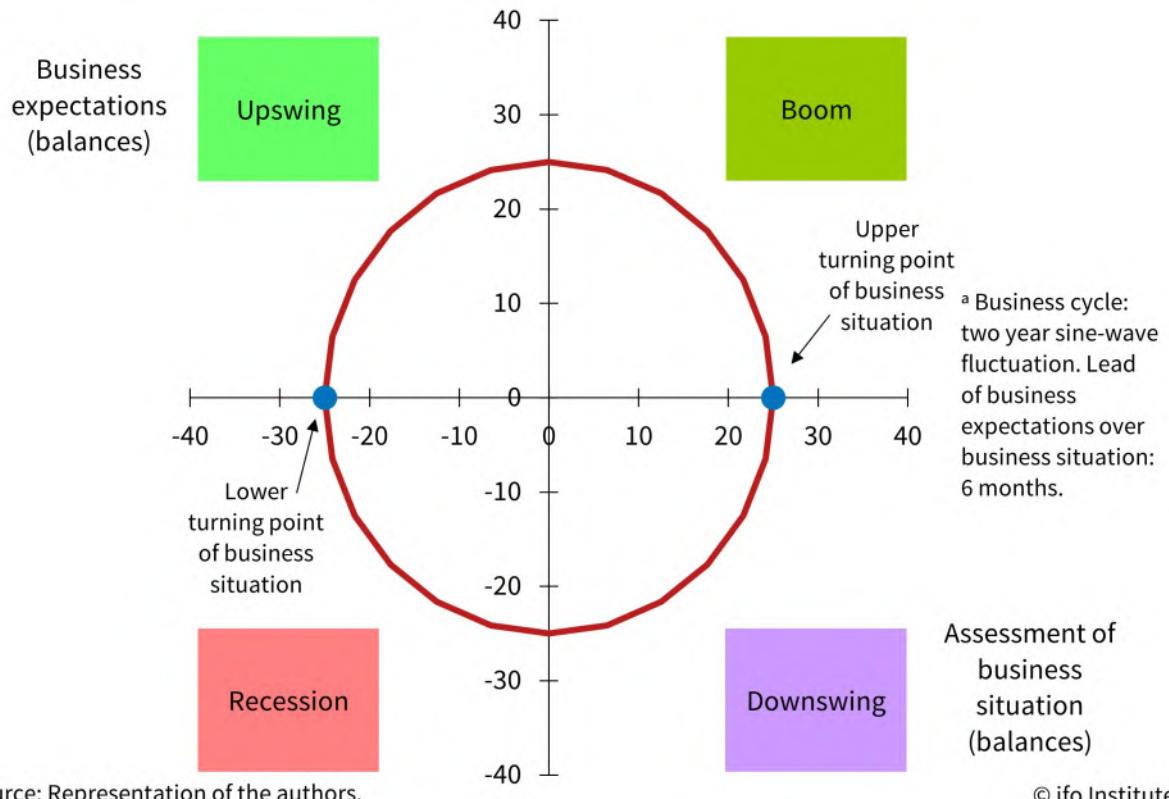


Figure 3.6: Ideal typical ifo Business Cycle Clock



situation and business expectations are both positive, then there is a “boom” (upper right quadrant). If the expectation indicator turns negative (with a deteriorating, but on balance still good business situation), the downturn has begun (lower right quadrant). Because the expectation indicator in the chosen example systematically leads the situation indicator by exactly six months in a two-year business cycle, the economy in this diagram moves clockwise in a circle. The Situation-Expectation-Graph crosses the abscissa of the ifo Business Cycle Clock when the maximum or minimum of the economic situation is reached (upper or lower economic turning point). The ordinate of the clock is crossed when the business situation reaches the zero balance “coming from below” or “coming from above”. All points above the abscissa indicate the economic phase “expansion”; all points below the abscissa indicate the phase “contraction”.

3.3.3 Deviations from the Ideal Typical Pattern

In fact, the interrelationships between the business situation and business expectations are naturally somewhat less stringent than in the case of the ideal-typical representation of the ifo Business Cycle Clock. This is, for example, because short-term irritations in the formation of corporate judgements, misjudgments, asymmetrical response behaviour, etc. can result in unsystematic movements of the situation-expectations graph within and between the individual quadrants of the ifo Business Cycle Clock. These movements mask the actual cyclical movement, and can even amount to a temporary backward trajectory. The latter development pattern always occurs when the expectations indicator temporarily lags the situation indicator.

As far as erratic disturbances in the movement of the clock are concerned, an empirical analysis of the irregular components in both time series shows that these are only minor compared to the smooth component. Using the Census-X-13ARIMA SEATS method for the decomposition of the series, the MCD measure for the situation indicator is two months, and for the particularly smooth expectations indicator only one month. The MCD measure shows from when the average change in smooth components outweighs the irregular movement of a time series. It thus indicates the average waiting time before one can be relatively sure that changes of direction for indicators are due to cyclical factors and not random.¹¹ More serious, however, is the objection that the ifo Business Cycle Clock in the four-quadrant scheme in the above ideal-typical example only moves on an exactly circular path if the lead of the expectation indicator over the situation indicator – as in the example described here – is just a quarter of the length of the cycle. From a mathematical point of view, the circular course results when the two indicators are orthogonal to each other.¹² This is the case in the example presented

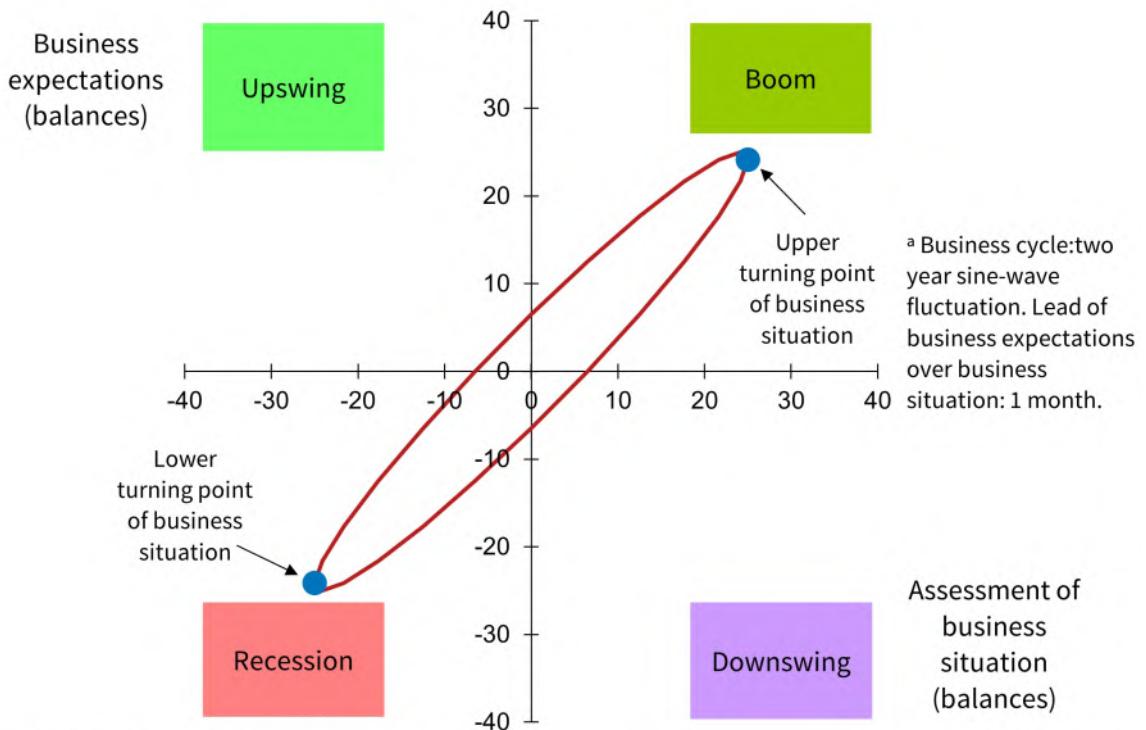
¹¹ The MCD measure (= Months of Cyclical Dominance) was developed by Shiskin in 1957. In calculating the MCD measure, the average changes in the irregular component of a time series are related to the average changes in the smooth component for successively extended time periods θ . The MCD measure indicates the lowest θ for which the average change in the smooth component outweighs the average change in the irregular movements (Abberger and Nierhaus 2009).

¹² Two functions $f(x), g(x)$ are orthogonal in the interval $[a, b]$, if the product $f(x)g(x)$ is a function with integral

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here (in which the situation indicator is modelled by an ideal-typical sinusoidal oscillation) regardless of the length of the cycle, if the expectation indicator is the first derivative of the situation indicator (i.e., the cosine) at any given time.

Figure 3.7: Elliptically distorted economic clock



Source: Representation of the authors.

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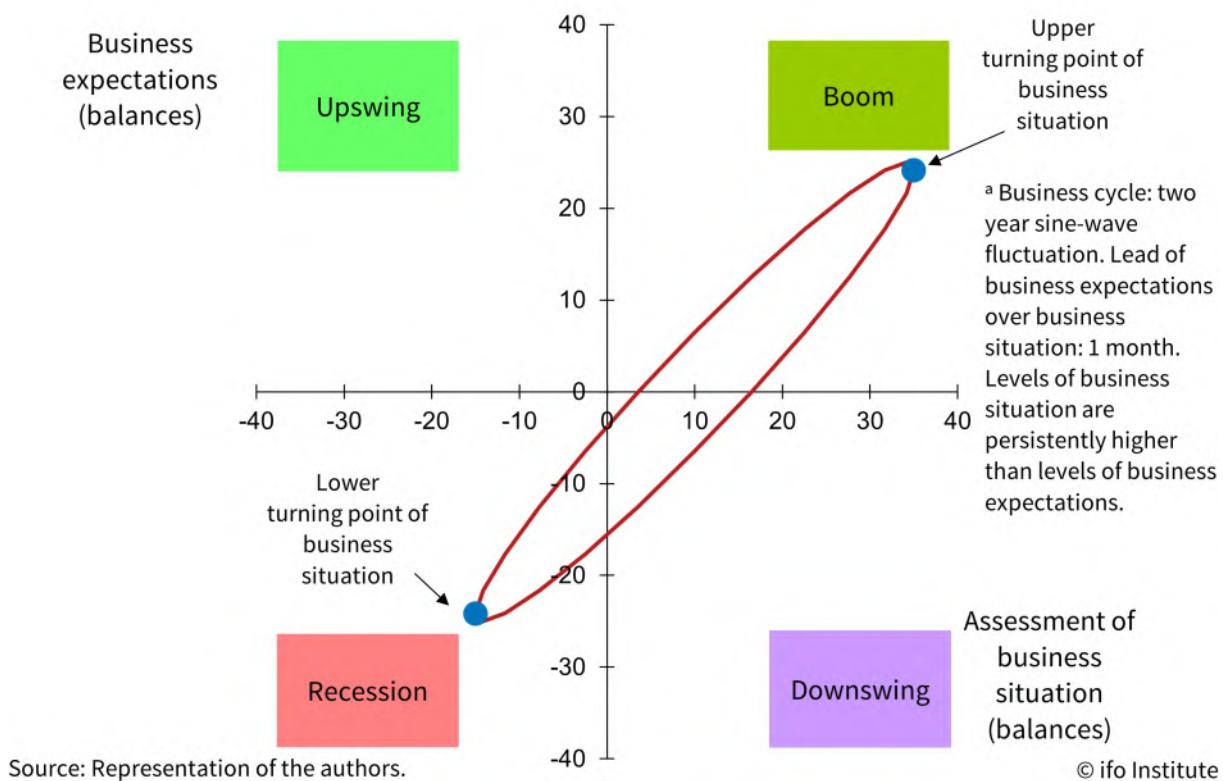
The average length of a business cycle in Germany and other industrialized countries is considerably longer than the two-year period selected here. Thus, the empirically observable lead of the expectations indicator over the situation indicator is not long enough for the two curves to be orthogonal to each other. This distorts the ideally observable circular rotation of the clock to a movement along the main diagonal that connects the boom quadrant with the recession quadrant. Empirical observations in the upswing or downturn quadrant are therefore less frequent than observations in the boom or recession quadrant. Figure 3.7 shows an example of an elliptically distorted business cycle clock in the case of a shortened lead time of one month for the expectations before the situation. In practice, however, this hardly affects the usefulness of the ifo Business Cycle Clock as an analytical tool. Moreover, it is possible to eliminate the distortion of the clock resulting from the violation of the orthogonality condition by an appropriate transformation of the business situations and business expectations with the instrument of principal component analysis (Abberger and Nierhaus 2011b).

zero in the interval $[a, b]$.

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If the situation indicator and the expectations indicator are permanently at different levels, this results in an additional shift of the ifo Business Cycle Clock to the right or left. Figure 3.8 shows an example of a business cycle clock that is shifted to the right and elliptically distorted for the case of a higher balance of the situation assessment compared to the expectations. A possible shift in the ifo Business Cycle Clock can be eliminated by a simple linear variable transformation, i.e., by subtracting the average balance from the respective input series.

Figure 3.8: Shifted elliptically distorted business cycle clock



Another reason for a systematic deviation from the circular course is the different types of the two indicators. While the business situation is surveyed as a level indicator (good/satisfactory/bad), the business expectations are surveyed as a change (more favorable/remain the same/less favorable). Mechanically, this has two effects, which act in opposite directions: The changes that are expressed in the expectations can accumulate in the assessment of the situation. If 100 respondents expect a less favorable situation in one month, and 100 more do so in the following month, it may be consistent that a total of 200 companies will revise their situation downwards in these two months. The fact that not every reported change has to result in an adjustment of the business situation has the contrary effect. For example, a good situation may develop less favorably, but remain good, just less good. Also, a bad situation can become even worse and thus remain bad.

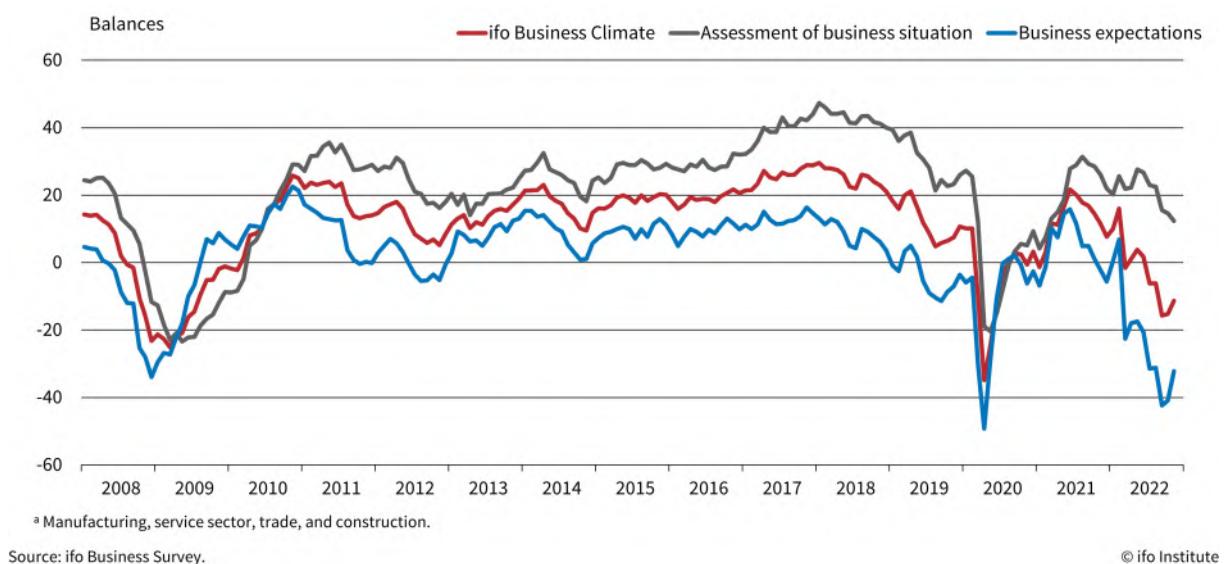
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These considerations show that, conceptually, the situation indicator and the expectation indicator can show different levels of fluctuation. The amplitudes of the indicators may therefore differ. If this characteristic is undesirable in the analysis of the indicators, it can easily be eliminated by standardizing the indicators individually. In addition, the ifo Business Cycle Clock can also degenerate into a straight line. This is the case when expectations have no lead time at all before the assessment of the current situation and the two indicators thus coincide. Finally, the clock may temporarily run backwards. Such a development always occurs when the expectations indicator temporarily lags the situation indicator.

3.3.4 The Empirical ifo Business Cycle Clock

Figure 3.9 presents the two input series of the ifo Business Cycle Clock and the ifo Business Climate Index for the period January 2008 to November 2022.

Figure 3.9: ifo Business Climate Index for Germany



In 2005, an export-driven upswing had begun in Germany, which reached its cyclical peak in the first quarter of 2008. Thereafter, the German economy gradually cooled down in the wake of the recessions in the USA and Japan. In autumn 2008, the German economy also fell into a severe recession. With the collapse of the US investment bank Lehmann Brothers, the financial crisis came to a climax, with production and demand collapsing synchronously in both industrialized and emerging countries worldwide. World trade fell sharply, as did industrial production – in particularly export-dependent economies such as Germany and Japan even at double-digit rates.

The lower economic turning point – measured by the cyclical component of real GDP – was reached in the third quarter of 2009. The upper turning point of the following cycle was reached in the third quarter of 2011, after which the economy cooled down quite significantly.

The ongoing European financial and confidence crisis also affected the domestic German economy for the first time. In the second quarter of 2013, a new, albeit initially modest, long-lasting upswing set in, driven by domestic demand. A strong upturn in employment increased disposable income, stimulating private consumption and boosting retail sales, and an influx of refugees led to a sharp increase in public spending. Meanwhile, the low interest rate policy of the European Central Bank stimulated demand for investment in construction.

Overall, economic output rose at rates that were only slightly above the potential rates, leading to a gradual increase in capacity utilization. Excessively dynamic wage and price increases did not occur, and the upturn was only moderate. However, at the beginning of 2018 the German economy began to cool off, and a split in economic development emerged: The export-oriented manufacturing sector was caught in a severe recession. Economic policies that attempt to change the globalized economic order through isolation, sanctions, and threats increased uncertainty worldwide, cooled industrial activity, and caused world trade to plummet. At the same time, domestic service providers and the construction sector were recording robust and at times strong growth.

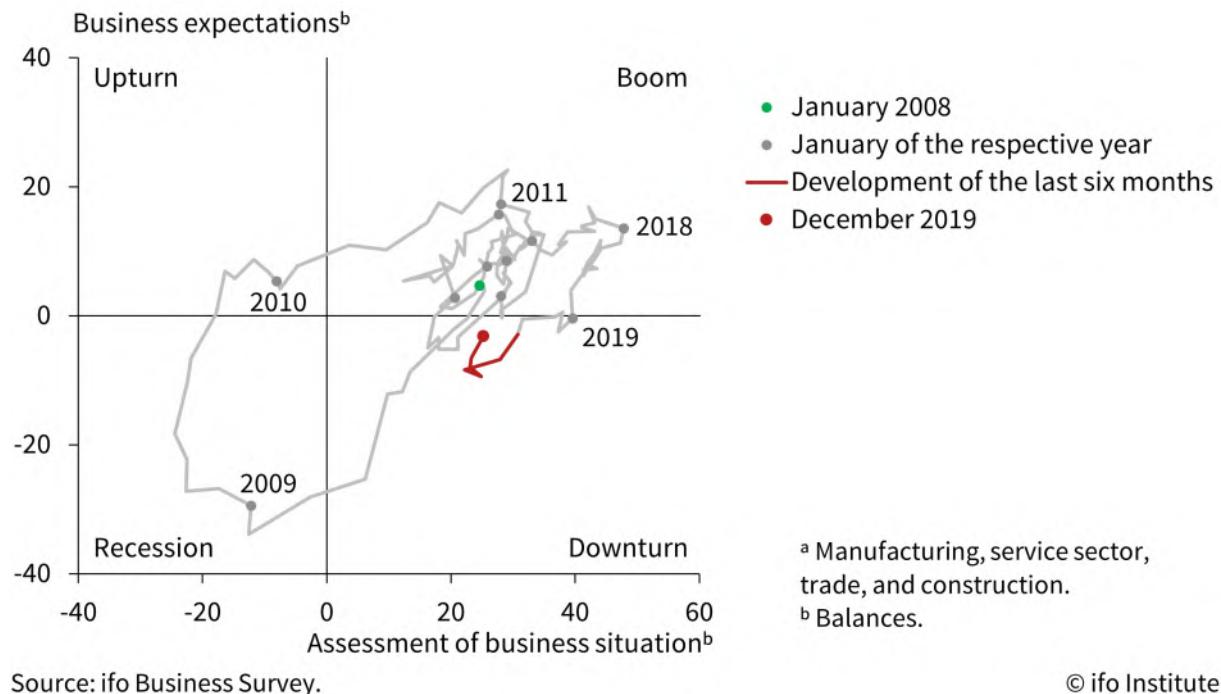
The movement of the ifo Business Cycle Clock was relatively “round” in the period 2008 to 2012. The lead time of the expectation indicator compared to the situation indicator was large enough to generate a largely circular movement of the situation-expectation graph. However, the lead time of the expectations indicator compared to the situation indicator was not large enough to fulfil the orthogonality condition in the strict sense. Therefore, the ideal-typically expected perfectly circular rotation of the clock became elliptical along the main diagonal connecting the boom and recession quadrants. Therefore, data points in the upswing and downturn quadrants were less frequent than data points in the boom and recession quadrants (see Figure 3.10).

From 2013 to the end of 2019, however, no clearly identifiable pattern of movement of the clock was apparent (see Figure 3.10). The main reason for this pronounced anomaly is that during most of this period the strong lead of the expectations indicator over the situation indicator, which is indispensable for the ifo Business Cycle Clock to function, was no longer given. A cross-correlation analysis between the situation and the expectations shows the highest statistical correlation in the years 2011-2016 in the case of a one-month lead (Table 3.2). Both the lead and strength of the correlation declined compared to the period 2005-2010, when the highest correlation is found when the expectations indicator leads the situation by four months (Wohlrabe and Wollmershäuser 2016). Another phenomenon particular to the period 2013 to the end of 2019 is the relatively small cyclical fluctuation from mid-2015 to the end of 2016, when the economic course is almost horizontal. The cyclical signal or the variance of the signal is very small in this phase, and the variance of the indicators is mainly attributable to the irregular component of the indicators.

In such a phase, it is not surprising if there is no pronounced lead time for any of the indicators. Table 3.2 also shows that the cross-correlation decreases considerably from 2011 to 2016.

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Figure 3.10: ifo Business Cycle Clock from 2008 to 2019



Source: ifo Business Survey.

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This is also typical for a phase where the variance of the signal is low. The data for 2017 at least indicate an upward movement in the boom quadrant and for 2018 and 2019 a downward tendency. Though the cross-correlations rise again in this period, there is no considerable lead of the expectations indicator over the situation indicator.

Figure 3.11 presents the ifo Business Cycle Clock for the most recent period January 2020 to October 2022. As a result of the Coronavirus pandemic, in the first half of 2020 the German economy fell into a severe recession, followed by a strong rebound. In 2021, economic activity continued to be damped by the pandemic. In 2022, the war in Ukraine and the extensive policy measures taken in this context slowed economic growth. Soaring energy prices massively reduced purchasing power in Germany, but so far a new recession has been avoided.

The movement of the ifo Business Cycle Clock in this period was relatively “round” again. Due to the shortened cycle length, the lead time of the expectations indicator compared to the situation indicator was long enough to generate the normal circular movement of the situation-expectation graph. However, this lead time was not long enough to fulfil the orthogonality condition equally, resulting one again in the ifo Business Cycle Clock being somewhat elliptically distorted (Figure 3.11).

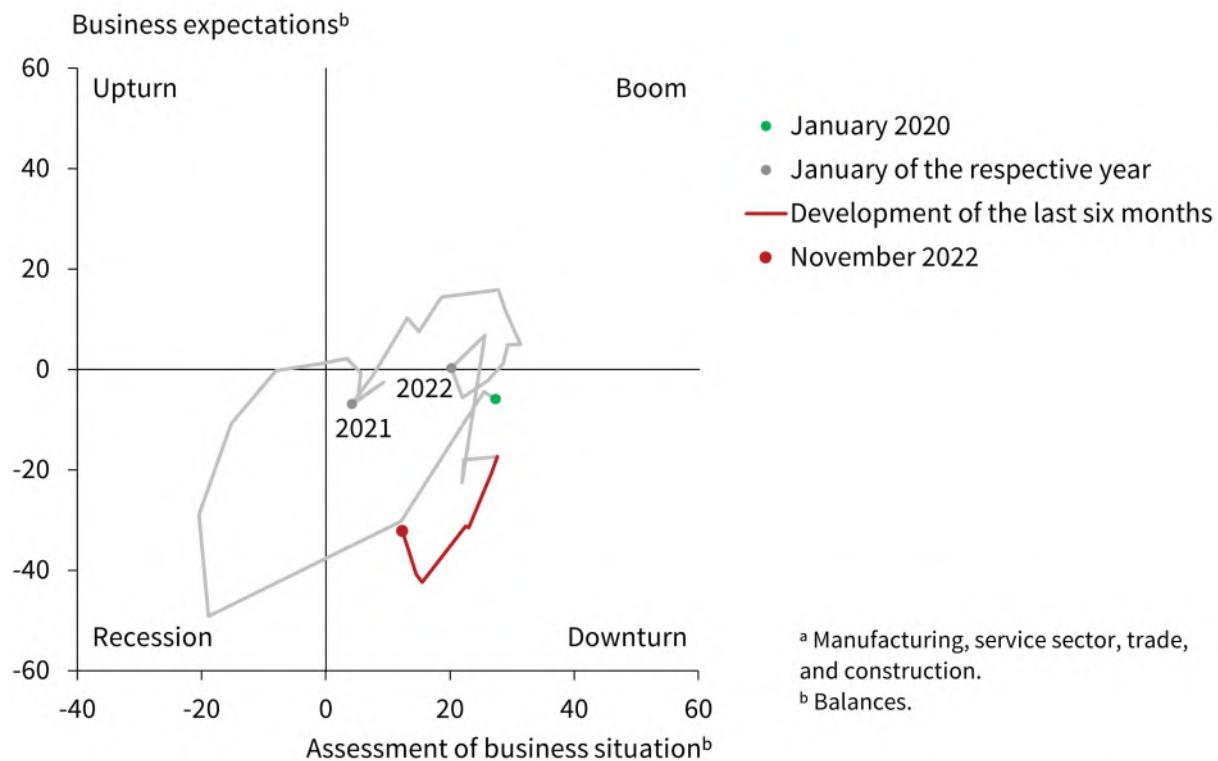
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Table 3.2: Cross-correlations between situation and expectations

Lead of business expectations in months	2005-2010	2011-2016	2017-2019
-6	-0.137	-0.401	0.054
-5	-0.014	-0.302	0.147
-4	0.117	-0.173	0.294
-3	0.251	-0.023	0.431
-2	0.383	0.154	0.580
-1	0.520	0.339	0.721
0	0.640	0.509	0.823
1	0.713	0.594	0.852
2	0.766	0.590	0.831
3	0.803	0.575	0.794
4	0.826	0.531	0.715
5	0.827	0.519	0.653
6	0.812	0.470	0.604

Source: ifo Business Survey, own calculations.

Figure 3.11: ifo Business Cycle Clock from 2020 to November 2022



Source: ifo Business Survey.

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3.3.5 Conclusion

“Business and consumer surveys are a popular tool for business cycle analysis. A standard way of using survey results is plotting the answers to specific questions, or combined indicators thereof, against time. An example of a slightly more sophisticated way of data presentation is the ifo Institute’s “Konjunktur-Uhr”, visualizing the interaction between managers’ business assessment and expectations” (Gayer 2008, page 1). Since 1993, the ifo Institute has presented the above-mentioned cyclical relationship between the situation and expectations components of the ifo Business Climate Index in a four-quadrant diagram. The abscissa of the clock shows the assessment of the current situation, the ordinate shows the expectations of the surveyed companies. The intersection of the two zero lines divides the diagram into four quadrants, which mark four sub-phases: Upswing, boom, downturn, recession. If the situation indicator and the expectations indicator are orthogonal functions, the economy – visualized as a situation-expectation graph – moves clockwise.¹³

If the situation indicator and the expectations indicator are not orthogonal to each other, which is empirically the rule rather than the exception due to the insufficient lead time, the ideal-typical circular rotation of the clock is deformed into a movement along the main diagonal that connects the boom quadrant with the recession quadrant. If necessary, the ifo Business Cycle Clock can be corrected using the instrument of principal component analysis.

The ifo Business Cycle Clock is available promptly, provides clear signals without major disruptions, and is not subject to revisions. It thus fulfils important characteristics of indicators for business cycle analysis (Moore and Shiskin 1967). In contrast to other modern graphic monitoring systems that depict the cycle in a four-quadrant system of the basic economic phases – such as the “Business Cycle Tracer” of the Dutch Statistical Office, the “Economic Climate Tracer” of the EU Commission and the “Konjunkturmonitor” of the German Federal Statistical Office¹⁴ – the ifo Business Cycle Clock shows the cyclical development without the need for prior *trend adjustment* of the input series. This eliminates the problems associated with such a trend adjustment. For example, the economic development at the current edge of the time series, which is particularly important from a forecasting point of view, and in particular the appearance of new turning points when new values are added or when the previous original data are revised, can sometimes change. The assessment of the economic situation is therefore very uncertain at the edge of the observation range. Newly added values can significantly change the image drawn through the filter (Kaiser and Maravall 2001). The ifo Business Cycle Clock gives clear economic signals even without an aprioristic trend adjustment.

¹³ Since March 2021, the ifo Institute has published a mean-adjusted clock in order to present a more centered rotation of the clock. In addition, the labeling of the four quadrants was changed to “Boom”, “Slowdown”, “Crisis”, and “Recovery” (Wohlrabe and Wollmershäuser 2021).

¹⁴ These monitoring systems are generally based on the deviation of the trend-cycle component of an indicator from the trend or its change over time (Van Ruth et al. 2005, Oltmanns 2009, Gayer 2008, and Abberger and Nierhaus 2011b).

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Overall, the ifo Business Cycle Clock is suitable for presenting the course of the economy as a whole and the associated dynamics solely on the basis of entrepreneurial judgements and assessments. However, the clock is less suitable for distinguishing the individual economic phases of the filtered real gross domestic product. For an exact cycle classification, analytical instruments specially optimized for this purpose should be used. The strongest point of the ifo Business Cycle Clock, however, is that it provides an excellent alternative visualization of the current economic development.

3.4 The ifo Heatmap

STEFAN SAUER, KLAUS WOHLRABE, TIMO WOLLMERSHÄUSER

3.4.1 Objective and Concept

The ifo Business Climate Index for Germany is the main result from the ifo Business Survey. It is considered as one of the most important early indicators for the German economy. The ifo Business Cycle Clock is an expressive presentation of the ifo Business Climate Index with the phases “Boom”, “Slowdown”, “Crisis”, and “Recovery” (see Section 3.3). Each phase depends on the current business situation and the business expectations. “Boom”: a positive business situation and expectations. “Slowdown”: a positive business situation accompanied by negative expectations. “Crisis”: both a negative business situation and negative expectations. “Recovery”: a negative business situation but expected improvement.

However, the ifo Business Climate and other results from the ifo Business Survey are not only reported on the level of the overall economy but also for numerous industries from manufacturing, construction, trade, and the service sector. These industries cover around 75 percent of the German gross value added. Therefore, the ifo Heatmap is intended to provide a compact overview of economic developments in various industries over several years (Wohlrabe and Wollmershäuser 2021). It is based on the four phases of the ifo Business Cycle Clock described above. These phases are represented by the colors light red (Recovery), dark red (Boom), light blue (Slowdown), and dark blue (Crisis). For each month, all industries shown in the ifo Heatmap get assigned one of these four colors.

3.4.2 Presentation of the ifo Heatmap

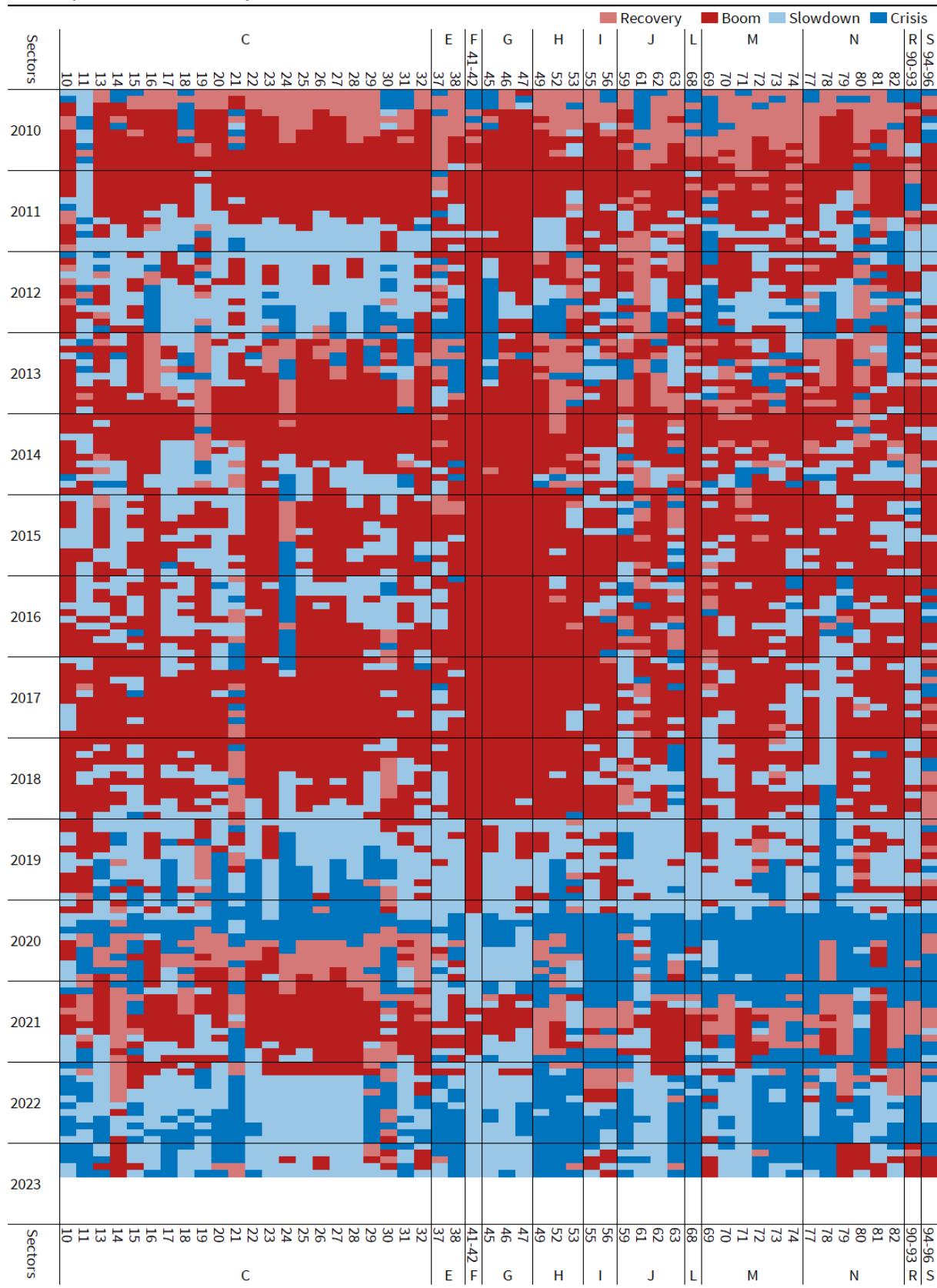
Figure 3.12 shows the ifo Heatmap as of May 2023. Subsequently, all industries included in the ifo Heatmap are listed in Table 3.3. The categorization of these industries is based on the official classification of economic activities by the German Federal Statistical Office (WZ 2008).

The ifo Heatmap shows that in the years between 2013 and 2018, the whole economy was in an almost constant boom phase with a positive situation and optimistic expectations. Only in 2019 did the economy slow down, before the outbreak of the Covid-19 pandemic in early 2020 catapulted all industries into a crisis. The ifo Heatmap clearly shows the faster recovery of the manufacturing sector while especially the service and trade sectors felt the negative influences of the second wave of infections and the resulting lockdown measures. Since the outbreak of the war in Ukraine, many industries have been in a slowdown or crisis phase.

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Figure 3.12: The ifo Heatmap – May 2023

Heatmap of ifo Business Survey



Source: ifo Business Survey.

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Table 3.3: Covered industries in the ifo Heatmap

C	Manufacturing
10	Manufacture of food products
11	Manufacture of beverages
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood, straw, and cork products (except furniture)
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of refined petroleum products
20	Manufacture of chemical products
21	Manufacture of pharmaceutical products
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Metal production and processing
25	Manufacture of metal products
26	Manufacture of computer, electronic, and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment
29	Manufacture of motor vehicles, trailers, and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
E	Water supply, sewerage, waste management, and remediation activities
37	Sewerage
38	Waste collection, treatment, and disposal; materials recovery
F	Construction
41-42	Construction of buildings and civil engineering
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
45	Wholesale and retail trade and repair of motor vehicles and motorcycles
46	Wholesale trade, except of motor vehicles and motorcycles
47	Retail trade, except of motor vehicles and motorcycles
H	Transportation and storage
49	Land transport and transport via pipelines
52	Warehousing and support activities for transportation
53	Postal and courier activities

- I Accommodation and food service activities
 - 55 Accommodation
 - 56 Food and beverage service activities
- J Information and Communication
 - 59 Motion picture, video, and tv program production, sound recording, and music publishing activities
 - 61 Telecommunications
 - 62 Computer programming, consultancy, and related activities
 - 63 Information service activities
- L Real estate activities
 - 68 Real estate activities
- M Professional, scientific, and technical activities
 - 69 Legal and accounting activities
 - 70 Activities of head offices; management consultancy activities
 - 71 Architectural and engineering activities; technical testing and analysis
 - 72 Scientific research and development
 - 73 Advertising and market research
 - 74 Other professional, scientific, and technical activities
- N Administrative and support service activities
 - 77 Rental and leasing activities
 - 78 Employment activities
 - 79 Travel agency, tour operator reservation service, and related activities
 - 80 Security and investigation activities
 - 81 Services to buildings and landscape activities
 - 82 Office administrative, office support, and other business support activities
- R Arts, entertainment, and recreation
 - 90-93 Arts, entertainment, and recreation
- S Other service activities
 - 94-96 Other services

3.5 What gives the ifo Business Climate its Predictive Power: Results from a Meta Survey

JULIA FREUDING, STEFAN SAUER, RAFFAELA SEITZ, KLAUS WOHLRABE

The ifo Business Survey's questionnaire, on the one hand, includes questions with precisely defined variables, such as turnover, prices, or the number of employees. On the other hand, some variables are formulated in a manner that is deliberately vague. This applies especially for the current business situation and the business expectations for the next six months, the two components of the ifo Business Climate. These terms are not precisely defined and are therefore open to interpretation. This has the advantage that each participating company can individually consider the most important factors. These factors can either be firm-specific, related to developments in the sector or in the general economy, or related to the economic policy framework. But which exact factors do the companies take into account most frequently? And are there sector-specific differences?

In order to answer these questions and thus to understand what gives the ifo Business Climate and its components such predictive power (Lehmann 2020, Lehmann and Reif 2021), the ifo Institute conducted a meta survey among the participating companies. The meta survey's focus lied on those factors that influence the business situation and the business expectations. Moreover, it included questions about benchmarks for the business situation and the time perspective of the business expectations. Additionally, the survey covered further information, such as the capacity utilization, the prize setting, or the person(s) completing the questionnaire. This chapter describes the meta survey's background and questionnaire and presents the main results of the questions concerning the business situation and the business expectations.

3.5.1 Background and Methods

In the early years of the ifo Business Survey (1952, 1956, 1963), the ifo Institute was already conducting meta surveys to collect background information. These meta surveys were called "We are testing the Business Survey" and were limited to questions about the general relevance of this kind of data collection. Subsequent studies focussed on individual sectors: manufacturing (1976), construction (1978), and trade (2009). The results for the trade sector suggested that the earnings situation and demand related factors, such as turnover or sales volume, are most important for assessing both the business situation and the business expectations (Abberger et al. 2011). Until 2019, however, a meta survey hadn't been conducted simultaneously for all sectors of the ifo Business Survey. That year, this gap was closed when the ifo Institute conducted a meta survey among all participants of the ifo Business Survey to uncover the factors influencing the assessments of the business situation and the business

expectations. In addition, further questions of the survey dealt with the response behaviour of the participating companies regarding the questions about price setting, number of employees, order backlogs, and capacity utilization. Moreover, the meta survey was exploited to ask information about the ifo Business Survey itself to detect possible room for improvement.

The drafting phase of the questionnaire ran from January to May 2019. Survey experts and business cycle experts of the ifo Institute identified the relevant topics of the meta survey and formulated the questions. Subsequently, the ifo Institute conducted pre-tests with selected participants from each sector. For these pre-tests, the participants were interviewed by email or by phone to validate the survey questions, detect ambiguities in the wording of the questions, or to discover missing answer categories. The pre-tests led to small adjustments of the questionnaire where necessary.

In total, 10,305 questionnaires were sent out on September 18th, 2019. The data collection lasted until October 25th. A total of 4,046 participants returned a completed questionnaire. This corresponds to a response rate of 39.3% (Table 3.4). The response rates by sector ranged between 36.3% in the retail sector and 47.9% in the construction sector.

Table 3.4: Sample size and response rate by sectors

	Total	Manufacturing	Services	Wholesaling	Retailing	Construction
Questionnaires sent out	10,305	2,649	3,435	1,49	1,707	1,024
Questionnaires received	4,046	1,158	1,192	587	619	490
Response rate	39.3%	43.7%	34.7%	39.4%	36.3%	47.9%

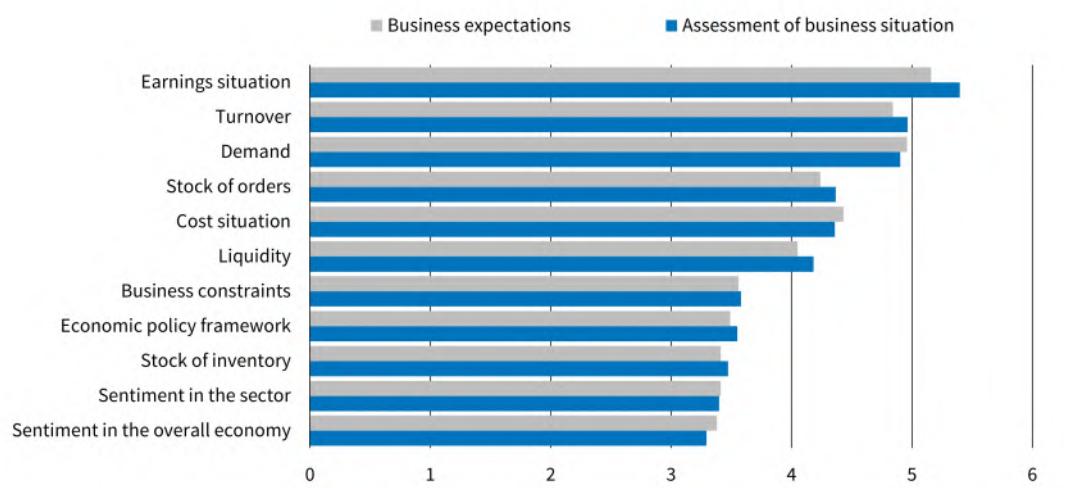
3.5.2 Results

This section describes the main results of the meta survey regarding the business situation and the business expectations. The participants assessed the importance of various factors that can influence the evaluation of the business situation and the business expectations. The factors to be evaluated were the following: earnings situation, turnover, demand, stock of orders, cost situation, liquidity, business constraints, economic policy framework, stock of inventory, sentiment in the sector, and sentiment in the overall economy. The respondents assigned values between 0 (no importance) and 6 (very high importance) to each of these factors depending on their perceived degree of importance.

Figure 3.13 shows the average assessment of each factor regarding the business situation and the business expectations. The higher the value, the higher the importance of the factor. Overall, the assessments of the influencing factors lead to very similar results for both the business situation and the business expectations. The earnings situation was rated as the most important factor with values over five for both variables. Turnover and demand were the

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Figure 3.13: Importance of the factors for the assessment of business situation and the business expectations



Source: Meta survey on the ifo Business Survey.

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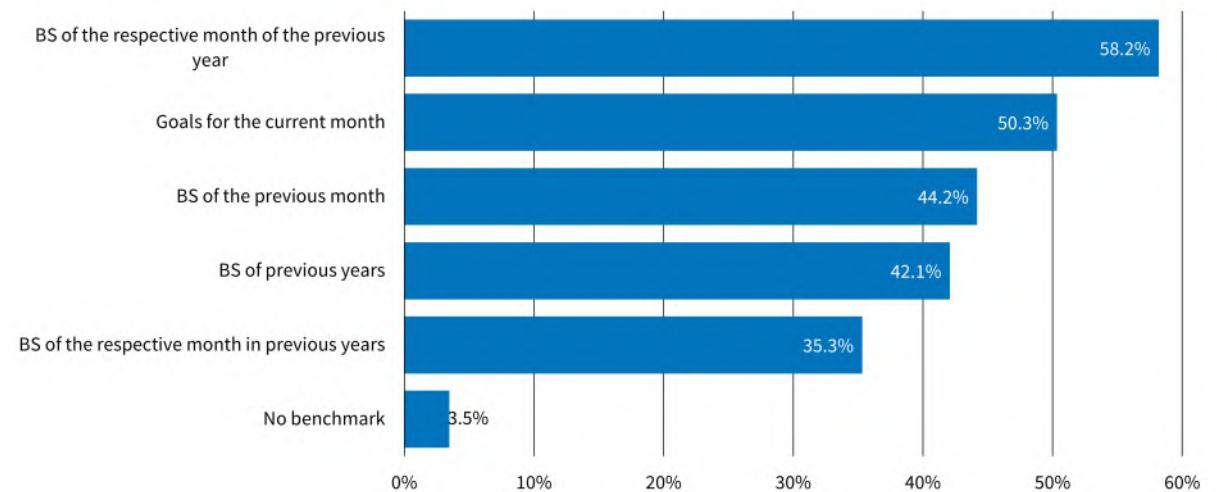
Note: Averages on a scale from 0 (no importance) to 6 (high importance).

next highest rated factors. The stock of order, the cost situation, and liquidity are all important for the business situation and the business expectations. On the other hand, the ratings are lower for external factors, such as business constraints, economic policy framework, and sentiments in the sector as well as in the overall economy. Thus, the survey participants base the assessments of the business situation and the business expectations mainly on internal company factors and not so much on external influences. On the assumption that the participants in the survey should evaluate their own company, this is an important result. If the general development of the economy played a more important role than company-specific factors, there would be a risk of only reflecting general accessible information in the index.

At the sector level, the factors are assessed similarly with only a few exceptions. For example, stock of orders is a more relevant factor, especially in the construction sector, though also in manufacturing, while it is not so important in retail. Liquidity is also very important for construction companies. Retailers focus more on turnover than companies from other sectors. The mean values of the factors are quite similar for different company sizes. Differences can only be detected for stock of orders and liquidity. Bigger companies take them less into account than smaller companies.

The meta survey included questions about benchmarks for the assessment of the business situation as well as about the time component of the business expectations. The results show that most of the companies (96.5%) use one or more benchmarks to assess their business situation. Figure 3.14 illustrates that a comparison with the business situation in the respective month of the previous year is the most used benchmark. Furthermore, goals for

Figure 3.14: Comparative benchmarks for the assessments of the business situation



Source: Meta survey of the ifo Business Survey.

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the current month are also considered by more than half of the respondents. Regarding the business expectations, the ifo Business Survey explicitly asks about "the next six months". The participants mostly interpret this time designation as for the whole time period. While 82.1% opted for this interpretation, only 16.4% stated that they consider the expectations for the point in time exactly in six months. In addition, only a few participants (1.5%) selected both options.

3.5.3 Summary and Outlook

The ifo Institute conducted a meta survey on the ifo Business Survey to learn more about the participants' considerations while they answer the questionnaire. This sheds light on the backgrounds of the results and improves their interpretation. The main results indicate that the high predictive power of the ifo Business Climate and its components the business situation and the business expectations, is mainly based on the participants' internal company factors, such as the earnings situation, turnover, and demand. The vague formulation of the terms business situation and business expectations gives the companies the flexibility of considering the factors that are important for them. The results of the meta survey show that this is a big advantage, as most companies consider a variety of factors to be important for their assessments. Freudenthal et al. (2021) present more detailed results.

Besides the questions about the business situation and the business expectations, the meta survey also covered other regular questions of the ifo Business Survey, such as price setting, number of employees, order backlogs, and capacity utilization. Moreover, information on the responding person(s) within the participating companies was collected. Thus, the data offers more potential for future research. The data of the meta survey can be accessed on the

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microdata level at the LMU-ifo Economics & Business Data Center (EBDC). It can also be linked to the microdata of the ifo Business Survey.

4 Other Indicators and Analyses from the ifo Business Survey

4.1 Regional Representation of the ifo Business Survey

MORITZ SCHASCHING¹

4.1.1 Introduction

The results of the ifo Business Survey are analyzed for different sectors and industries, as well as for Germany as a whole. However, they are also analyzed for different regions throughout the country: As well as publishing monthly survey results for Eastern Germany and Saxony, the ifo Institute also calculates regional evaluations for Hesse, Lower Saxony, Bavaria (on behalf of the Bavarian State Ministry of Economic Affairs, Regional Development, and Energy), Baden-Württemberg (on behalf of the Landeskreditbank Baden-Württemberg), and North Rhine-Westphalia (on behalf of the NRW.Bank).

Since current data for many important economic indicators are not available with the required frequency or are altogether absent from official statistics at the state level, the results of the ifo Business Survey make an essential contribution to business cycle analysis, business cycle research, and economic forecasts at the subnational level. Even one of the most important economic indicators - the quarterly calculation of the gross domestic product (GDP) - is not reported by the official statistics for the individual states, for methodological reasons. The only exceptions are the states of Baden-Württemberg and Rhineland-Palatinate, which regularly update quarterly GDP figures on its website. Until the fourth quarter of 2018, the ifo Institute calculated the quarterly GDP of Saxony-Anhalt on behalf of the Ministry of Economics, Science, and Digitalisation of Saxony-Anhalt and, until the fourth quarter of 2019, the GDP of Saxony. The non-official quarterly GDP of East and West Germany is published by the Halle Institute for Economic Research. Since 2022, however, Lehmann and Wikman (2022) have calculated quarterly GDP estimates for all German states from 1995 onwards until the end of 2021.² Furthermore, in March 2023 Lehmann (2023a) introduced a real-time database for German regional economic accounts, which contains information for nine macroeconomic aggregates and all federal states of Germany.

¹ This chapter based on Michael Weber's "Regionalauswertung der ifo Konjunkturumfragen" in Sauer and Wohlrabe (2020a).

² Lehmann and Wikman (2022) intend to update the data on a regular basis as soon as quarterly economic growth data are available for Germany. The latest version is Lehmann and Wikman (2023) (as of April 2023).

4 Other Indicators and Analyses from the ifo Business Survey

This chapter presents the regional analysis of the ifo Business Survey in detail. Subsequently, the possibilities and limits of the regional evaluation of the ifo Business Survey are explained and the relevance of the regional survey results for business cycle research is demonstrated.

4.1.2 Economic Indicators at the State Level

Data that are published at high frequency without major revisions are ideal for business cycle research. The greater the delay in publication, the less appropriate the data are for business cycle analysis. The less frequently the data are published, the less they can represent cyclical patterns during the year. And the more the indicators must be revised later, the less the current data can be interpreted as a reflection of the actual economic trend.

However, the ideal of up-to-date, frequently collected, and reliable data imposes a financial and administrative burden. Unless the data must be collected for administrative purposes anyway, each additional data collection is associated with high financial and bureaucratic costs. For this reason, the number of respondents, the content and frequency of official surveys, and the regionally differentiated publication of aggregated results are often restricted by law.

Therefore, regularly available economic indicators of official statistics at the regional level are rarely available. To name just a few indicators which are available: monthly turnover and employment in manufacturing; monthly turnover, incoming orders, working hours, and employment in construction; turnover and employment indices in wholesale, retail, and automobile trade, as well as in the hospitality industry; the monthly consumer price index; and monthly data on insurable employment by economic sectors, on unemployment, and on job vacancies.³ Nevertheless, in manufacturing, the first official estimates are available with a delay of about two months after the end of the reporting month. Subsequently received data are supplemented by estimation procedures. The final results are published in March of the following year and are not subsequently revised. In contrast, in construction only final results are published, which are available approximately two months after the end of the reporting month. Only unemployment and other labour market time series are available without any time lag. However, these allow at best a limited analysis of the economic development. Thus, the ifo Business Surveys are almost more important at the subnational level than at the federal level.

The ifo Business Surveys differ from the official statistics in many aspects:

- Data is collected and published monthly, not half-yearly or quarterly
- All survey results are available without time lag

³ In some states, quarterly turnover indices or percentage changes in turnover are published for selected service sectors.

- Almost all data are seasonally adjusted, which makes it easier to identify cyclical patterns during the year
- Later revisions are not necessary, as participating companies can't correct data retrospectively

4.1.3 Possibilities and Limitations of Regional Analyses

For the regional analyses of the ifo Business Survey, only the answers of the companies from the corresponding states and regions are considered. Therefore, the descriptions given in the previous chapters on survey content, survey methodology, aggregation, and interpretation of the results also apply without restriction to the regional survey results.

For reasons of representativeness, region-specific extrapolation factors are now used instead of the nationwide ones to better represent the economic structures of the individual regions. Furthermore, the regional and economic sector-specific net sample sizes determine whether the extrapolated responses of the participants are representative of the respective branches in the individual regions. In case of regional evaluation, the net samples must be sufficiently large and similar in composition on a permanent basis so that stable extrapolation and seasonal factors can be calculated for the individual time series.

Table 4.1 shows the average number of responses to the ifo Business Survey in 2021 by state and sector.⁴ The differences in the number of participants between the states can clearly be seen. While in Bavaria an average of 1,841 companies take part in the monthly ifo Business Survey, there are 73 reports in Bremen. North Rhine-Westphalia has an average of 1,776 participants and Baden-Wurttemberg 1,227. The proportion of responses in the individual states corresponds roughly to the distribution of all companies in Germany. Furthermore, those “states with a high share of Germany’s gross domestic product, such as Bavaria, North Rhine-Westphalia, and Baden-Wurttemberg, are also most strongly represented in the ifo Business Survey” (Hiersemenzel et al. 2022, p. 8).

⁴ More precisely, it is the number of responses and not the number of companies that is shown in Table 4.1. For example, in the construction sector the participating companies submit several reports each month, because they cover different construction types at the same time. However, big companies in the manufacturing sector that operate in different branches simultaneously can also submit several questionnaires for the different branches.

Table 4.1: Regional subdivision of participants in the ifo Business Surveys (Annual averages 2021)

	Total	Manufacturing	Construction	Trade	Service	Share in Panel	Share in Germany	GDP share 2021
Baden-Wurttemberg	1227	386	333	213	295	14.0%	13.7%	15.0%
Bavaria	1841	405	612	349	475	21.0%	18.8%	18.5%
Berlin	173	15	41	19	98	2.0%	5.0%	4.6%
Brandenburg	207	49	65	47	46	2.4%	2.8%	2.2%
Bremen	73	8	23	17	25	0.8%	0.7%	1.0%
Hamburg	206	16	28	41	121	2.3%	2.8%	3.5%
Hesse	569	131	122	124	192	6.5%	7.6%	8.5%
Mecklenburg-Western Pomerania	179	28	90	20	41	2.0%	1.7%	1.4%
Lower Saxony	751	154	281	158	158	8.5%	8.7%	8.8%
North Rhine-Westphalia	1776	477	466	354	479	20.2%	20.2%	20.5%
Rhineland-Palatinate	306	63	108	67	68	3.5%	4.7%	4.5%
Saarland	94	14	25	38	17	1.1%	1.0%	1.0%
Saxony	487	141	189	53	104	5.5%	4.4%	3.8%
Saxony-Anhalt	240	58	99	46	37	2.7%	1.9%	1.9%
Schleswig-Holstein	293	44	116	63	70	3.3%	3.6%	3.0%
Thuringia	362	116	156	42	48	4.1%	2.2%	1.8%

Note: Annual averages of the year 2021.

Source: ifo Business Survey; Federal Statistical Office.

Due to a sufficiently large number of participants, regional results of the ifo Business Survey are calculated for Bavaria, Baden-Wurttemberg, North Rhine-Westphalia, Saxony, Eastern Germany⁵ as well as for Hesse and Lower Saxony. For these regions, the ifo Business Climate, the business situation, and business expectation indicators as well as further survey results (e.g., employee expectations, capacity utilization, order backlog, price expectations) can be meaningfully reported for the overall economy as well as for the individual sectors. In some cases, the number of participants allows even more disaggregated analyses. Due to the large number of participants in the federal states of Bavaria, Baden-Wurttemberg, and North Rhine-Westphalia, an analysis at the two-digit level of the economic sector classification is possible within manufacturing. The main construction sector can be subdivided into building construction and civil engineering. In the trade sector it can be evaluated for wholesale and retail trade and the service sector can be subdivided into individual economic sections (Table 4.2). In Hesse, Lower Saxony, Saxony, and Eastern Germany, by contrast, the results are only calculated for the four large economic sectors of manufacturing, construction, trade, and services (Lehmann et al. 2019).

Table 4.2: Maximal subdivision of the regional evaluations

	Manufacturing	Construction	Trade	Service
Baden-Wurttemberg	2-digit	Building construction, civil engineering	Wholesale & Retail	Economic sections
Bavaria	2-digit	Building construction, civil engineering	Wholesale & Retail	Economic sections
North Rhine-Westphalia	2-digit	Building construction, civil engineering	Wholesale & Retail	Economic sections
Hesse	No subdivision	No subdivision	No subdivision	No subdivision
Lower Saxony	No subdivision	No subdivision	No subdivision	No subdivision
Saxony	No subdivision	No subdivision	No subdivision	No subdivision
Eastern Germany	No subdivision	No subdivision	No subdivision	No subdivision

Source: ifo Institute.

Alternatively, several federal states can be combined into a region. For example, “North-Eastern Germany”, consisting of Mecklenburg-Western Pomerania, Berlin, and Brandenburg, with an average of 559 participants, would be large enough for an analysis of the four major economic sectors. Further regions could be “Northern Germany” including Schleswig-Holstein, Lower Saxony, Hamburg, and Bremen, “Central Germany” including Saxony, Saxony-Anhalt, and Thuringia, or a region comprising the Saarland and Rhineland-Palatinate. (Lehmann et al. 2022)

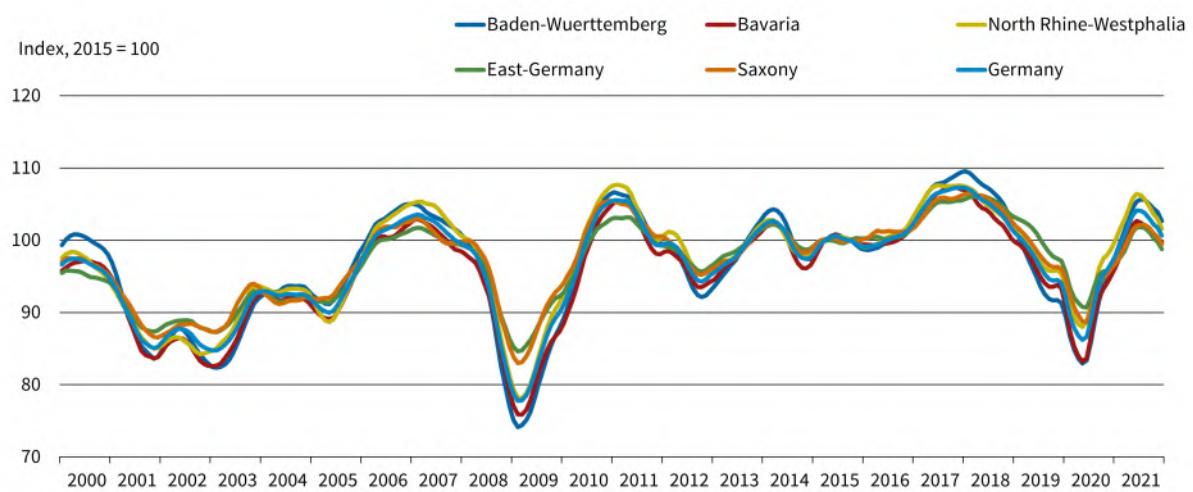
⁵ The results for Bavaria are published by the Bavarian Ministry of Economic Affairs and Media, Energy and Technology, for Baden-Wurttemberg by the L-Bank Staatsbank für Baden-Württemberg, for North Rhine-Westphalia by the NRW.Bank, and for Saxony and Eastern Germany by the ifo Institute Dresden.

4.1.4 Relevance of the Regional Analysis

The monthly results of the ifo Business Surveys considerably expand the data basis for regional business cycle research, in terms of quality and quantity. This will be demonstrated using the example of the overall economic development during the year.

Figure 4.1 shows the smoothed development of business climate indices for Germany and its states. The results of the survey show basically the same volatility in all regions, but with different intensities. The ifo Business Climates in the three West German states (Bavaria, Baden-Wurttemberg, and North Rhine-Westphalia) are more volatile than in Saxony or Eastern Germany. This may reflect the more industrial character of the Western German regions. However, manufacturing is the main economic driver at both the national and regional level.

Figure 4.1: Regional ifo Business Climate indices (smoothed)



Source: ifo Business Survey.

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Overall, the ifo Business Climate Index for Germany represents the regional developments very well. The correlation coefficients of the seasonal adjusted values are more than 0.96 in each case, with exception of Eastern Germany (0.87), the value 0 indicating no correlation at all and 1 a perfect positive correlation. However, by its very nature, the ifo Business Climate Index for Germany cannot fully reflect the specific regional volatility.

Nevertheless, the individual regional analyses are very important for the economic forecast because they show the partly different developments of the ifo Business Climate Indices within Germany (Wohlrabe and Wollmershäuser 2017). Even if the overarching trend for Germany and the individual regions is moving in the same direction, indicators can develop differently due to different regional economic structures. If, for example, the business situation in the German economy improves, this does not necessarily apply to the individual states. For example, the seasonally adjusted business climate index for Saxony developed diametrically to the national business climate index in almost 30 percent of the cases between 2000 and

2021. According to Lehmann et al. (2019), this is probably due to the greater importance of the construction industry and other less export-oriented industries in the region compared to Germany. Also in the other federal states, the ifo Business Climate does not always follow the German counterpart. This suggests that regional-specific economic developments are reflected in the regional analyses and thus emphasizes the importance of the regional analyses. With the help of the regional analyses, short-term regional economic developments can be identified early and with a high degree of certainty (Claudio et al. 2019; Henzel et al. 2015; Lehmann and Wohlrabe 2014a,b, 2015, 2017a).

To demonstrate the quality of the economic indicators collected by the ifo Institute, the results of the ifo Business Survey are compared with the GDP data of the German states. Since official quarterly GDP data are only available for the federal states of Baden-Wurttemberg and Rhineland-Palatinate, the estimated quarterly GDP data from Lehmann and Wikman (2022) are used. Lehmann and Wikman have estimated quarterly GDP data for all 16 federal states for the period between 1995 and 2021.

The development of the GDP should be reflected at an early stage in the business climate or in the assessment of the business situation and business expectations of the participants at state level. Thus, the business expectations should lead GDP, whereas the business situation should develop contemporarily.

This lag-lead effect of the regionalized survey results is examined with the help of cross-correlations. In this way, the correlation coefficient shows the direction, strength, and temporal dimension of the linear correlation between two time series. A perfect positive correlation (both time series always increase simultaneously) results in a correlation coefficient of 1, a perfect negative correlation (one time series always increases exactly when the other time series decreases) results in a correlation coefficient of -1. The temporal dimension is obtained by measuring the correlation of the GDP time series with earlier or later values of the respective ifo main indicator. The business climate as the geometric mean of the business situation and business expectations should therefore have a lead on the expectations and a lag on the situation.

Table 4.3 lists the cross-correlations between the posterior mean of the annualized real GDP and the ifo main indicators consisting of business climate, business situation, and business expectations. And Table 4.4 lists the cross-correlations between the seasonally- and calendar-adjusted posterior mean of the quarter-on-quarter real GDP and the ifo main indicators. These cross correlations are examined at the regional level and for Germany as a whole. For this purpose, the monthly survey results were aggregated to the quarterly level by averaging. The period under consideration covers the first quarter of 2000 to the fourth quarter of 2021.

Table 4.3 confirms the positive correlation between regional GDP and regional business climate indicators. The ifo Business Climate, the most important leading indicator, is leading in all four states. In Baden-Wurttemberg and Saxony the highest correlation coefficients lead at

Table 4.3: Cross-correlations between the annualized real GDP and the ifo main indicators

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
Germany									
BC	-0.07	0.16	0.41	0.64	0.75	0.73	0.61	0.39	0.16
BS	-0.21	-0.04	0.17	0.41	0.59	0.67	0.65	0.51	0.32
BE	0.19	0.47	0.70	0.85	0.79	0.61	0.34	0.04	-0.18
Baden-Wurttemberg									
BC	-0.12	0.13	0.39	0.63	0.75	0.75	0.64	0.43	0.19
BS	-0.31	-0.12	0.12	0.38	0.58	0.68	0.68	0.56	0.37
BE	0.25	0.51	0.72	0.83	0.76	0.58	0.32	0.03	-0.21
Bavaria									
BC	-0.10	0.13	0.36	0.58	0.68	0.66	0.55	0.35	0.15
BS	-0.26	-0.08	0.13	0.37	0.54	0.61	0.58	0.46	0.29
BE	0.21	0.47	0.66	0.79	0.72	0.53	0.30	0.03	-0.16
North Rhine-Westphalia									
BC	-0.01	0.24	0.47	0.66	0.72	0.64	0.48	0.23	0.00
BS	-0.17	0.01	0.22	0.43	0.56	0.59	0.53	0.36	0.16
BE	0.27	0.54	0.75	0.84	0.75	0.53	0.24	-0.06	-0.29
Saxony									
BC	-0.22	-0.03	0.19	0.43	0.55	0.57	0.49	0.32	0.15
BS	-0.32	-0.20	-0.03	0.21	0.39	0.48	0.48	0.37	0.22
BE	0.00	0.26	0.50	0.68	0.68	0.57	0.39	0.16	-0.01

BC: Business climate, BS: Business situation, BE: Business expectations.

one quarter and in Bavaria and North Rhine-Westphalia at two quarters. The correlation coefficients range from 0.57 in Saxony to 0.75 in Baden-Wurttemberg. By contrast, the business situation indicator is contemporaneous with GDP only in Saxony. In all other states, the business situation has a lead time of one quarter. Again, the correlation coefficient has the lowest value in Saxony of 0.48 and the highest value in Baden-Wurttemberg of 0.68. The expectations component has a lead of three quarters to GDP in all four regions. North Rhine-Westphalia has the highest value of 0.84, followed by Baden-Wurttemberg (0.83), Bavaria (0.79), and Saxony (0.68). Table 4.4, on the other hand, shows a contemporaneous progression of the ifo Business Climate and business expectations indicators with GDP in all four states and Germany. In addition, the business situation indicator lags by one quarter in each state and for Germany as a whole. Overall, the highest correlation coefficient is 0.60.

Generally, the high correlation values between the regional ifo main indicators and the regional GDP demonstrate the power of the ifo main indicators to determine the economic situation of the individual states. Numerous studies confirm the quality of the regional indicators of the ifo Business Survey in terms of forecasting and business cycle analysis. Lehmann and Wohlrabe (2015) show that the quality of (short-term) economic forecasts for the states of

Table 4.4: Cross-correlations between the quarter-on-quarter real GDP and the ifo main indicators

lead/lags	-6	-5	-4	-3	-2	-1	0	1	2
Germany									
BC	-0.15	-0.13	-0.15	-0.03	0.03	0.06	0.36	0.32	0.25
BS	-0.13	-0.13	-0.17	-0.08	-0.02	-0.04	0.21	0.29	0.24
BE	-0.14	-0.08	-0.09	0.07	0.11	0.22	0.52	0.28	0.18
Baden-Wurttemberg									
BC	-0.24	-0.24	-0.20	-0.06	0.04	0.12	0.42	0.40	0.34
BS	-0.21	-0.24	-0.25	-0.16	-0.06	-0.02	0.25	0.35	0.33
BE	-0.23	-0.16	-0.05	0.13	0.21	0.34	0.58	0.35	0.24
Bavaria									
BC	-0.23	-0.19	-0.22	-0.05	0.06	0.10	0.42	0.39	0.29
BS	-0.21	-0.22	-0.23	-0.14	-0.03	-0.02	0.25	0.35	0.29
BE	-0.18	-0.08	-0.14	0.13	0.20	0.28	0.60	0.34	0.20
North Rhine-Westphalia									
BC	-0.20	-0.18	-0.15	-0.02	0.10	0.15	0.44	0.40	0.27
BS	-0.18	-0.18	-0.18	-0.09	0.01	0.02	0.27	0.36	0.27
BE	-0.16	-0.12	-0.04	0.10	0.21	0.34	0.59	0.35	0.18
Saxony									
BC	-0.10	-0.13	-0.14	-0.05	-0.03	-0.04	0.23	0.22	0.14
BS	-0.08	-0.12	-0.16	-0.06	-0.06	-0.12	0.10	0.20	0.14
BE	-0.11	-0.12	-0.07	-0.02	0.02	0.10	0.38	0.19	0.12

BC: Business climate, BS: Business situation, BE: Business expectations.

Baden-Wurttemberg and Saxony as well as for Eastern Germany can be considerably improved if the results of the ifo Business Survey are taken into account in the forecast models. The results of the ifo Business Survey already represent an overall gain in information for Germany's economy; the regional survey results provide additional information. Using the example of Saxony, Lehmann et al. (2010) demonstrated that the regional survey results reliably indicate economic development even in times of crisis, both in terms of the direction and the intensity of economic fluctuation.

In 2014, Lehmann et al. (2014) investigated the indicators of the regional results for individual branches of the economy, analogous to the procedure applied above. They focus on the manufacturing and construction sectors in Saxony and Eastern Germany. As a result, there is a strong positive correlation of the indicators of both sectors with the respective monthly sales development. The expectation indicators show the sales development with a lead of three months. Since the sales themselves are only published by official statistics with a delay of three months, the regional expectations result in an information lead of six months - a considerable gain in information for political decision-makers and scientific economic monitoring.

4 Other Indicators and Analyses from the ifo Business Survey

Finally, Lehmann et al. (2022) developed a macroeconomic ifo capacity utilization indicator for the German states on the basis of the regional results of the ifo Business Survey. The results of this study show that, firstly, there are considerable differences in the cyclical developments in the individual federal states and, secondly, that there is a high correlation between the ifo capacity utilization and an estimated output gap at the level of the states. With this regionalization of the macroeconomic ifo capacity utilization, the public is now provided with new indicators for regional business cycle analysis.

4.1.5 Conclusion

The monthly results of the ifo Business Survey can also be analyzed for spatially delimited subgroups. The entire survey program is available for regional analyses. Restrictions result only from the number of participants in the respective regions. The available indicators reflect economic development at the regional level very well; this applies to the regional economy as well as to its subsectors. The regional results of the ifo Business Survey thus provide high-quality, relevant, and promptly available indicators for the assessment of overall economic development in the German federal states.

4.2 The KfW-ifo SME Barometer

STEFAN SAUER

4.2.1 Concept and Objectives

Small and medium-sized enterprises (SMEs) play an important role in the German economy, employing 31.7 million people — a good 70% of the workforce — and generating an annual domestic turnover of around EUR 4,100 billion (Schwartz 2019). For analyses of the current economic developments of SMEs, the ifo Institute, in cooperation with KfW Research, has developed evaluations of the monthly ifo Business Survey based on company size in the sectors manufacturing, construction, wholesale and retail trade, and the service sector. The main indicator of these evaluations is a business climate for Germany's SMEs, which also allows comparisons to larger companies and the development of the overall economy. Together with other results, this indicator is published monthly by KfW Research as the “KfW-ifo SME Barometer” (KfW Research 2022b).

4.2.2 Methodology of the SME Barometer

For the calculation of the KfW-ifo SME Barometer, it is necessary to divide the participating companies into SMEs and large companies. However, there is no generally valid definition for an SME. Mostly qualitative criteria are used, where it's not the size of the company that is decisive, but rather the unity of ownership and management. According to these criteria, the owners exert, for example, a decisive personal influence on management issues and bear entrepreneurial risks, thus maintaining the livelihood and spirit of the enterprise.

Since information on these characteristics is not available for all enterprises, the KfW-ifo SME Barometer is based instead on quantitative company characteristics that are gathered once a year in the ifo Business Survey. Due to sector-specific structures, these characteristics differ by sector. SMEs in the manufacturing sector, by definition, include all enterprises with fewer than 500 employees, while in the wholesale sector they include those with an annual turnover of less than 50 million euros. These limits are lower for retailing companies (less than 12.5 million euros annual turnover), in the service sector (less than 25 million euros annual turnover), and for construction enterprises (up to 199 employees). All companies that exceed the respective limit are classified as large companies (Table 4.5).

The high proportion of SMEs in the German economy is also reflected in the panel of the ifo Business Survey. While participants of the manufacturing sector, wholesale and retail trade, and the service sector are on average 80% SMEs, the percentage is even higher in the construction sector with 90%.

4 Other Indicators and Analyses from the ifo Business Survey

Table 4.5: Classification of SME and large companies

	SME	Large enterprises
Manufacturing	1-499 employees	≥ 500 employees
Construction	1-199 employees	≥ 200 employees
Wholesale	turnover p.a. $< 50m$ €	turnover p.a. $\geq 50m$ €
Retailing	turnover p.a. $< 12.5m$ €	turnover p.a. $\geq 12.5m$ €
Service Sector	turnover p.a. $< 25m$ €	turnover p.a. $\geq 25m$ €

For both groups the aggregations follow the standard methodology used in the ifo Business Survey. The results are first calculated on a two-digit level, then aggregated to the respective sector result, and finally to an overall indicator for Germany as a whole. For more detailed calculations, the number of participants in many industries is too small, especially for larger companies.

The aggregation weights for manufacturing and wholesale and retail trade are the gross value added shares at the two-digit level, divided proportionally between SMEs and large enterprises according to their shares in turnover. The aggregate weights for construction and the service sector are the turnover shares of the individual branches according to official statistics. The aggregation of the sectors to the results for Germany is done analogously to the other overall indicators from the ifo Business Survey, such as the ifo Business Climate Index, based on their gross value-added shares.

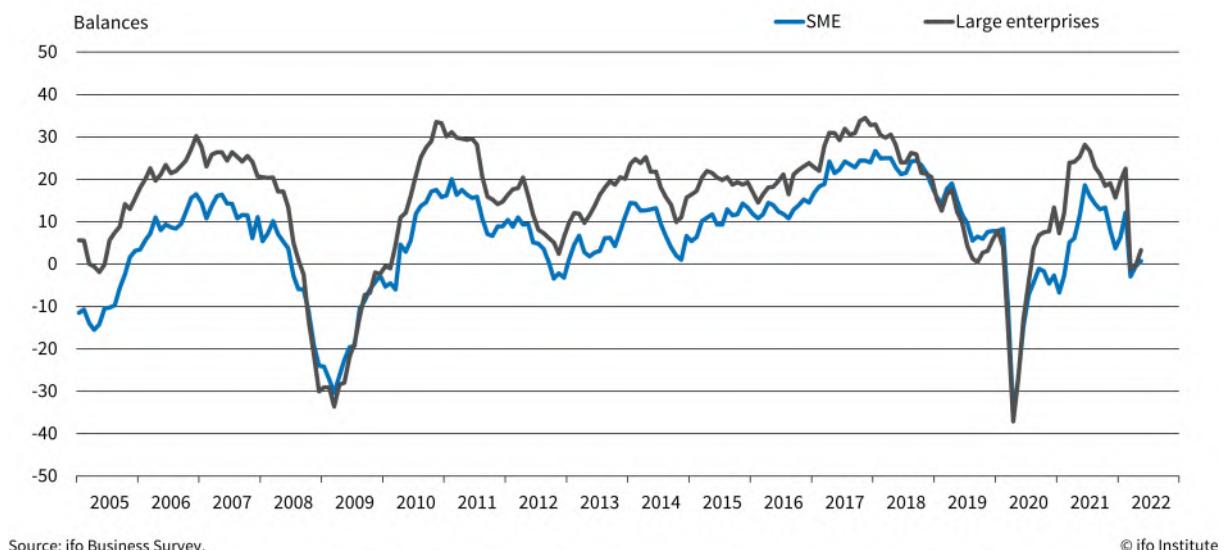
4.2.3 Results of the SME Barometer

Time series for SMEs and large companies start in January 2005 for the overall economy and the service sector. For all other sectors, the time series start in 1991. All time series are also available seasonally adjusted. The main result of the SME Barometer is the ifo Business Climate for SMEs which is calculated as an average of the balances of the current business situation and the business expectations for the next six months.

Figure 4.2 shows the business climate for SMEs compared to large companies. Altogether, both time series show similar business cycles, but the business climate among small and medium-sized enterprises is almost constantly below that for large companies. This can be attributed to SMEs' less optimistic business expectations. However, it can also be seen that the business climate in 2008 and 2009 developed in favor of SMEs. This suggests that they were less affected by the financial and economic crisis than large companies. The same could be seen during the first months of the Covid-19 crisis in 2020, where the business climate for large enterprises plummeted significantly. Nevertheless, large enterprises recovered faster as SMEs were affected more by the second wave of infections and the resulting governmental containment measures.

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.2: ifo Business Climate for SME and large companies



Source: ifo Business Survey.

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In addition to business climate, business situation, and business expectations, the SME barometer also provides time series on various other variables. This includes the future developments of prices, the number of employees, capacity utilization, and credit constraints. For manufacturing, there are additional results for export expectations and the competitive position of companies.

4.3 The Jimdo-ifo Business Climate Index for Self-Employed and Micro-Enterprises

STEFAN SAUER, KLAUS WOHLRABE

4.3.1 Concept and Objectives

One of the main objectives for the composition of the ifo Business Survey panel was a high coverage of the gross value added in all sectors of the economy (Section 2.7). Thus, self-employed persons as well as micro-enterprises (two to nine employees) tended to be underrepresented or not represented at all in many sectors. They are generally not considered to be a driving force for cyclical macroeconomic developments. Nevertheless, they play an important role in general economic activity. They often cover tasks that are rarely or not at all provided by large companies. In addition, micro-enterprises and self-employed can be a driver for innovation and rapid growth. Start-ups are therefore actively promoted by economic policy.

According to the Federal Statistical Office (2021b), approximately 82% of the German companies in the economic sectors covered by the ifo Business Survey (around 2.6 million) were classified as self-employed or micro-enterprises. Only approximately 0.6% of the companies (17,000) were large companies (more than 249 employees). In terms of sales, however, the ratios are reversed. In 2021, large companies accounted for around 71% of sales, while self-employed and micro-enterprises only accounted for around 6.5%. Around 18% of the workforce is employed by micro-enterprises, while large companies employ around 44%. These figures show that economic indicators for self-employed and micro-enterprises can also be of interest. Particularly in crisis situations, such as the Corona pandemic, evaluations for small businesses can be very important. For example, analyses can be helpful for designing policy measures, such as economic stimulus packages and governmental aid programs for companies. Therefore, in 2021 the ifo Institute decided to place a bigger focus on self-employed persons and micro-enterprises in the ifo Business Survey (Sauer and Wohlrabe 2022b). In order to significantly expand the number of these companies, a large campaign to recruit new survey participants was launched in the fall of 2021. This was run in collaboration with Jimdo GmbH and the Association of Founders and Entrepreneurs Germany (VGSD). More than 1,000 self-employed and micro-enterprises registered.

Since August 2021, therefore, there have been created separate business cycle indicators for self-employed and micro-enterprises, as well as both groups together. The main results are published monthly as the “Jimdo-ifo Business Climate Index”. These results are calculated with the standard methodology described in detail in the methodology chapter for the ifo Business Survey. Currently (June 2022), the indicators are based on data from around 1,700 self-employed and micro-enterprises. Results are published for the overall economy and at the sectoral level (manufacturing, construction, wholesale trade, retail trade, service sector).

The time series start in August 2021. Only in the services sector, in which many areas are dominated by micro-enterprises, was the past number of participants sufficient to calculate longer time series beginning in 2005. Accordingly, these are also already seasonally adjusted. The time series starting in August 2021 are not yet seasonally adjusted, as this requires longer time series lasting several years (Sauer and Wohlrabe 2015).

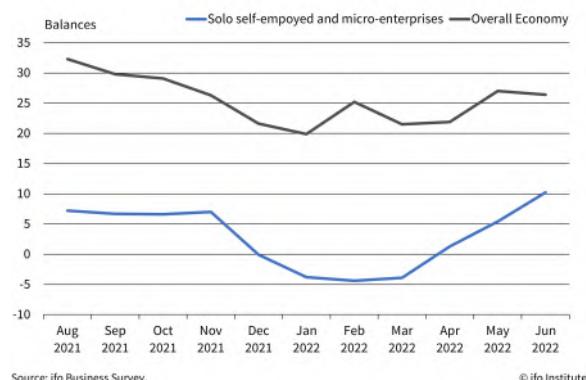
Besides the aggregated indicators, the increased amount of microdata for micro-enterprises and self-employed also offers more potential for research projects.

4.3.2 Selected Results

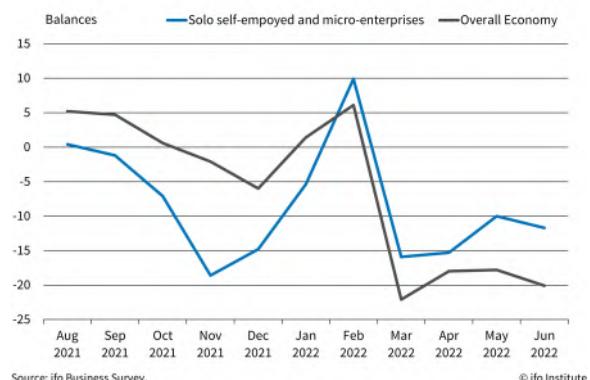
The results since August 2021 show that self-employed and micro-enterprises were significantly less positive about their current business situation than it was the case in the overall economy (Figure 4.3a). In the winter months 2021/2022, negative assessments were even slightly in the majority. Afterwards, the business situation improved, but was still clearly below the overall economic value. Business expectations, on the other hand, were a little less pessimistic for the smallest enterprises than for the overall economy (Figure 4.3b).

Figure 4.3: Assessment of the business situation and business expectations of self-employed and micro-enterprises compared to the overall economy

(a) Assessment of the business situation



(b) Business expectations

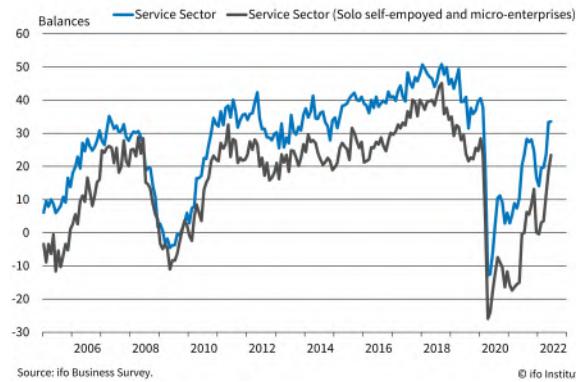


There are already much longer time series for the services sector. Figures 4.4a and 4.4b compare the business situation and expectations in the overall service sector to the self-employed and micro-enterprises in this sector. A similar pattern is noticeable here for the business situation. The time series for the micro-enterprises is almost consistently below that for the service sector as a whole. By contrast, there is no such difference in the business expectations. Here, the time series are almost the same. One exception is the recovery phase in the summer of 2020, when micro-enterprises were noticeably more cautious. This could be related to the fact that micro-enterprises are more strongly represented in sectors that were particularly affected by the measures against the Covid-19 pandemic (e.g., restaurants, hairdressers, event industry, travel agencies).

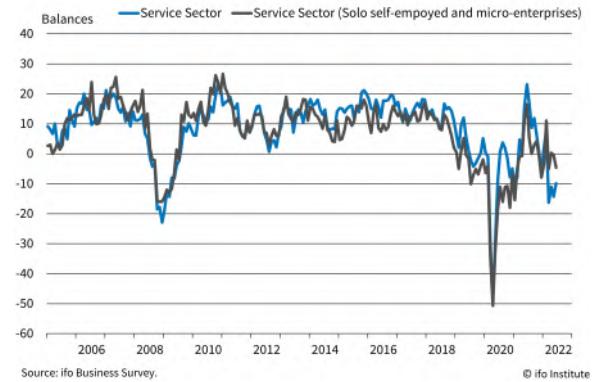
4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.4: Assessment of the business situation and business expectations of self-employed in the service sector

(a) Assessment of the business situation

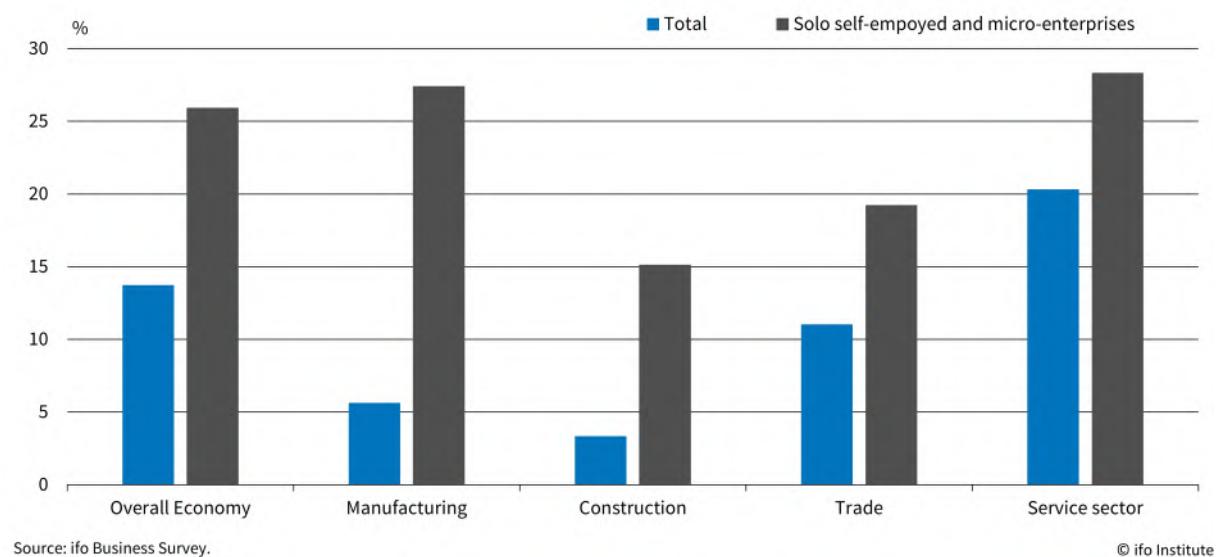


(b) Business expectations



Results from other questions during the Covid-19 pandemic also indicate that smaller companies were more affected by the crisis. For example, enterprises with up to nine employees were much more likely to classify the situation as threatening for their existence (Figure 4.5): In January 2022, 25.9% of these companies saw their existence as threatened, while the overall share in the German economy was significantly lower at 13.7%. The difference was particularly high in the manufacturing sector: While the overall situation had eased noticeably and only 5.6% of all manufacturing companies felt that their existence was at risk, the share of the smallest companies was still over a quarter (27.4%). This is in line with a study by Peichl et al. (2021), which shows that the equity situation of small companies with fewer than 50 employees was more severely affected during the Corona crisis than that of larger companies.

Figure 4.5: Share of companies that see their existence threatened (January 2022)



4.4 The ifo Employment Barometer

KLAUS WOHLRABE

4.4.1 Concept and Objectives

An important part of business cycle analysis is the assessment of the current situation of the labor market. From the overall economic perspective, many variables are interesting, such as the number of employed persons, vacancies, persons subject to social insurance contributions, number of unemployed, or the unemployment rate. One serious issue, however, is that some official labor market statistics, in particular the number of persons subject to social insurance contributions, are only published with a delay of three months, and reliable data are only available after six months. Although the number of registered vacancies with the Federal Employment Agency (Bundesagentur für Arbeit) can also provide timely information on the labor demand, it only gives a vague indication of the number of new jobs that have been realized.

The ifo Employment Barometer is designed to close this gap. Since 2002, it has been providing potentially valuable information on the current state of the labor market with survey-based data on the demand for labor.⁶ The ifo Employment Barometer is calculated by the ifo Institute exclusively for the *Handelsblatt*. This is based on approximately 9,000 monthly reports from companies in the manufacturing, construction, trade, and service sectors, whereby the companies are asked to communicate their workforce plans for the next three months.

4.4.2 Construction of the ifo Employment Barometer

Since 2002, the ifo Employment Barometer has been based on the following question in the monthly ifo Business Survey:⁷

We expect our **workforce** to

- increase
- remain roughly the same
- decrease

Companies are asked to answer the question with a horizon of three months. The aggregation to balances is carried out in the same way as described in the methodology section. The

⁶ For early methodological contributions see Hott and Kunkel (2004) and Abberger and Nierhaus (2008a). For a East-German focus see Lehmann (2010) and Vogt (2008) for Saxony.

⁷ The formulation has been in place since the harmonisation of the questionnaires on the various sectors since July 2018. Before that it was slightly different in some survey areas.

answers are first individually weighted by firm size and then aggregated according to the value-added shares of the individual industries. The ifo Employment Barometer is then calculated for manufacturing, wholesale and retail trade, construction, and services, and based on that for the overall economy. Moreover, the ifo Employment Barometer provides results for more disaggregated sectors (e.g., mechanical engineering and chemical industry). It thus allows a separate analysis of the labor market by economic sectors or branches. The ifo Employment Barometer at the highest level of aggregation has been available since 2002, as the results of the service providers have also been available since then. Sectoral results for manufacturing, trade, and construction have also been available from 1991 onwards.

The interpretation of the balances in the ifo Employment Barometer is similar to that of the other questions. A positive balance means that a larger proportion of the (weighted) companies will increase the number of persons employed within the next three months. The balances of the ifo Employment Barometer are seasonally adjusted, but not calendar-adjusted. Experience shows that calendar effects have no effect on expectations in terms of the number of employees: For example, an additional public holiday in the following three months does not change the assessment. When calculating the index values, the balances are each normalized to the average of the year 2015 (Henzel and Wohlrabe 2014, Wohlrabe 2018).

4.4.3 Results of the ifo Employment Barometer

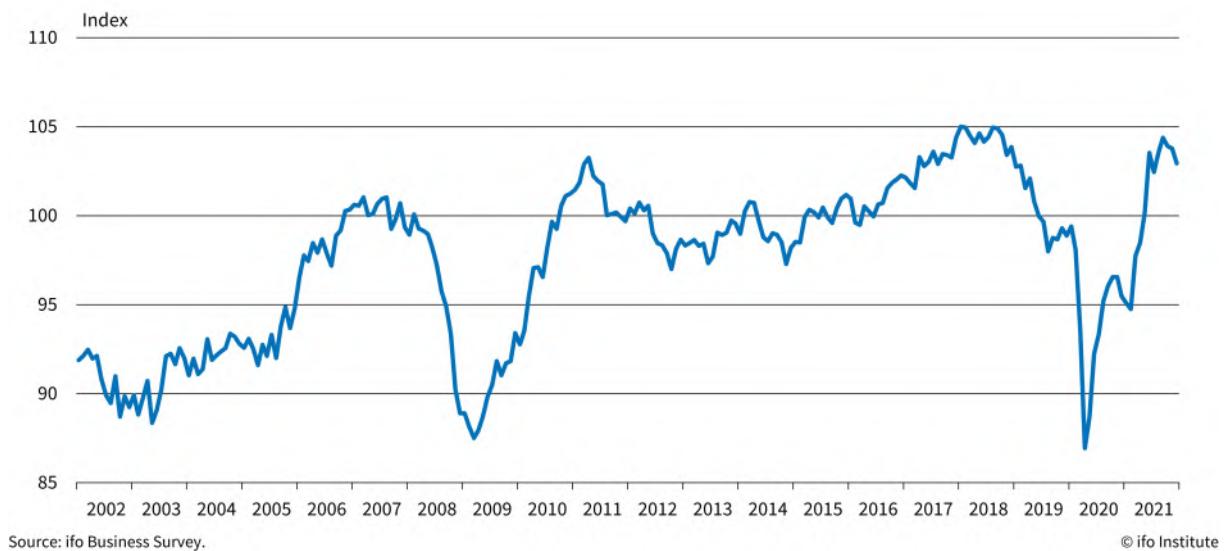
Figure 4.6 shows the development of the ifo Employment Barometer up to 2021. The first large drop was during the financial crisis in 2008/09. Then there was a clear upward trend with a peak at the end of 2018. The second large drop was due to the Corona crisis. Figure 4.7 shows the balances for the various sectors. According to these series, the most jobs are created in the service sector.

4.4.4 Predictive Quality of the ifo Employment Barometer

The ifo Employment Barometer is intended to provide an early indication of trends in the labor market and thus to complement the official labor market data. It should have leading characteristics and a high prediction quality. Using various methods, Abberger (2007) has already shown that the ifo Employment Barometer is a very good predictor for the number of employed persons in Germany.

The labor market situation cannot be described by a single variable. In particular, realized employment and unemployment do not always develop in parallel. If the workforce increases, for example because people who were not registered as unemployed (e.g., pensioners or students) take up a job, an increase in the number of people in employment does not lead to a decrease in the number of unemployed people. There are also differences in the survey technique. While the number of unemployed persons originates from purely administrative statistics, which are, for example, strongly influenced by legal changes, the employment

Figure 4.6: Development of the ifo Employment Barometer



calculation is more strongly linked to economic decisions. Moreover, unemployment statistics cover all registered persons, whereas the number of persons in employment also includes estimates, i.e., it contains some uncertainty.

Personnel plans of firms could be measured with the help of the vacancies, among others. Reliable information on the hiring decisions is especially provided by the statistics on employees subject to social insurance contributions. However, only dependent employees are covered, and the data are submitted with a considerable delay. In order to get a comprehensive impression of the labor market situation, the following reference series are used:

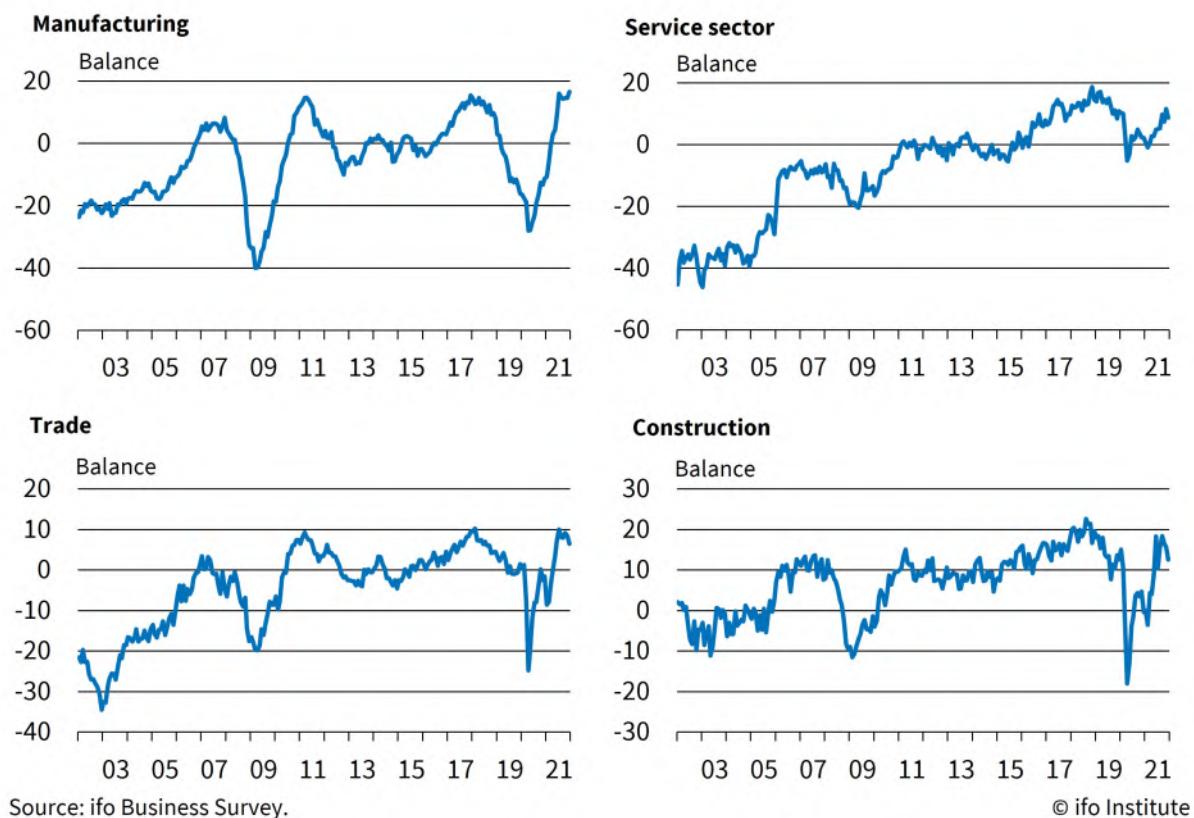
- persons subject to social insurance contributions (SI employees)
- (registered) vacancies
- number of unemployed persons
- unemployment rate

These series were obtained from the Federal Employment Agency. All variables are seasonally adjusted. In order to reflect the dynamics of the labor market, the monthly and annual growth rates are calculated for the number of unemployed and for those subject to social insurance contributions. The former rather reflects the short-term dynamics at the current edge, but is strongly affected by random events and therefore often shows irregular fluctuations. The annual growth rate is more likely to be a trend development, as the reference point is further back in time, and it is only slightly influenced by the chosen seasonal adjustment method.

Figure 4.8 gives a first impression of the relationship between the ifo Employment Barometer and the reference series. The ifo Employment Barometer has a particularly strong corre-

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.7: ifo Employment Barometer by Sectors



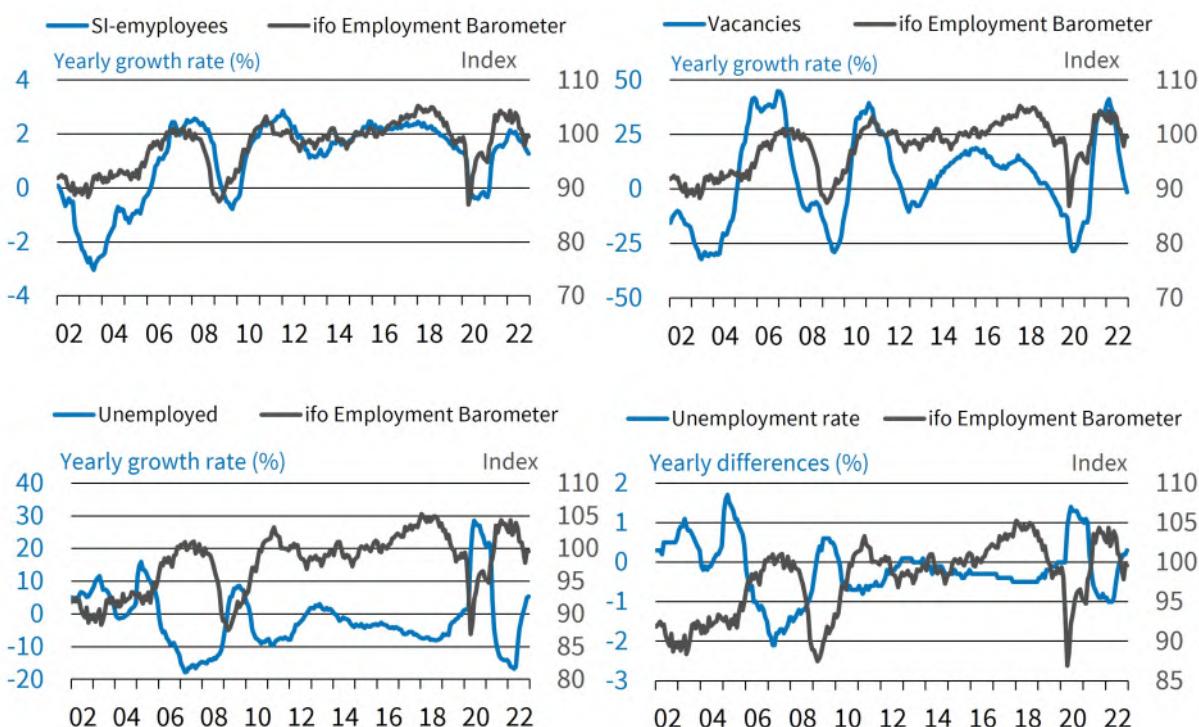
tion with the annual change in the number of persons employed subject to social insurance contributions. The slump in the number of people employed during the 2008/2009 economic crisis was reported in time. The connection with the vacancies is also very good. The turning points in the respective target series are detected apparently earlier by the ifo Employment Barometer.

With regard to the unemployment figures, it can be seen that by construction there is an inverse relationship between the number of unemployed persons and the ifo Employment Barometer. Turning points are also identified accordingly. However, it is also clear that changes in the legal framework, which primarily affect the number of registered unemployed persons but have little or no effect on labor demand, result in a temporary misindication of the ifo Employment Barometer. For example, the sharp rise in the number of unemployed persons at the beginning of 2005, triggered by the Hartz IV reform, did not lead to a corresponding decline in the ifo Employment Barometer. At that time, a large number of persons were included in the unemployment statistics who had not been added before. This is where the different survey concepts underlying the two series become apparent. The same applies to the link with the unemployment rate. However, the denominator of the unemployment rate is also influenced by changes in the number of people in employment, so that the ifo Employment

Barometer provides direct information on the current development of the unemployment rate.

The first graphical impressions shall be supplemented with a correlation analysis. The goal is to uncover leading or lagging characteristics of the ifo Employment Barometer compared to the labor market indicators. Table 4.6 shows the cross-correlations for the different reference series. In addition to correlation within the same month (contemporaneous), we also report the lead up to six months ahead (-6). In Table 4.6, the highest correlations for each reference series and the ifo Employment Barometer are highlighted in bold. The largest negative correlation is marked for unemployment figures and unemployment rates, as there is an inverse relationship here (see also Figure 4.8).

Figure 4.8: Comparison of the ifo Employment Barometer with various labour market indicators



Source: Federal Employment Agency; ifo Business Survey.

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It turns out that the ifo Employment Barometer shows a very good correlation with the number of SI employees. The highest correlation for the monthly growth rate is about 0.7 for a one-month lead time; for the annual growth rate it is even 0.82 in case of the contemporaneous comparison. The correlation is somewhat less pronounced in the case of registered vacancies. The development of the rate of unemployment shows that that the long-term dynamics can be especially well reflected here. From a comparison of the effects of short-term dynamics (monthly growth rate) and long-term dynamics (annual growth rate) on labor market, it is

4 Other Indicators and Analyses from the ifo Business Survey

clear that the latter is better covered by the indicators. This could be due to the expectation horizon of the survey's questions, which is three months and thus somewhat longer-term. In addition, monthly growth rates are much more erratic than annual growth rates, so the correlation is usually smaller.

Table 4.6: Cross-correlations between the ifo Employment Barometer and labour market indicators

Lead in months		-6	-5	-4	-3	-2	-1	0
SI employees	MGR	0.589	0.610	0.632	0.649	0.684	0.712	0.717
	YGR	0.578	0.622	0.665	0.706	0.748	0.786	0.822
Vacancies	MGR	0.508	0.493	0.486	0.472	0.459	0.466	0.459
	YGR	0.610	0.628	0.641	0.649	0.651	0.651	0.646
Unemployed	MGR	-0.283	-0.291	-0.311	-0.332	-0.344	-0.374	-0.395
	YGR	-0.308	-0.366	-0.422	-0.478	-0.531	-0.581	-0.625
Unemployment rate	Level	-0.510	-0.534	-0.557	-0.582	-0.606	-0.632	-0.658
	YD	-0.331	-0.386	-0.436	-0.485	-0.529	-0.571	-0.606

MGR: monthly growth rate, SI: social insurance, YD: yearly difference, YGR: yearly growth rate.

Source: Employment Agency; ifo Business Survey.

4.4.5 Sectoral View

One advantage of the ifo Employment Barometer is that it allows views of the labor market according to each economic sector. Figure 4.9 shows the development of the monthly balances of the ifo Employment Barometer for the manufacturing and construction sectors compared with the corresponding annual growth rate of the SI employees. Figure 4.9a illustrates the comparison in the industry. Since employment in this sector is subject to very strong cyclical fluctuations and thus has a decisive influence on the German business cycle, it is important to accurately assess the labor market situation in this sector. Here, the ifo Employment Barometer has a stable lead. In the right-hand part of the figure, a good correlation with the annual change in employment can also be seen in the construction sector. However, a few isolated events, such as in the winter of 2009/2010, disrupt the context.

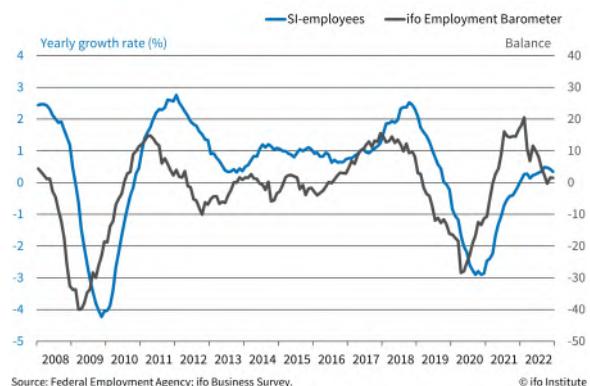
Table 4.7 shows the cross-correlations for manufacturing and construction. In both cases, the correlation is very good, especially in relation to the annual growth rate. As already shown in Figure 4.8, the ifo Employment Barometer has a good lead. The highest correlations are revealed by a monthly comparison. In the main construction industry, the ifo Employment Barometer is characterized by very good synchronization.

4.4.6 Analysis Potential and Research Output

Henzel and Wohlrabe (2014) compare the results of the ifo Employment Barometer with the results of the IAB Labor Market Barometer and find a close connection between both indicators

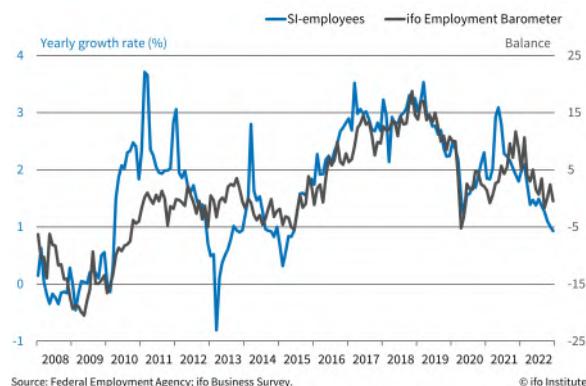
Figure 4.9: Comparison of the ifo Employment Barometer with various labour market indicators

(a) Manufacturing



Source: Federal Employment Agency; ifo Business Survey.

(b) Construction



Source: Federal Employment Agency; ifo Business Survey.

Table 4.7: Cross-correlations employment barometer and sectoral labour market indicators

lead in months	-6	-5	-4	-3	-2	-1	0
Industry SI employees							
MGR	0.421	0.504	0.587	0.660	0.712	0.750	0.792
YGR	-0.067	0.034	0.139	0.245	0.349	0.449	0.545
Construction SI employees							
MGR	0.257	0.228	0.226	0.232	0.204	0.265	0.275
YGR	0.786	0.790	0.788	0.793	0.782	0.790	0.792

MGR: monthly growth rate, SI: social insurance, YGR: yearly growth rate.

Source: Federal Employment Agency; ifo Business Surveys; calculations by the ifo Institute.

and the German labor market. They point out that the ifo Employment Barometer is the most reliable indicator of changes in employment, while the IAB Barometer provides a more detailed picture of the monthly dynamics of the number of registered unemployed persons. They also show that the ifo Employment Barometer is a reliable indicator for all target variables and proves to be advantageous when economic decisions in connection with the demand for workforce are in the foreground. However, it shows survey-based weaknesses when it comes to changes in the legal framework. Hutter and Weber (2015) also confirm the barometer's forecast for the unemployment rate using regression models. Lehmann and Wohlrabe (2017b) use the same framework for the prediction of employment figures. Lehmann and Weyh (2016) show for many European countries how survey data can be used to forecast labor market data. In the course of the harmonization of the questionnaires across the economic sectors, an ex-post question was also raised for the purpose of qualification. It asks how the number of persons employed has changed in the previous month. This is particularly important for productivity analyses. The EBDC can be used to work with the corresponding micro-data.

4.5 The ifo Business Uncertainty Indicator

STEFAN LAUTENBACHER, STEFAN SAUER, KLAUS WOHLRABE

4.5.1 The Impact of Uncertainty on Economic Activity

Economic uncertainty is a much-discussed topic in politics, central banks, and macroeconomic research. In the past decade, uncertainty has often been cited to explain the slowing of the economy, for instance during the eurozone sovereign debt crisis, the Brexit negotiations, the trade war between the US and China, and the war in Ukraine with its economic impacts. Uncertainty can affect the economy through various channels. On the one hand, it can increase risk premiums on financial markets and thus the cost of financing. On the other hand, higher uncertainty can make households and firms more cautious and may cause them to postpone decisions that are not easily reversed. If households are reluctant to buy durable consumer goods, such as cars and furniture, and businesses postpone investments and new hires, overall economic demand can be weakened.

4.5.2 Measuring Uncertainty

Since uncertainty is not directly observable, various proxy measures have been developed. These include the implied or realized volatility of stock market returns, the dispersion of business expectations (Grimme and Stöckli 2018), and counts of uncertainty-related keywords in newspaper articles (Bachmann et al. 2013; Baker et al. 2016; Bloom 2009). However, these measures sometimes show large differences (Kozeniauskas et al. 2018). It is also an open question how well they are aligned with the actual perceived uncertainty of decision-makers in the economy. Their uncertainty is crucial, as it can influence consumption and investment behavior. For this reason, in recent years surveys have been increasingly used to measure the subjective uncertainty of households and firms. Concerning firms, since April 2019 the ifo Institute has elicited the uncertainty of managers in its monthly ifo Business Survey with the following question:

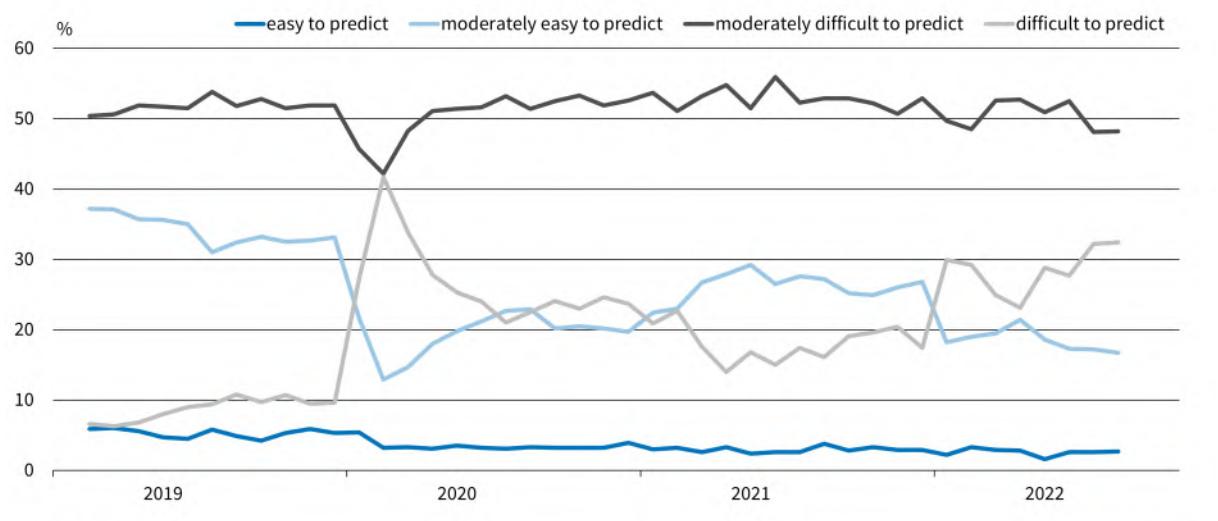
The **future development** of our **business situation** is **currently**

- easy to predict
- moderately easy to predict
- moderately difficult to predict
- difficult to predict

A possible advantage of this question is that it captures uncertainty indirectly by omitting the words “uncertainty” or “uncertain”. Since the use of terms that have negative connotations for respondents might blur the measurement, a possible bias in the answers is avoided.

Figure 4.10 shows the shares of the answers of all participating companies since the question was introduced. On average, more than half of the participants choose the category “rather difficult”. Before the start of the COVID-19 crisis, the category “rather easy” followed with a share of between 30% and 40%, while the share of respondents who find it difficult to predict their firm’s future business development initially fluctuated around 10%. However, in March and April 2020, during the outbreak of the COVID-19 crisis, there was a sharp rise to over 40%. This share shrank considerably in the following months. Following the beginning of the war in Ukraine and the resulting uncertainties, it is again currently (October 2022) over 30%.

Figure 4.10: Share of the four uncertainty categories in all answers



Source: ifo Business Survey.

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From these shares, the ifo Business Uncertainty Indicator for the German economy is calculated by the following formula, which weights the degree of uncertainty of the four answer categories easy (e), rather easy (re), rather difficult (rd), and difficult (d):

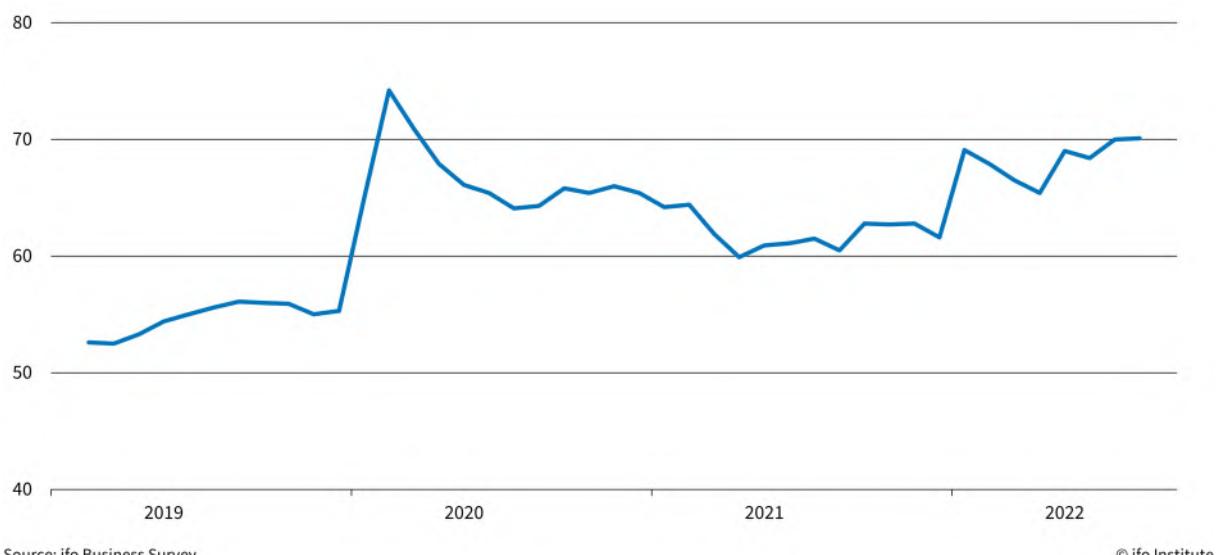
$$Uncertainty = 0 \cdot share(e) + \frac{1}{3} \cdot share(re) + \frac{2}{3} \cdot share(rd) + 1 \cdot share(d) \quad (4.1)$$

The value range of the ifo Business Uncertainty Indicator thus lies between 0 and 100, whereby 100 reflects the highest uncertainty. This would occur if all firms chose the category “difficult”. A value of 0 would accordingly mean that all firms are able to predict their business development easily.

Figure 4.11 shows the ifo Business Uncertainty Indicator since April 2019. The indicator has been consistently above 50, which marks the center of the uncertainty scale. Together with the answer shares in Figure 4.10, this suggests that there is a certain basis level of uncertainty

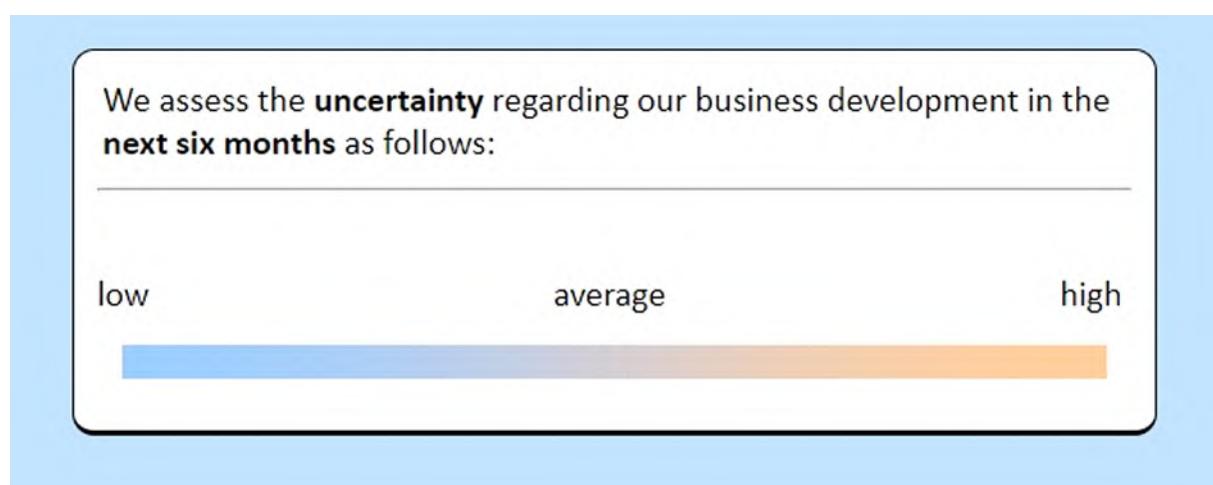
4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.11: ifo Business Uncertainty Indicator



among managers regarding the further course of their business. Even before the COVID-19 crisis, that is, in comparatively quiet economic times, it was not easy for managers to predict their future business development. The beginning of the COVID-19 crisis marks the peak of the ifo Business Uncertainty at 73.8 in April 2020. However, the current uncertainty (October 2022) is also very high, the value of 70.1 being the third highest value since the start of the indicator.

In addition to this uncertainty measure, since July 2017 uncertainty has also been elicited using a direct question in the ifo Business Survey:



The respondents can indicate their subjective uncertainty on an approximately continuous scale, the ends of which are labeled “low” and “high”. The scale has values between 0 and

100, whereby higher values correspond to higher uncertainty. The weighted average of the answers to this direct question gives a second uncertainty indicator.

Figure 4.12: Comparison of the two uncertainty measures for the overall economy

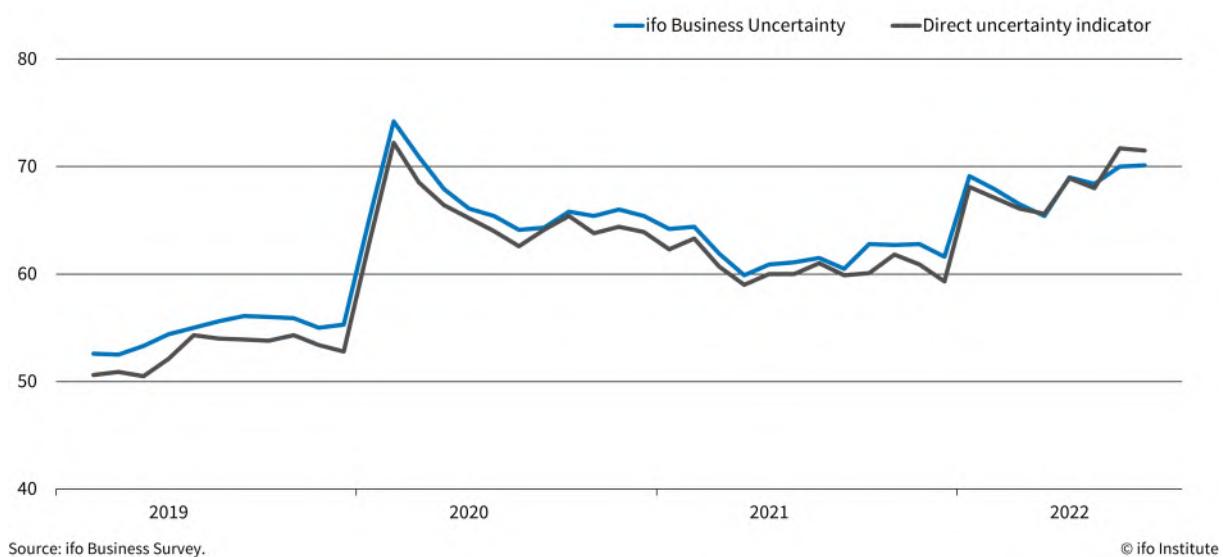
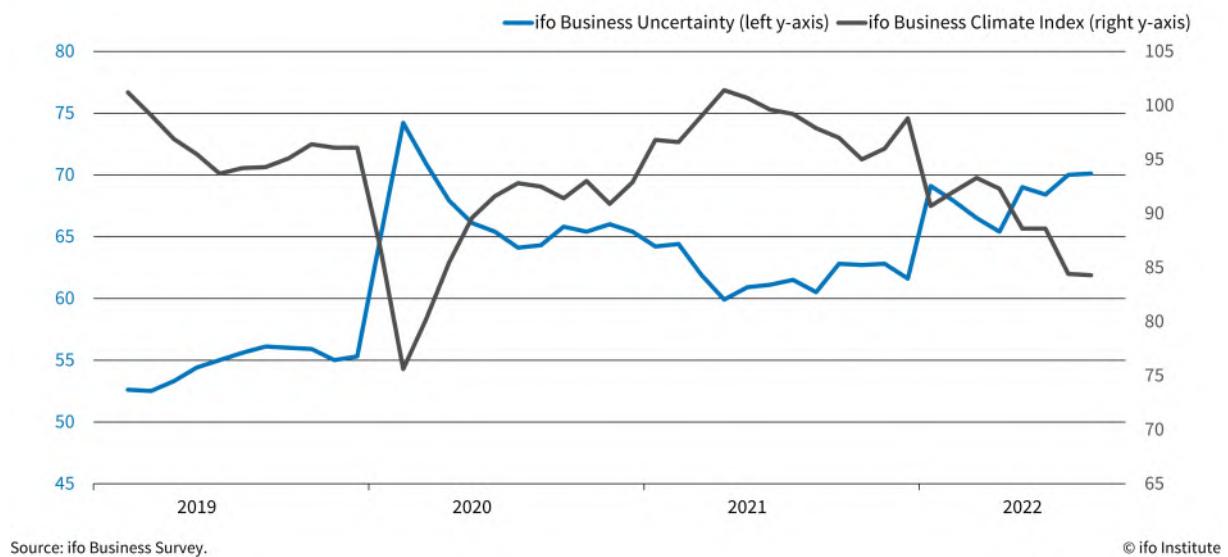


Figure 4.12 shows that the (still relatively short) time series of the two uncertainty indicators are almost identical. This suggests that the two different underlying questions of the indicators measure the same perception, which validates the results of the ifo Business Uncertainty Indicator. Moreover, it implies that managers seem to have a good understanding of the concept of uncertainty: If business leaders find it more difficult to predict their future business situation, on average they also rate their own uncertainty as higher. Lautenbacher 2020 discusses these measures of uncertainty in detail and additionally compares them with firms' business expectations for the next six months and their current business situation as ascertained by the ifo Business Survey. He finds that the more pessimistic managers are about their future business development and the more negatively they assess their current business situation, the more uncertain they are. There are also two special cases. First, even in a business situation rated as "good", uncertainty can be high if a deterioration of the situation is expected. Second, managers remain uncertain in a business situation rated as "bad" even if they expect the situation to improve.

Based on these findings, it is not surprising that the new uncertainty measure also has a strong negative correlation with the ifo Business Climate Index (see Figure 4.13). After all, the index is constructed as the average of the assessments of the current business situation and the business expectations. A deterioration in the ifo Business Climate Index is thus typically accompanied by an increase in perceived uncertainty. In times of a rising ifo Business Climate Index, managers tend to find it easier to predict the future development of their business situation.

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.13: Comparison of the ifo Business Uncertainty and the ifo Business Climate Index



4.5.3 Conclusion

To sum up, the ifo Business Uncertainty Indicator is based on managers' perceptions of how difficult they find it to predict the future business development of their firm. As such, it measures uncertainty at the decision-maker level, where it may affect investment and hiring, and, at an aggregate level, the business cycle. The indicator almost perfectly follows a second measure of firms' subjective uncertainty, and it is strongly negatively related to the ifo Business Climate Index. The ifo Business Uncertainty Indicator is published monthly with the press release for the ifo Business Climate Index. Furthermore, the uncertainty is also calculated on the sector and industry level as well as for different regions and firm sizes.

4.6 The ifo Credit Constraint Indicator

ARTEM MARJENKO

4.6.1 Basic Idea and Objectives

Historically, banks have played an important role in funding businesses in Germany (Deutsche Bundesbank 2012, Bendel et al. 2016). Indeed, although enterprises have been making considerably less use of bank loans over the last twenty years, bank loans still remain one of their main sources of finance. The data in Germany's national financial report (as of the end of 2020) indicate that loans from domestic banks account for 38.2% of the total loan volume and 20.7% of the total debt of the corporate sector (in 2000, the corresponding figures were 77.5% and 43.7%). Firms' access to bank loans is therefore crucial for providing money to the economy. If banks restrict their credit supply to an extent that poses a threat to the economy, this is referred to as a credit crunch (Deutsche Bundesbank 2009, p. 22 ff). The last time a significant danger of a credit crunch existed was in 2008, amid the global financial crisis. The ifo Credit Constraint Indicator was designed in June 2003 to measure firms' access to bank loans and identify possible credit crunches. Furthermore, it can be utilized in quantitative analyses to forecast credit growth.

Aside from the ifo Business Survey, there is another survey in Germany which analyzes banks' lending behavior on a regular basis: the Bank Lending Survey. This is conducted among commercial banks by the German Central Bank (Bundesbank). The major indicator resulting from this survey is called the credit standards (Deutsche Bundesbank 2016, p. 16). It is very interesting to compare the ifo Credit Constraint Indicator with the Bank Lending Survey's credit standards, since both indicators reflect the lending behavior of banks, but originate from two different surveys: The credit constraint indicator is determined on the demand side (enterprises), the credit standards on the supply side (banks). In fact, both indicators show a similar pattern (Marjenko et al. 2014, p. 35 ff).

4.6.2 Design of the ifo Credit Constraint Indicator

In January 2017 the design of the ifo Credit Constraint Indicator was changed. The two following subsections describe the "old" (before January 2017) and the "new" (after January 2017) indicators. Since they have a different design, the two indicators should not be considered the same. They each form a separate time series.

4 Other Indicators and Analyses from the ifo Business Survey

4.6.2.1 The ifo Credit Constraint Indicator before January 2017

Up until December 2016, the underlying question behind the ifo Credit Constraint Indicator was: “How do you currently assess the willingness of banks to provide loans to enterprises?”

- accommodating
- normal or usual
- reluctant/restrictive

The credit constraint indicator is the share of firms who choose the option “reluctant/restrictive”. The question was first introduced in the ifo Business Survey in spring of 2003, when Germany’s banking system was suffering a severe crisis. It was asked twice a year at that time. Starting from November 2008, it was asked on a monthly basis in response to the outbreak of the global financial crisis. The business sectors covered by the survey were the manufacturing industry, the construction industry, wholesale trade, and retail trade.

However, the question on the banks’ lending behavior and the construction of the indicator differed methodologically from the usual principles used in the ifo Business Survey:

1. The question was not only geared towards firms’ experience in loan negotiations with banks and hence did not abide by the ifo Business Survey principles. It was rather worded as an opinion poll. Indeed, an ifo study (Hainz and Hristov 2017b) based on a one-time supplementary question in the ifo Business Survey established that many survey participants answered the question although they didn’t need a bank loan at that point at all (and therefore didn’t negotiate with banks on loans).
2. The collected data on the banks’ lending behavior constitute a so-called unbalanced panel (i.e., with data gaps), which bears certain implications for the microeconometric analysis of the data. This is because it’s very unlikely that a firm which applied for a loan in one month would also apply for a loan in the next month and thus would not be able to provide a reasonable response to the question.
3. The ifo Credit Constraint Indicator is the share of “-”-responses and not – as otherwise usual in the ifo Business Survey – the balance of “+” and “-” responses. A restrictive access to bank loans is of prime interest here, while other response categories are less important.

4.6.2.2 The ifo Credit Constraint Indicator after January 2017

A major drawback of the old question on banks’ lending behavior was that it didn’t specifically ask for firms’ experience in loan negotiations with banks. To fix this, the question was redesigned in 2017 and now reads:

We have conducted loan negotiations with banks in the past 3 months:

- Yes
- No

If yes:

the banks' behavior was:

- accommodating
- normal
- restrictive

If no:

- no need for a bank loan
- other reasons

The new ifo Credit Constraint Indicator is the share of “restrictive” responses now based only on firms who actually negotiated with banks.

Besides the sectors manufacturing industry, construction industry, wholesale trade, and retail trade, the service sector is now also surveyed and thus included in the indicator. The aggregation of micro data (i.e., single responses) into credit constraint indicators for various branches of the economy is done with the same methodology as with all the other indicators from the ifo Business Survey (see Subsection 2.2.3). The survey periodicity for the new question was changed from monthly to quarterly, with the question being asked in the last month of each quarter (i.e., in March, June, September, and December). Changing to a quarterly cycle should guarantee a sufficiently large number of “yes” responses in the upper question and thus allow for a representative evaluation. Also, the problem of an unbalanced panel mentioned previously (see item No. 2 above) is mitigated. The ifo Credit Constraint Indicator is still defined as the share of “-”-responses rather than the balance of “+” and “-” responses (see item No. 3 above).

Since the new question on the banks' lending behavior is more comprehensive than the old one, it can be used to obtain further indicators:

- Demand for bank loans:

$$\frac{\text{Number of “yes” responses}}{\text{Number of “yes” responses} + \text{number of “no” responses}}$$

- No prospect of a loan (no loan negotiations despite need for loan):

$$\frac{\text{Number of “other reasons” responses}}{\text{Number of “yes” responses} + \text{number of “other reasons” responses}}$$

4.6.3 Survey Results on Credit Constraints

Figure 4.14 shows the dynamics of the ifo Credit Constraint Indicator in the major sectors of the economy from the very beginning of the time series in June 2003. High levels of the indicator in 2003-2005 reflect the financial crisis caused by the burst of the dot-com bubble in 2000. The spike in 2009 was triggered by the subprime mortgage crisis in the US and the subsequent global financial crisis starting in 2008. More recently (in the course of 2022), the indicator began to rise again, as many central banks – including the ECB – rapidly dropped the policy of monetary accommodation in an attempt to bring down high inflation, which led to higher interest rates and an associated rise in borrowing costs. As of November 2022, it is hard to say if this recent growth of the indicator is going to become a long-lasting trend.

Figure 4.14: ifo Credit Constraint Indicator by economic sectors

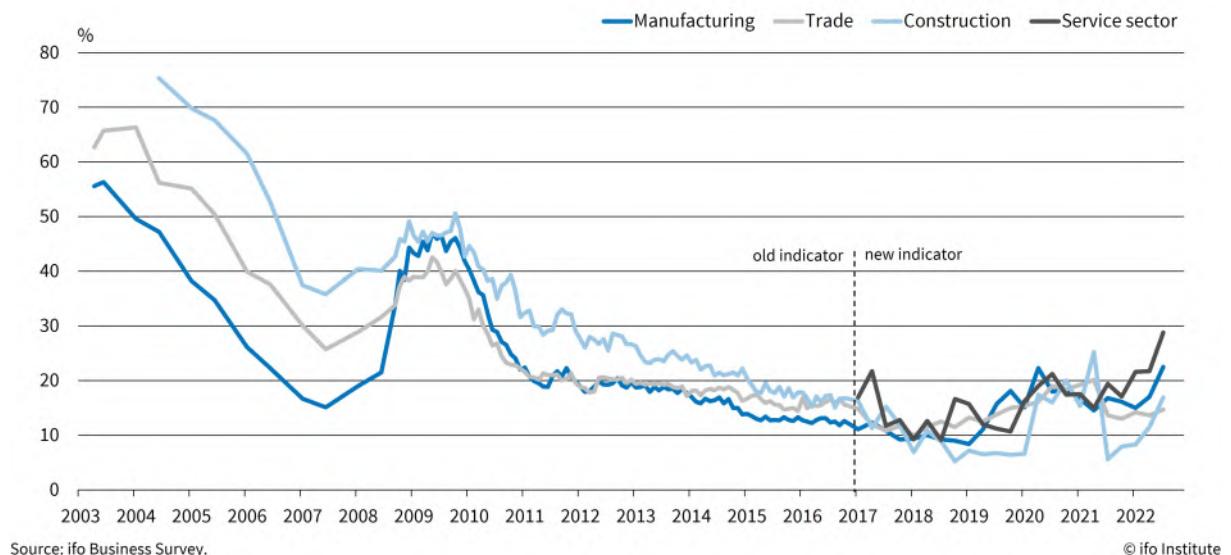
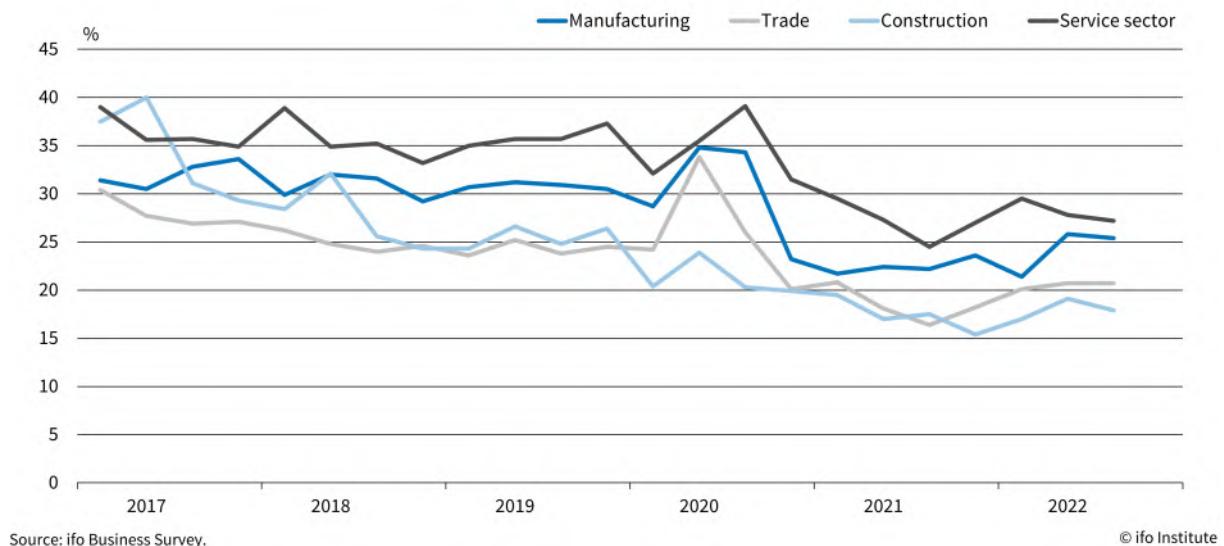


Figure 4.15 illustrates the demand for bank loans across different sectors, which is determined as the share of companies who conducted loan negotiations with banks. All the curves are somewhat downward sloping, except for a slight boost in Q2/2020 at the beginning of the COVID-19 pandemic. At that point the strictest lockdowns were implemented, pushing some businesses to the brink of bankruptcy, which they sought to avoid by taking out a loan. Recently (Q3/2022), approximately every fourth company in the manufacturing industry and the service sector and every fifth company in the trade sector and the construction industry has relied on bank loans.

More detailed descriptions of the survey results and the ifo Credit Constraint Indicator can be found in numerous publications, e.g., Hott and Kunkel (2003), Kunkel (2004, 2007) and Marjenko et al. (2012, 2014, 2019).

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.15: Demand for bank loans by economic sectors



Source: ifo Business Survey.

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4.7 The ifo Investment Expectations

STEFAN SAUER, TIMO WOLLMERSHÄUSER

4.7.1 A History of ifo's Investment Surveys

The business cycle is closely linked to economic investment. Economic downswings are often accompanied by reduced investment, while upswing and boom phases mostly come with a high investment activity. These investments can stimulate the economy and are a precondition for steady economic growth. However, official data on investment is only available after a considerable delay. Therefore, good early indicators for economic investment are very helpful for business cycle analysis and economic forecasting.

The ifo Institute has always focused on investment surveys for different industries, such as the ifo Investment Survey in Manufacturing (Weichselberger 2007) and the ifo Investment Survey for the Leasing Industry (Städtler 2019), which had been conducted since the 1950s and 70s respectively. Among other questions, these surveys asked the participating companies for the exact volume of their actual and planned investments, measured in euros (D-Mark before the year 2002).

The investment survey activities were eventually extended to other industries to cover the investment of the German economy more broadly. In contrast to the quantitative investment surveys in the manufacturing and the leasing industry, companies from other industries were only asked for a trend of their investment activity. In the trade sector, questions about total investment as well as investments in buildings and in equipment have been included once a year in the ifo Business Survey since 2000, and twice a year in the service sector since 2005.

4.7.2 The Investment Survey since 2015

In 2015, a uniform set of qualitative questions was introduced in the ifo Business Survey for manufacturing, trade, and services. For the construction industry, no investment questions were added, as it only contributes a share of 1 percent of the overall economic investments. Although the construction companies realize a large part of the investments in buildings, the investment itself is assigned to the industry that pays for the investments.

These uniform investment questions are now asked twice a year in March and November. The former quantitative investment surveys for the manufacturing industry and the leasing industry, on the other hand, have been discontinued.

The questions asked in March relate to the past year and the current year:

- Last year, our total investments were higher / approximately the same / lower (compared

to the year before).

- This year, our total investments are expected to be higher / approximately the same / lower (compared to last year).

In November, the time horizon shifts. While the question about the current year is repeated, a question about the coming year is added:

- Next year, our total investments are expected to be higher / remain approximately the same / be lower (compared to the current year).

The same questions are not only asked for total investments but also separately for

- investments in buildings,
- investments in equipment,
- investments in software and databases,
- investments in research and development.

These questions are now used to construct investment indicators. These so-called ifo Investment Expectations are available for the overall economy, on the industry-level, and for various sub-industries. The weighting and aggregation of the responses are analogous to the methodology for the other indicators of the ifo Business Survey. As a balance, the indicators show the difference between the percentages of positive answers (higher investments) and negative answers (lower investments). However, as the questions always refer to investment activity in a particular year, no seasonal adjustment is made.

4.7.3 The Forecasting Power of the ifo Investment Expectations

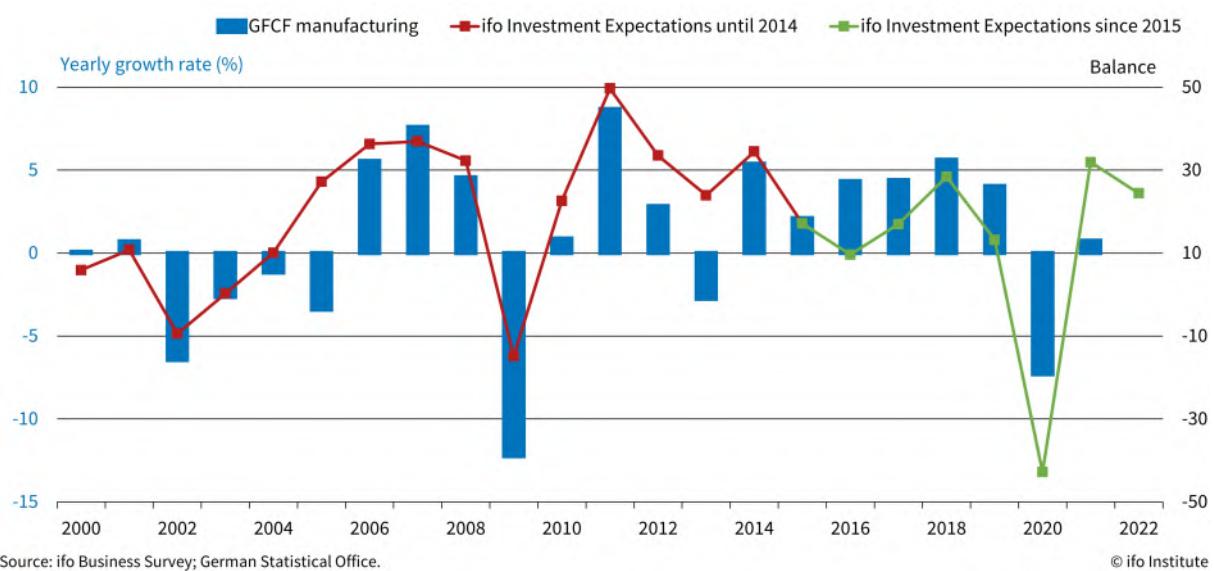
For an analysis of the informative value of the ifo Investment Expectations, the survey results from the years up to 2014 were linked to those from 2015 onwards. For trade and services, this was easily done, as the questions pre-2015 were already qualitative. Since the survey results for the manufacturing industry up to 2014 are only available in quantitative terms, they have been converted into qualitative values. Constant investments were assumed if the investment volume indicated by the company was within a range of ± 1 percent for two consecutive years. Otherwise, quantitative changes in the investment expenditure made or planned were allocated to the “higher” or “lower” category, depending on the direction of the change.

First of all, the ifo Investment Expectations for the current year, which are collected in March, are compared with the actual rate of change in total investment (gross fixed capital formation (GFCF)). The official statistics only provide annual data with a considerable delay. Therefore, the ifo Investment Expectations on the industry level are an important early indicator. Figures 4.16 to 4.18 illustrate the results for the manufacturing industry, the trade sector, and the service sector. The correlation coefficient, which indicates the relationship between the ifo

4 Other Indicators and Analyses from the ifo Business Survey

Investment Expectations and the rate of change of total investments, is 0.77 in manufacturing, 0.62 in trade, and 0.67 in services. The ifo Investment Expectations for the current year, surveyed in March, are therefore a good predictor of the actual change in total investment.

Figure 4.16: ifo Investment Expectations for the current year in manufacturing (March results)



As expected, the correlation between the ifo Investment Expectations and the rate of change of total investments increases with the November survey results. The corresponding coefficient is 0.83 in manufacturing and 0.66 in services (Figures 4.19 and 4.20). For trade, no long-term analysis is yet possible, as investment questions in November have only been asked since 2015.

Furthermore, based on the investment expectations of the three industries, the ifo Investment Expectations are also calculated for the overall economy. Services, manufacturing, and trade are weighted with their respective shares in value added. The ifo Investment Expectations for the overall economy are also very closely related to the rate of change in total private investments (Figures 4.21 and 4.22). Using investment expectations from the spring survey, the correlation coefficient for the current year is 0.78. Using the investment expectations from the autumn survey, this rises to 0.85.

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.17: ifo Investment Expectations for the current year in trade (March results)

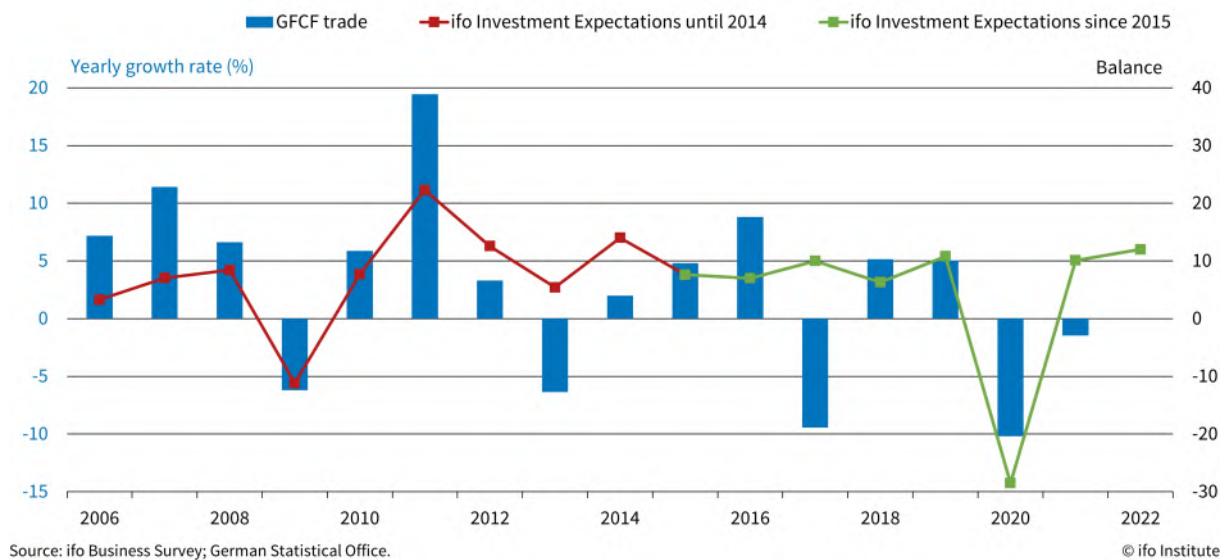
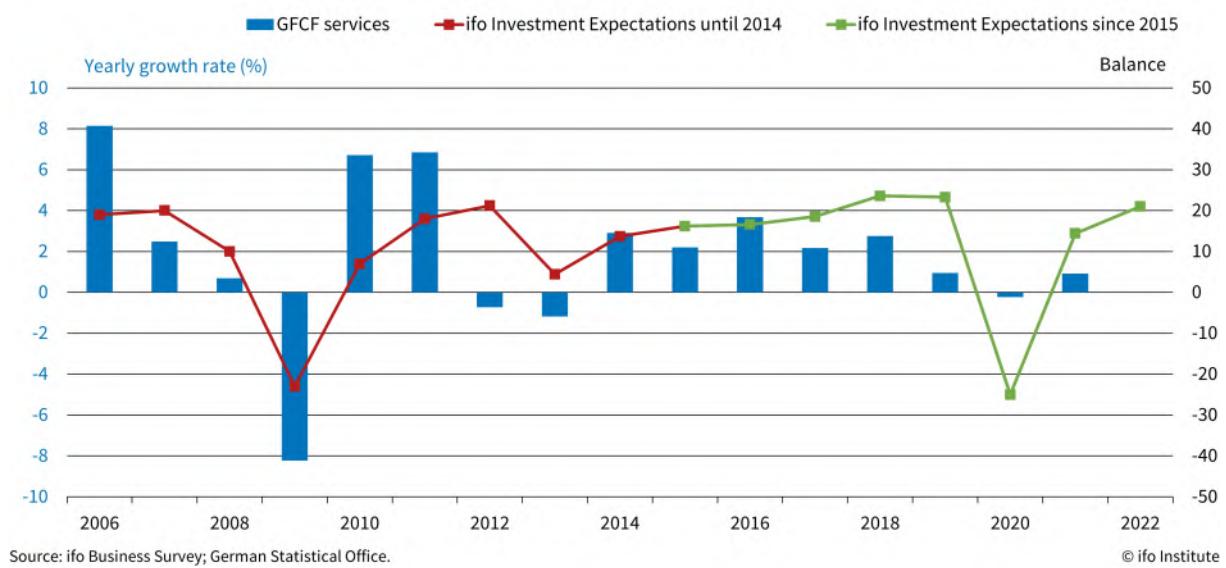


Figure 4.18: ifo Investment Expectations for the current year in services (March results)



4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.19: ifo Investment Expectations for the current year in manufacturing (November results)

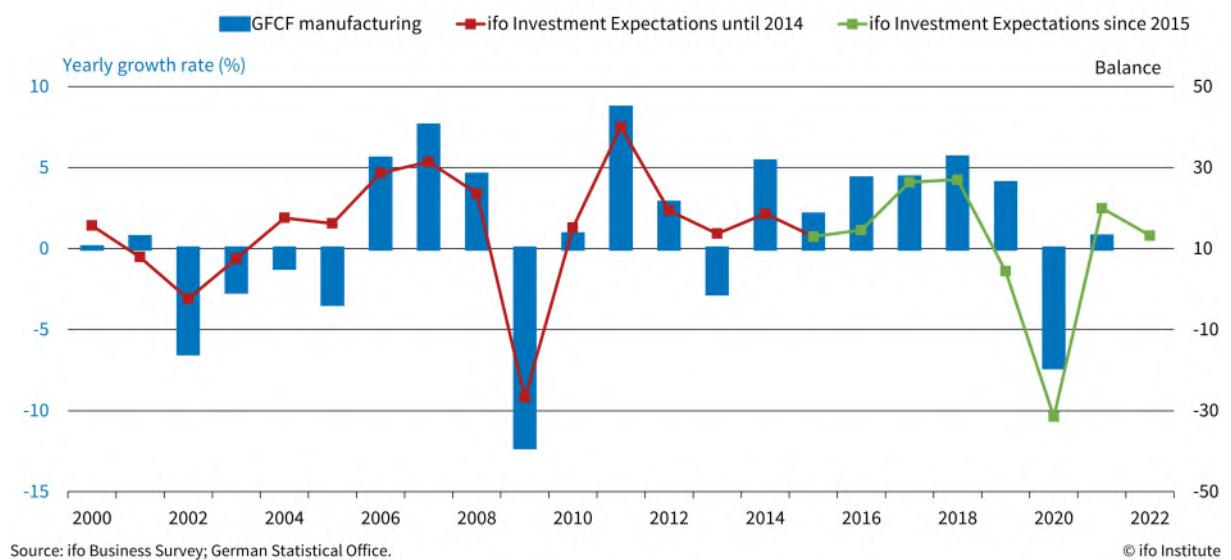
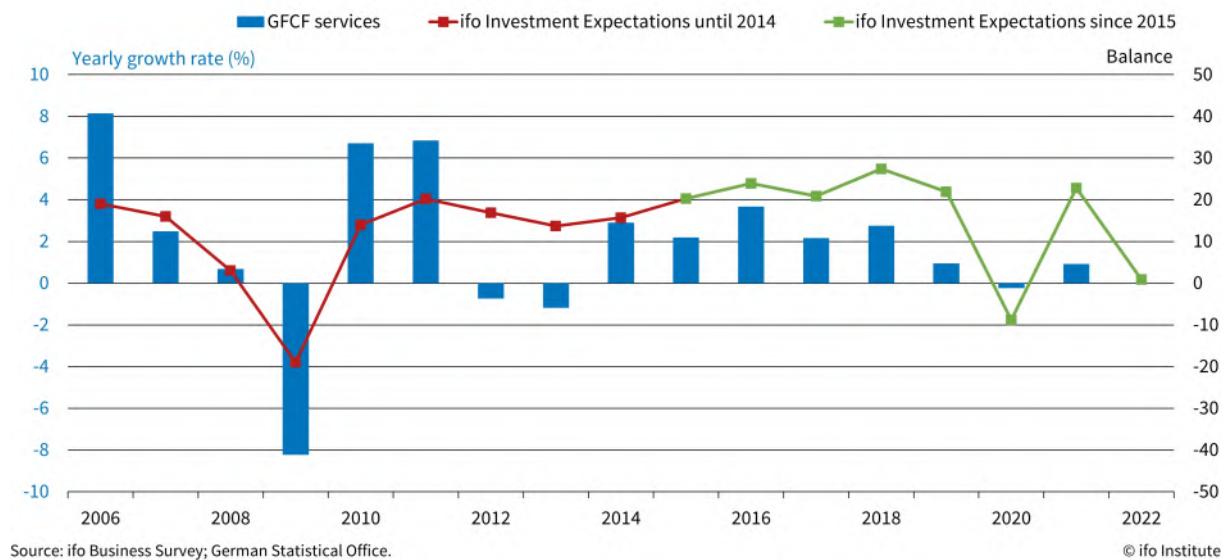


Figure 4.20: ifo Investment Expectations for the current year in services (November results)



4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.21: ifo Investment Expectations for the current year in the overall economy (March results)

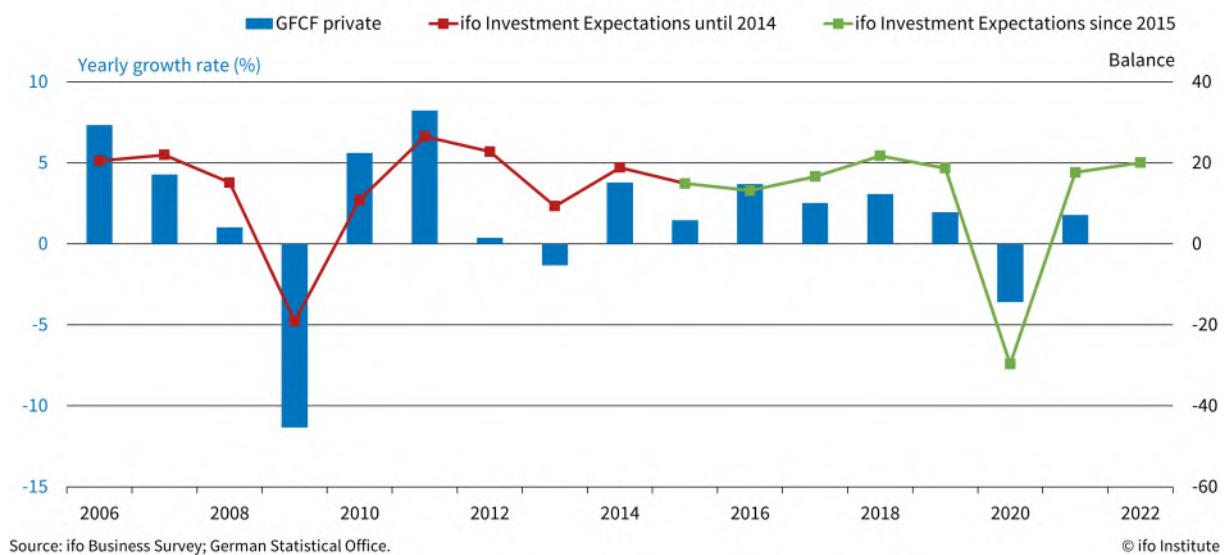
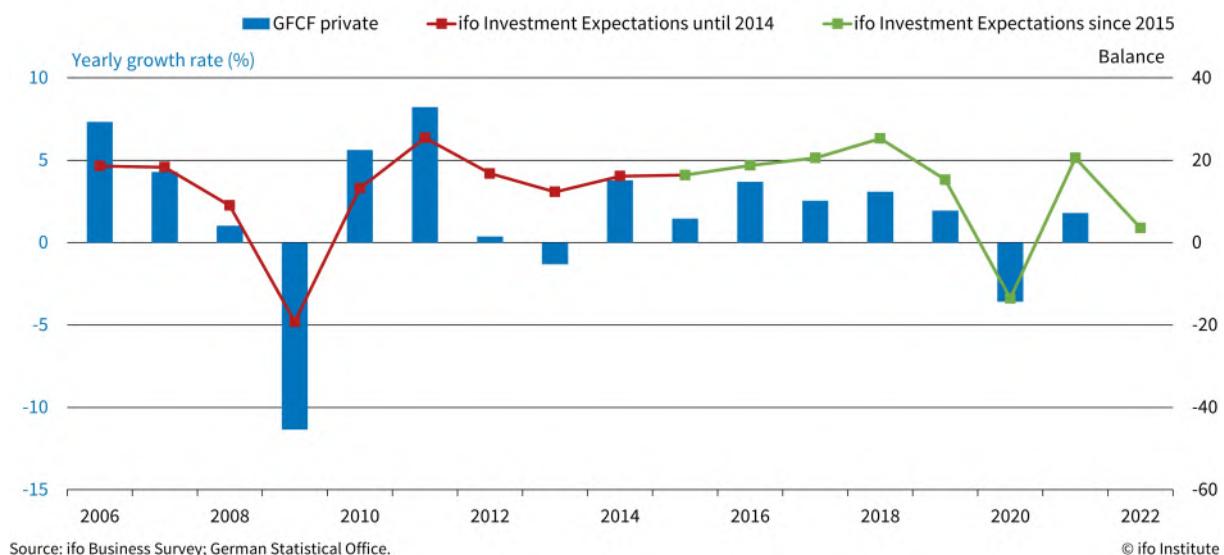


Figure 4.22: ifo Investment Expectations for the current year in the overall economy (November results)



4.8 The KfW-ifo Skilled Labor Barometer

STEFAN SAUER

4.8.1 Concept and Objectives

The shortage of skilled workers has increased considerably in recent years and is now affecting large parts of the German economy. Among the worst affected sectors and professions are the healthcare sector, the construction industry, and science, technology, engineering, and mathematics (STEM) professions. The Covid-19 pandemic increased the severity of the problem even more acutely in sectors such as the hospitality industry. In view of the demographic change and the retirement of the baby boomer generation, this is likely to continue to be a major challenge in the coming decades. According to projections by the Federal Statistical Office (2021a), for example, the working age population (15 to 74) will shrink from 2023 onwards. The Joint Economic Forecast Project Group (2021) therefore assumes that average growth rates in the German economy will fall noticeably below one percent in the second half of the 2020s. Thus, labor shortages may become a serious obstacle to growth in Germany and lead to further bottlenecks in the supply of goods and services.

In order to obtain current information on developments in the shortage of skilled labor, the ifo Institute, in cooperation with KfW Research, has developed a skilled labor shortage indicator based on answers from the ifo Business Survey (“KfW-ifo Skilled Labor Barometer”). Its intention is to describe the shortage situation in a clear and up-to-date manner, help to inform policymakers and the public, and highlight the need for action. In addition to an overall indicator for the German economy, information is also provided for various sectors, federal states, and small and medium-sized enterprises (SMEs) compared to large companies. All indicators are published twice a year in May and November by KfW Research on their website (KfW Research 2022a).

4.8.2 Methodology of the Skilled Labor Barometer

The following question is asked quarterly to all participating companies in the ifo Business Survey:

Our business activity is currently impeded. (yes/no) if yes, by the following factors:

- *lack of skilled workers*
- *lack of low-skilled workers*
- *...*

This is the wording for the service sector. Apart from business activity, the other sectors have different wordings (manufacturing: production activity, construction: construction activity, trade sector: sales activity).

For the calculation of the Skilled Labor Barometer, only the answers to the skilled workers variable are used. The proportion of companies that are affected reflects the degree of shortage of skilled labor in the German economy at the respective point in time. The aggregation of the answers to the indicators follows the methodology used for the ifo Business Climate Index for Germany and for the other indicators of the ifo Business Survey (Sauer and Wohlrabe 2018b).

Information on the shortage of skilled workers has already been collected in the ifo Business Survey in the manufacturing industry since the 1960s. The main indicator of the Skilled Workers Barometer for the overall economy starts in 2009, as the questions on the shortage of skilled workers were also asked in the service sector from this point onward. In the construction industry, questions were only asked in general terms about labor shortages until 2018, before the shortage of skilled workers was also included in the questionnaire. An indicator that also includes construction has therefore only been available since 2018. In the construction sector, the question is surveyed monthly but for the indicator only the first month of each quarter (January, April, July, October) is used, when it is also asked in the other sectors. A list of all indicators (available industries, regions, firm size categories) and the starting dates of the respective time series can be found on the KfW Research website.⁸

4.8.3 Results of the Skilled Labor Barometer

Figure 4.23 shows the main indicator of the Skilled Labor Barometer for the German economy (with and without the construction sector). It indicates the proportion of German companies that are affected by a shortage of skilled workers. It can be seen that the shortage of skilled workers has increased significantly since 2009. Between 2009 and 2011, the indicator rose visibly from around 10 percent to just under 20 percent. It then fluctuated around the 20 percent mark until 2016, after which there was a further significant rise to an interim peak of 36.2 percent in April 2018. As the economy slowed down, the proportion decreased somewhat, but was still over 30 percent at the end of 2019. With the outbreak of the Covid-19 pandemic, which confronted companies with numerous other problems, the extent of the shortage of skilled workers diminished considerably. However, this dip was only temporary.

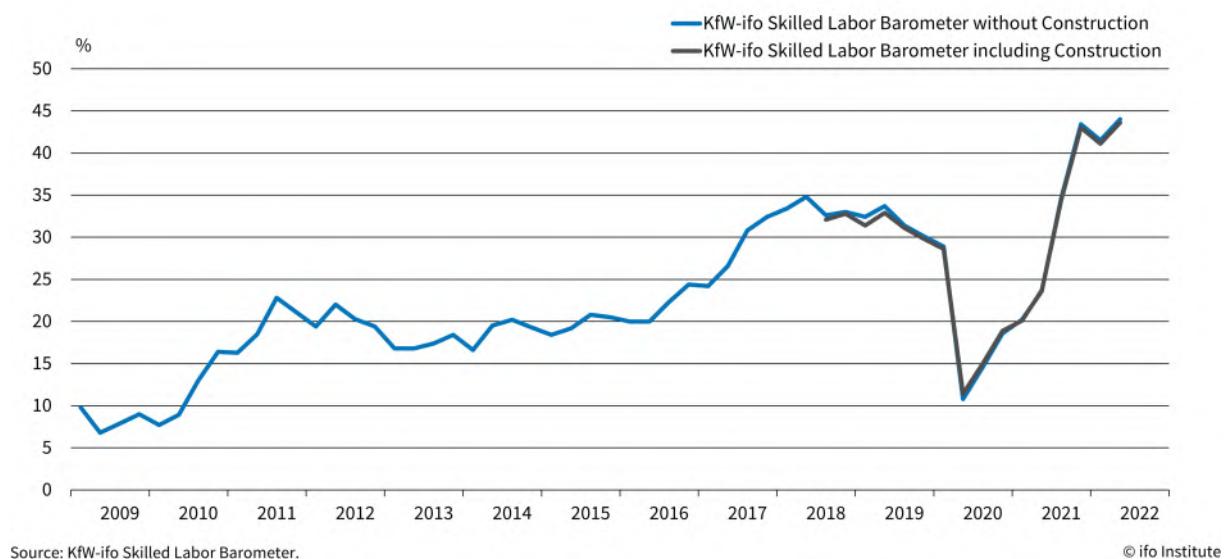
The results from April 2022 showed that 43.6 percent of the companies in Germany were impeded in their business activities by a shortage of skilled workers. This was considerably more than a year earlier (23.7%) and marked an all-time high since the introduction of the question in the survey.⁹

⁸ <https://www.kfw.de/About-KfW/Service/Download-Center/Konzernthemen/Research/Indikatoren/KfW-ifo-Fachkr%23%A4ftebarometer/>

⁹ For a comparison to other European countries see Peichl et al. (2022).

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.23: KfW-ifo Skilled Labor Barometer



Source: KfW-ifo Skilled Labor Barometer.

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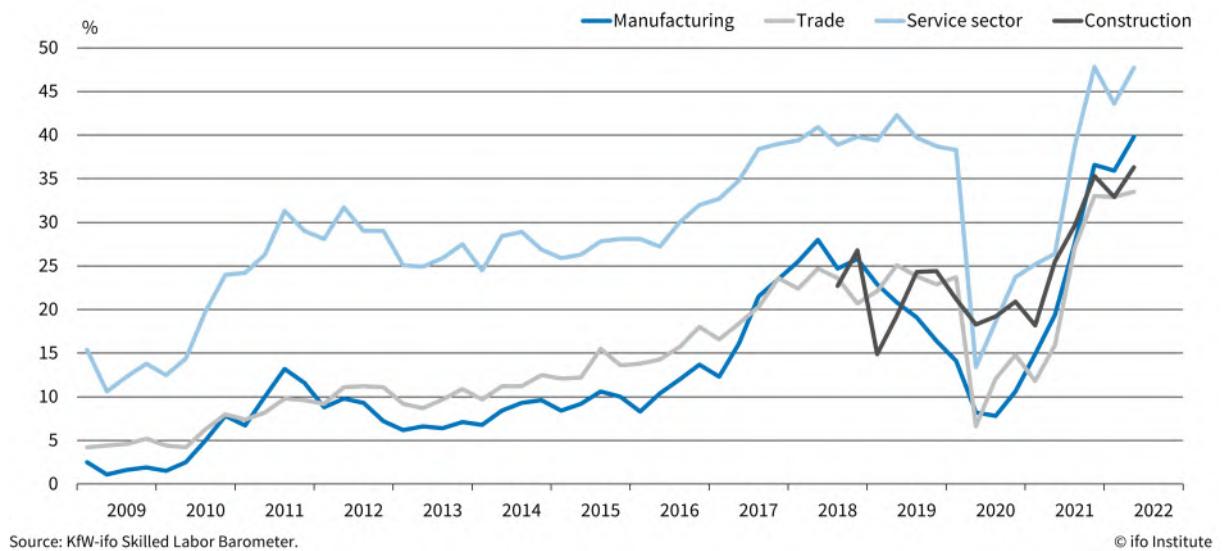
Among the major economic sectors, shortages of skilled workers are currently (April 2022) having the greatest impact in the service sector (Figure 4.24), where 47.7 percent of the surveyed companies reported problems. In the other sectors, the share of affected companies is significantly lower, though the problem has also increased considerably for them. In manufacturing, construction, and the trade sector, in April 2022 the share was higher than ever before.

The survey results also provide information on regional characteristics of the shortage of skilled workers. In structurally weaker regions, a slightly higher number of companies are affected by a shortage of skilled workers. In Eastern Germany, for example, the share of companies affected has been somewhat higher than the overall economic average in recent years. However, it is becoming apparent that the problem is now widespread throughout Germany and not limited to individual regions.

In recent years, hardly any differences can be seen between small and medium-sized enterprises (SMEs) and large companies throughout the German economy. However, differences can be seen at the sector level: While SMEs in the manufacturing sector are struggling much more with the shortage of skilled workers, the problems are noticeably more severe among large companies in the other sectors, especially the service sector (Sauer and Wollmershäuser 2021).

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.24: Skilled workers shortage by economic sector



Source: KfW-ifo Skilled Labor Barometer.

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4.9 Return on Sales and Profit Situation in the Manufacturing Industry

SIMON LITSCHE, RAFFAELA SEITZ

4.9.1 Objective

The development of the return on sales is an important indicator for the economic performance of an industry. As it represents the proportion of profit generated from sales, it is a key decision-making parameter for investors and credit institutions, especially when it comes to providing debt capital. The average return on sales of an industry also plays an important role for politics, e.g., for the allocation of subsidies. However, structural data from official statistics on the return of sales is available only after a considerable amount of time. For example, the annual cost structure survey in the German manufacturing industry is published by the German Federal Statistical Office one and a half years after the end of a reporting year. Due to this temporal lag, it is difficult to draw conclusions about the current economic situation. The ifo indicators on the return on sales and the profit situation close this gap by providing up-to-date information for the manufacturing industry. The ifo Business Survey in the manufacturing industry surveys the participating companies twice a year on this topic. The aggregated results of the qualitative question about the profit situation show the development of the earnings situation of an industry (Ebnet 2015). Moreover, the quantitative information provided by the question on return on sales allows for even more precise estimates.

4.9.2 Survey Questions

The questions on the return on sales and profit situation are asked in the ifo Business Survey in the manufacturing industry in May and September every year. The first question concerns the net profit or net loss after taxes as a share of the net sales. In contrast to most questions in the ifo Business Survey, this is a quantitative question. This means that the survey participants are asked for concrete numerical information on their return on sales. The question also relates to the whole company and not – as usual – only to the relevant product area of the company. Furthermore, it differs from other questions in terms of the time scope because it changes between the two survey months: In May, the respondents are asked for an ex-post assessment of the previous year and in September ex-ante for the current year.

Moreover, the current profit situation is surveyed by qualitative questions: The survey participants indicate trends for their current profit situation and ex-post for the development compared to the situation approximately six months in the past. This is compared either in May: to autumn of the previous year, or in September: to spring of the current year. The exact wording of the questions - for example in 2022 - is as follows:

The **return on sales** of our company (profit or loss after taxes in % of the net sales) was 2021/ is forecasted for 2022¹⁰

a) in case of **profit**:

- up to 1%
- more than 1 to 2%
- more than 2 to 3%
- more than 3 to 4%
- more than 4% and that is approx. ____%

b) in case of **loss**:

- 0 to -1%
- less than -1 to -2%
- less than -2 to -3%
- less than -3 to -4%
- less than -4% and that is approx. ____%

Profit situation (as measured by the operating result from ordinary business activities):

a) We **currently** assess the **profit situation** of our company as

- well
- satisfactory
- bad

b) Our **profit situation** compared to **autumn 2021/first quarter 2022** has

- improved
- not altered
- worsened

¹⁰ or in the financial year which falls mainly in 2021/2022.

In May, ex-post information is requested, which is usually determined using the companies' provisional annual accounts. In September, however, an ex-ante estimate of the return on sales of the current year is examined. This suggests that May's figures tend to be more precise than September's. A comparison of the results shows that returns on sales are usually higher in May than in September, because ex-ante the survey participants tend to estimate their return on sales lower - in accordance with the principle of commercial caution (Seitz and Wohlrabe 2021).

4.9.3 Calculation of the Results

4.9.3.1 Return on Sales

The return on sales is calculated based on a multi-stage procedure. Before the analysis, the micro data has to be prepared. It is necessary to combine the response options "in case of profit" and "in case of loss", which are recorded separately in the micro data set. Furthermore, the response options are designed differently: For losses as well as profits, the first four response options are margins, whereas the last one asks for an approximated numerical value. In the micro data set, all options are combined into one variable.

Subsequently, the actual distribution of the panel, which is divided by economic branches and size classes, is examined. The relative distribution of the size classes within a branch is then corrected according to the target value. Since this adjustment also affects the distribution between the economic branches, the next step is to analyze the corrected actual distribution by branch and adjust it according to its importance. The distribution of the turnover published by the Federal Statistical Office is usually used as a benchmark for the target distribution. However, other variables such as gross value added or the number of employed persons can also be used. Because the branches differ considerably in some cases, it is difficult to generalize. Thus, an individual solution is preferable. The differentiation according to size classes and economic sectors is important since the achieved returns on sales can vary considerably depending on size class and economic sector.

After the weighting procedure, the answers are adjusted for outliers. Typically, between two and six answers are excluded at the top and bottom end of the scale. It is important to ensure that the cleanup is performed in parallel, i.e., that the same number of responses is deleted at both extremes. Finally, the return on sales is condensed as a weighted arithmetic average. Normally, the return on sales is separately broken down by economic sector and size class. It is also quantitatively and categorically analyzed. Furthermore, it is calculated in relation to the profit situation and to the fact that companies made profits or losses.

4.9.3.2 Profit Situation

As the questions on the current profit situation and its development in the last six months are qualitative, the standard aggregation and weighting methodology of the ifo Business Survey

(Section 2.2) can be used. The results show the balance between the shares of the positive and negative answer categories.

4.9.4 Return on Sales and Profit Situation between 2008 and 2021

For an analysis of the results, the period from 2008 to 2021 is considered, as this allows two crises to be compared: the financial crisis and the Covid-19 pandemic. The following sectors of the German industry are analyzed in more detail: manufacturing of chemicals and chemical products, manufacturing of electrical equipment, manufacturing of machinery and equipment, and manufacturing of motor vehicles.

4.9.4.1 Return on Sales

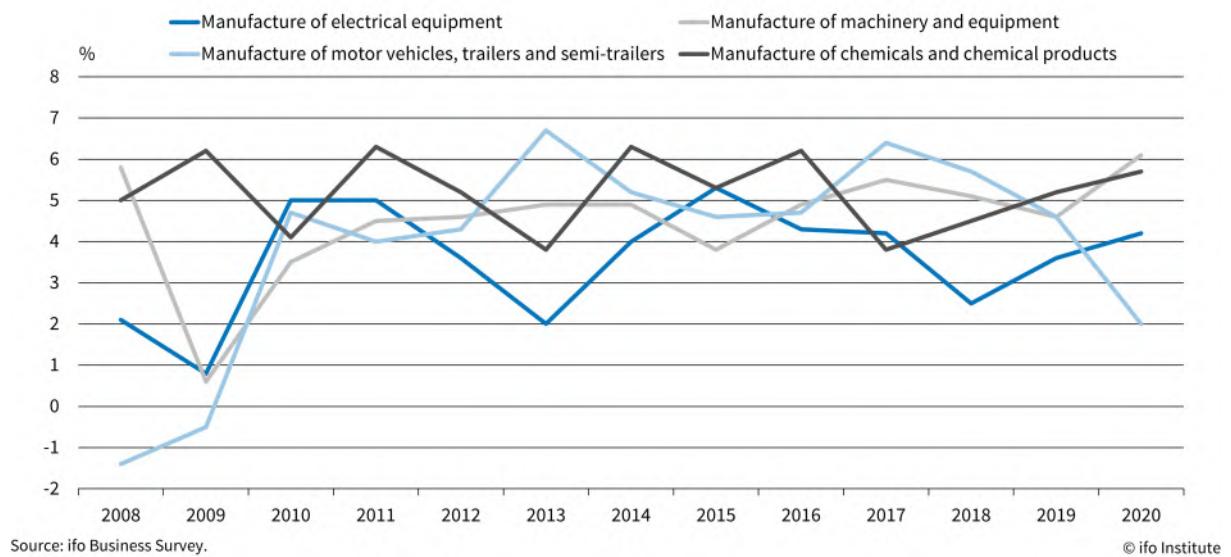
Table 4.8 shows the descriptive statistics for the ex-post and ex-ante questions about return on sales for the years 2019 to 2021. The minimum, maximum, mean, standard deviation, and most frequent value (mode) are listed for each point of time. It can be seen that the minimum and maximum values of the return on sales have grown apart since the 2020 pandemic. In the surveys of May 2019, September 2019, and May 2020, the range was around 65 to 80. Afterwards, these values ranged from 95 to 160. The mean value decreased substantially from September 2020, increased sharply in May 2021, and exceeded the pre-crisis level in September 2021. The standard deviation had a significantly higher level in the last four surveys. Furthermore, a difference can be observed between the ex-ante and ex-post values. This could be due to the cautious estimation carried out in advance (ex-ante) in accordance with the principle of commercial caution. In May, the preliminary financial statements could be used, and as a result these data could be more precise. The most frequently mentioned value was 4% until September 2020. When looking ex-ante at 2020, the most frequently cited figure was only 1%. This shows the big impact of the Covid-19 crisis.

Table 4.8: Net return on sales: descriptive statistics

Survey date	Min	Max	Mean	Standard deviation	Mode
May 2019: 2018 ex-post	-40	30	3,5	4,8	4
Sep 2019: 2019 ex-ante	-30	35	2,9	4,5	4
May 2020: 2019 ex-post	-50	30	3,0	5,6	4
Sep 2020: 2020 ex-ante	-70	25	0,9	6,4	1
May 2021: 2020 ex-post	-99	51	2,4	8,2	4
Sep 2021: 2021 ex-ante	-60	100	3,1	6,1	4

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.25: Weighted return on sales



4.9.4.2 Profit Situation

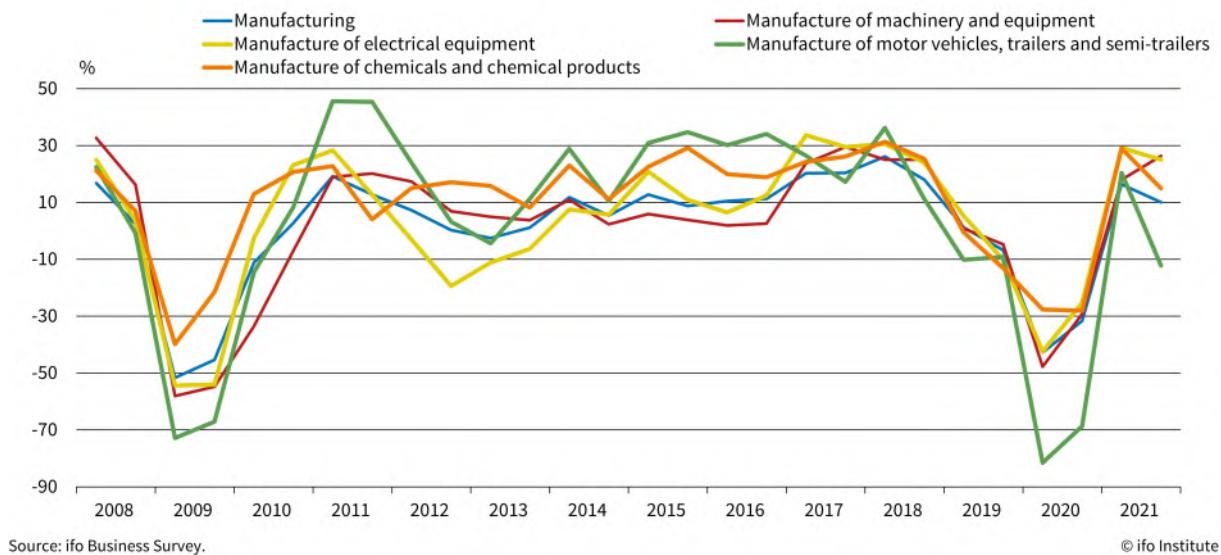
Figure 4.26 visualizes the balance values of the weighted company responses. The balance values for the individual sectors and for the manufacturing sector show a broadly similar pattern, with a dip in May 2009 and 2020. The dip in May 2009 resulted from the global financial crisis, while the other was caused by the pandemic. In both crises, the manufacturers of motor vehicles, trailers, and semi-trailers suffered the most. When comparing the two crises, it is noticeable that in 2009 more respondents (in balance) across all industries spoke of a poor profit situation - except for the manufacturers of motor vehicles, trailers, and semi-trailers. The widest range (from -81.5 to 45.6 balance points) was recorded by manufacturers of motor vehicles, trailers, and semi-trailers. From September 2020 to May 2021, the balance values rose consistently in all sectors. In September 2021, they decreased again across all sectors except for the manufacturers of machinery and equipment.

The development of the profit situation was very similar across the sectors (Figure 4.27). In May 2009 and May 2020, the profit situation deteriorated in many branches compared to previous results because of the prevailing economic crisis. Compared to the previous six-month period, most participants reported a worsened profit situation during the financial crisis, with the exception of the manufacturers of motor vehicles, trailers, and semi-trailers. During both crises, the manufacturers of motor vehicles, trailers, and semi-trailers spoke most frequently of a deterioration, while during the financial crisis the manufacturers of machinery and equipment and the manufacturers of electrical equipment showed the lowest balance value.

In September 2021, the earnings situation developed less positively compared to spring of the

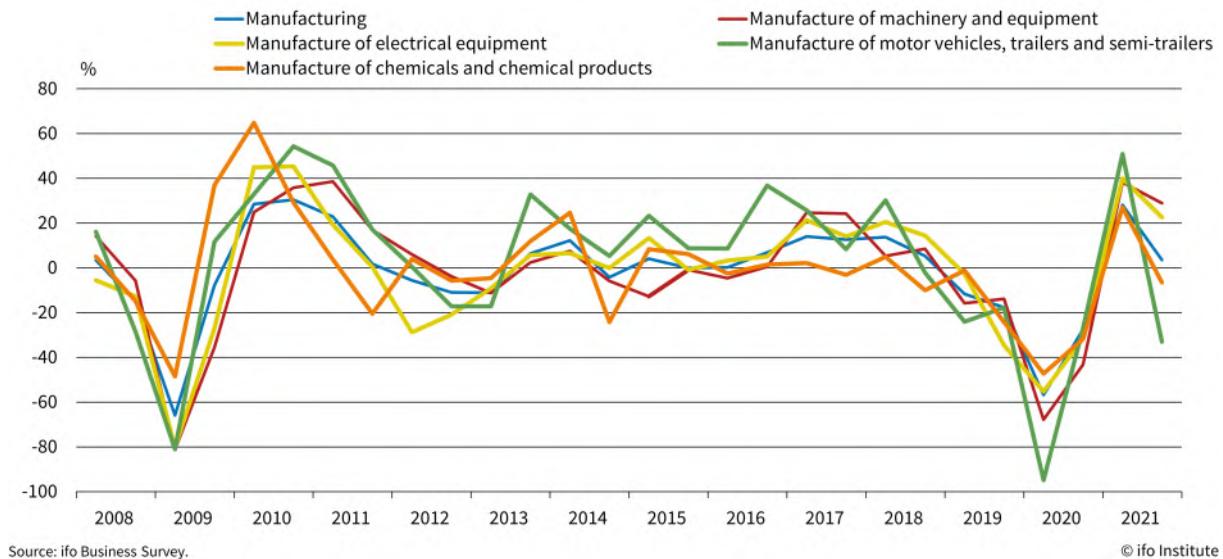
4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.26: Assessment of the profit situation



same year. For the manufacturing industry, positive and negative responses nearly balanced each other out. In the automotive sector, however, the negative responses predominated. This was also due to supply bottlenecks (Wohlrabe 2021).

Figure 4.27: Development of the profit situation



4.10 The Bitkom-ifo-Digital-Index

STEFAN SAUER, KLAUS WOHLRABE

4.10.1 Concept and Objectives

The digital economy is an increasingly important economic sector, covering a broad spectrum of subdivisions associated with digitization. However, there is no official data on economic developments in this sector. To close this gap, the ifo Institute constructed a business climate for the digital economy in Germany, known as the Bitkom-ifo-Digital-Index. Including information from the manufacturing, trade, and service sectors, the index was developed in cooperation with Bitkom, the most important industry association of the digital economy in Germany. It is published exclusively by Bitkom and can be accessed on their website¹¹ alongside with other results.

Information and communications technology (ICT) companies supply technologies and services for the processing and communication of data and thus form the core of the digital economy. The special significance of ICT results from its function as an important driver of innovation and growth in almost all economic sectors. While digitalization was initially limited to individual companies and industries, it is now increasingly shaping economic and social change. Thus, digitalization is a decisive factor not only for the competitiveness of individual companies, but also for the future viability of entire economies in global competition.

Since there was no official definition of the digital economy in the classification of economic activities by the Federal Statistical Office (2009), the economic sectors included in the new digital index first needed to be defined. In consultation with Bitkom, ifo has decided to include four manufacturing sectors (electronic components; computers and peripheral equipment; communication equipment; consumer electronics), three service sectors (telecommunications; computer programming, consultancy, and related activities; data processing, hosting, and web portals), and wholesale and retail ICT trade.

To calculate the indicators for the digital economy as a whole, existing time series from the monthly ifo Business Survey are used for the mentioned economic sectors and aggregated with corresponding weights. These weights are based on the number of persons employed in the respective sectors. With a total of 75.9%, the service activities have by far the largest weight on the digital index. Trade activities (12.9%) and hardware manufacturing (11.2%), on the other hand, are included in the overall indicator with a lower weight. The distribution is also roughly reflected in the number of participants in the ifo Business Survey. In total, the digital index is based on answers from around 470 companies. The Bitkom-ifo-Digital-Index calculates a geometric mean of the current business situation and business expectations

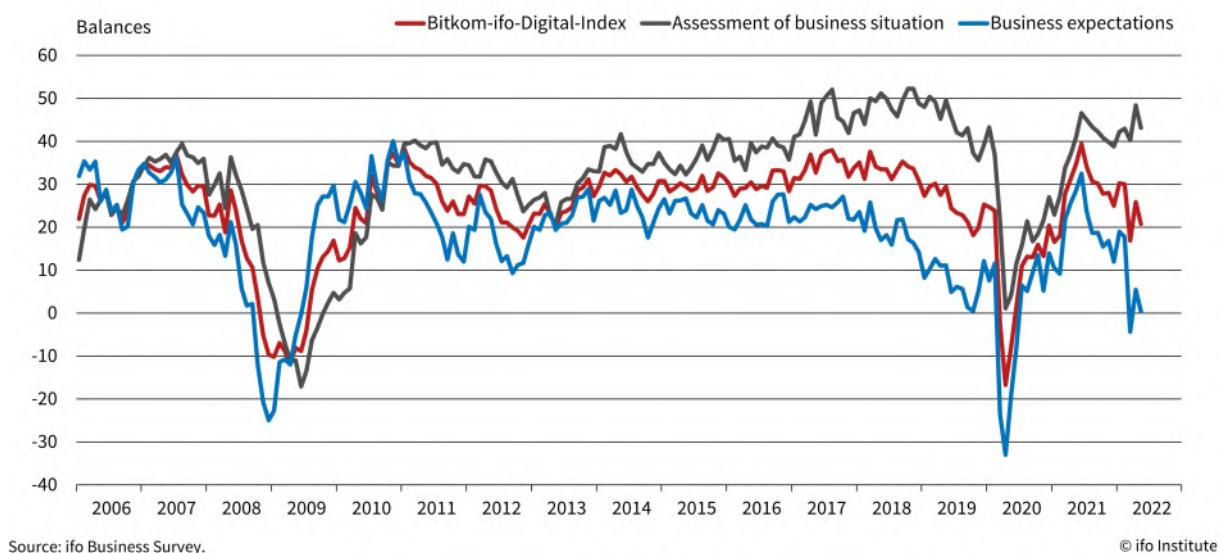
¹¹ <https://www.bitkom.org/Digitalindex>

(Sauer and Wohlrabe 2018b), analogous to the methodology of the ifo Business Climate Index for Germany.

4.10.2 Results

Figure 4.28 shows the Bitkom-ifo-Digital-Index together with its two components. In the first years of the time series, for example during the significant downswing and recovery associated with the global economic crisis of 2008/2009, it can be seen that the development of the business situation usually followed the expectations with a lag of a few months. This didn't hold at the outbreak of the Covid-19 crisis, when both time series plummeted at the same time; the recovery of both time series was also almost parallel. In the years before, the majority of participating companies were satisfied with their current business situation while the expectations were characterized by dwindling optimism. One reason for this was that the already very good assessments of the situation could hardly improve any further. Correspondingly, companies indicated that the current situation should remain good. The situation in 2022, after the Russian invasion of Ukraine, was mostly characterized by rising energy prices and supply bottlenecks. Thus, the expectations of the firms were clearly less optimistic. The current business situation, however, was still assessed as very good.

Figure 4.28: The Bitkom-ifo-Digital-Index and its sub-indices



In comparison with the ifo Business Climate Index for Germany, the upswings and downswings of the two indicators largely coincide in time. In fact, the basic course of the time series is similar. This is also confirmed by the very high correlations between the series of more than 0.9 in each case (Pols et al. 2019). However, the short-term economic signals of the survey indicators may be different because of sector-specific information that differs from the overall development.

4 Other Indicators and Analyses from the ifo Business Survey

Beyond business climate, business situation, and business expectations, there are more time series available for economic developments in the digital sector. For example, expectations for future price setting, employee developments, or negative influences on the business of the companies, such as unfavorable demand situation, workforce shortages, or financial constraints, are covered. Among other issues, these results show that a lack of skilled workforce is a big problem for the digital sector in Germany. In May 2022, half of the firms of this sector participating in the ifo Business Survey stated that they had difficulties finding skilled workers. All results are also calculated separately for small and medium sized enterprises of the digital sector, and are published in a yearly report by Bitkom (2021).

4.11 The Business Climate for the Event Industry

STEFAN SAUER, KLAUS WOHLRABE

4.11.1 Concept and Objectives

The event industry has a big significance for the German economy overall. According to Zanger and Klaus (2021), the industry generated sales of 81 billion euros in 2019 (before the Covid-19 pandemic), and this is without accounting for any effects that events may have on other industries, such as accommodation and gastronomy. To give a comparative figure, the automotive industry generated 436 billion euros in the same year.

The event industry includes businesses from a wide range of industries, mainly in the service sector, including event agencies, catering, public relations, rental and leasing of equipment, temporary employment agencies, security, organizers of trade fairs, cinemas, discotheques, theaters, and so on. However, because of this heterogeneity there is no aggregate for the event industry in the official statistics (Federal Statistical Office 2009). Neither were any economic indicators calculated for this aggregate in the ifo Business Survey, until this gap was closed in 2021.

In cooperation with the Federal Association of the Concert and Event Industry (BDKV), all industries that are part of the event industry were identified and an extensive acquisition of new survey participants from these industries was started. Furthermore, among the companies from the service sector that had already been participating in the survey, information was collected to determine whether they are part of the event industry. The total number of participants that were identified as part of the event industry exceeded 300. By considering these companies, aggregate indicators for the event industry can be calculated.

Therefore, since May 2021, a business climate, as well as results for all other variables surveyed in the ifo Business Survey, have been reported monthly for the event industry (Sauer and Wohlrabe 2021). These indicators are calculated using the standard methodology for the ifo Business Climate Index for Germany (Sauer and Wohlrabe 2018b). However, not all indicators for the event industry have yet been seasonally adjusted, as this first requires longer time series over several years (Sauer and Wohlrabe 2015).

4.11.2 Selected Results for the Event Industry

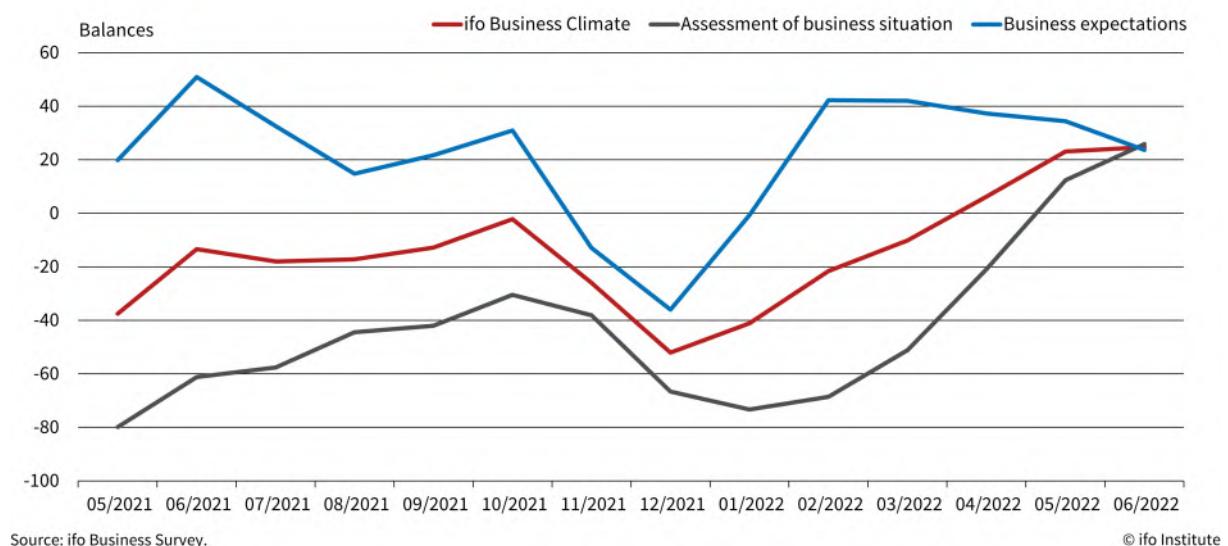
The event industry was one of the sectors of the German economy most affected by the Covid-19 crisis. For a long time, events such as concerts or trade fairs could either not take place at all, or could but only with considerable hygiene requirements. By June 2021 (70 percent), in December 2021 (67 percent), and in January 2022 (70 percent) more than two thirds of the

4 Other Indicators and Analyses from the ifo Business Survey

companies in the event industry stated that their existence was threatened. This proportion is considerably higher than in the service sector as a whole (20 percent) or the German overall economy, where around one in seven companies were in a situation that threatened their existence at that time.

The survey results in the first months after the introduction of the new indicators for the event industry therefore revealed the participants' high level of dissatisfaction with their current business situation (Figure 4.29). After a reduction of this dissatisfaction in the course of 2021, the majority of survey participants again rated the situation as poor in the winter months in view of the renewed Covid-19-related restrictions. It was not until May 2022 that the positive assessments of the business situation outweighed the negative ones for the first time. Companies were also looking ahead to the coming months with noticeable optimism. This led to a positive business climate for the event industry. Figure 4.30 compares the business climate of the event industry to the service sector and the German overall economy. It can be seen that in 2021 and especially during the delta and omicron waves of the pandemic in the winter months 2021/2022, the event industry had a far worse business climate. After the Covid related restrictions were relaxed, the Climate improved considerably. While many other sectors have had to deal with the impacts of the war in Ukraine, the event industry has not been so severely affected. This led to a better business climate in the event industry than in the service sector and overall economy for the first time in May 2022.

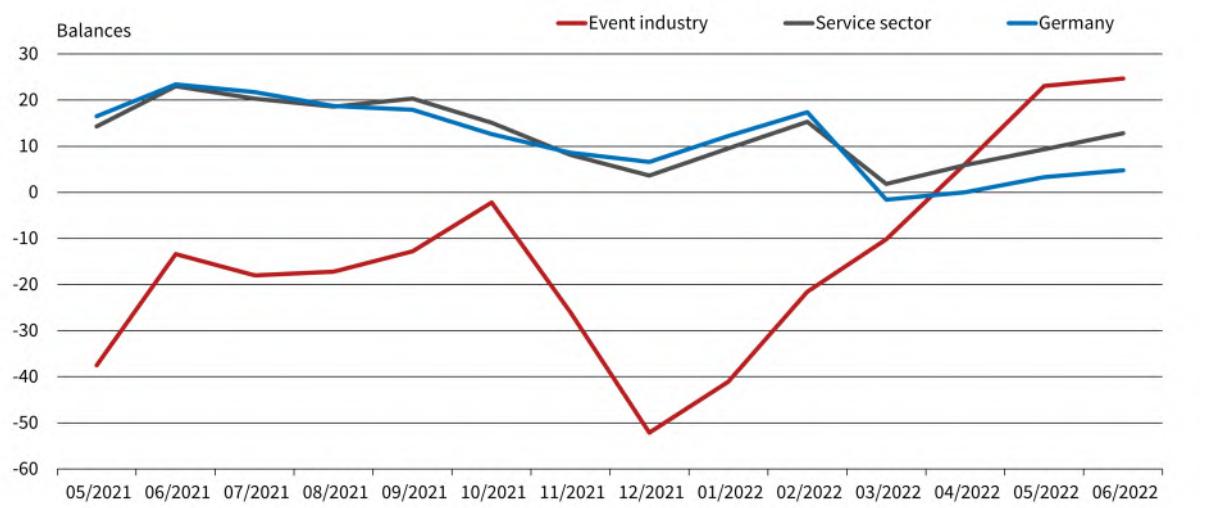
Figure 4.29: ifo Business Climate and its sub-indicators in the event industry



Since then, as concerts, festivals, and other events were able to take place without too many restrictions, the survey participants from the event industry reported increasing sales. Overall, by summer 2022, the event industry was once again experiencing better times. Nevertheless, uncertainty about the development of the pandemic in the fall and winter of 2022 still made concrete plans difficult.

4 Other Indicators and Analyses from the ifo Business Survey

Figure 4.30: ifo Business Climate of the event industry compared to the service sector and the overall economy



Source: ifo Business Survey.

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4.12 The ifo Architects' Survey

KATRIN DEMMELHUBER

4.12.1 Historic Background and Concept

The quarterly ifo Architects' Survey was begun in 1980, with the aim of generating an early indicator for the economic development of building construction in the Federal Republic of Germany. The rational was that, as the planning order is usually sent to the architect before the building permit is issued, the building construction planning volume could be recorded earlier via a survey of German architects than with the data from the building permit and incoming orders statistics (Gluch 1981; Neisen 1979; Oppenländer and Poser 1989b). The most important results of the survey appeared in the journal *Deutsches Architektenblatt*.

From 2003 to 2017, the ifo Institute conducted the survey in cooperation with the German Federal Chamber of Architects. For this purpose, the architects were surveyed with regard to contract conclusion, planning volumes, and the current and anticipated order situation. Results of the survey were published in the ifo Schnelldienst by Gluch from 2003 to 2017. However, in 2017 this project was discontinued. The survey participants were integrated into the panel of the ifo Business Survey in the service sector. Since the 4th quarter of 2017, the ifo Institute has continued reporting on the basis of this monthly survey. The results are published on the website of the Federal Chamber of Architects¹² and occasionally in the ifo Schnelldienst (Brandt 2019, 2020a; Demmelhuber 2022; Zeiner 2018).

4.12.2 Descriptive Statistics

The monthly number of participants ranged from approximately 160 in the years from 2017, to 270 in 2022, with an average response rate of 58%. This rather low rate (compared to other ifo surveys) can be partly explained by the often volatile response behavior of new participants. New architectural firms are continually being recruited, but only a certain proportion of the recruited participants answers the survey consistently over a longer period. One reason for this could be the typically small number of employees in architectural firms: 15% of the panellists are solo entrepreneurs, 60% of the companies have 2–9 employees, and only 25% have 10 employees or more. Another reason is the small-scale structure of the architecture business segment (Demmelhuber 2022); the life cycle of architectural firms is often directly linked to the professional cycle of the respective architect.

Panellists who have not responded for more than 12 months are regularly removed from the panel. Panel mortality is a major challenge for a monthly survey and constant recruitment of

¹² Available at <https://bak.de/kammer-und-beruf/daten-fakten/konjunktur-im-architekturmarkt/ifo-umfrage/>, accessed March 17, 2023.

new companies therefore is essential. The ifo Institute is supported by the Federal Chamber of Architects in its acquisition efforts.

4.12.3 Questionnaire

Since 2017, the architects surveyed have received the questionnaire of the ifo Business Survey in the service sector (Section 2.6). As far as the time horizon is concerned, the questions relate to the current situation, past developments, and plans and expectations for the coming months. Topics of the questions include the current business situation, sales, the order situation, employment development, and prices. Most of the questions are based on the guidelines for business surveys in the European Union.¹³

4.12.4 Methodology

A detailed description of the calculation and indexation of time series in the service sector can be found in Section 2.6 of this handbook. First, each company response is assigned to a sub-class at the lowest level of the hierarchy (in the case of the ifo Architects' Survey, this is the five-digit level) and is given an individual weight. In the service sector, this is determined by the annual turnover. These company weights are necessary for taking greater account of the responses of larger companies and therefore reflecting their importance for the German economy. After the individual responses of the companies have been weighted at the micro data level, the balance calculations and aggregations can be executed. For the group of architectural firms, the aggregation follows the methodology of the ifo Business Survey (Section 2.2). Company responses are aggregated at the federal level and the results are calculated at the four-digit level. Based on the official Classification of Economic Activities (WZ 2008) of the German Federal Statistical Office, four sub-classes are considered (Table 4.9).

Table 4.9: Sub-classes of the architectural activities

WZ2008 Code	Description
71.11	Architectural activities
71.11.1	Consulting architectural activities in building construction
71.11.2	Consulting architectural activities in interior design
71.11.3	Consulting architectural activities in town, city and regional planning
71.11.4	Consulting architectural activities in landscape architecture

4.12.5 Results of the ifo Architects' Survey

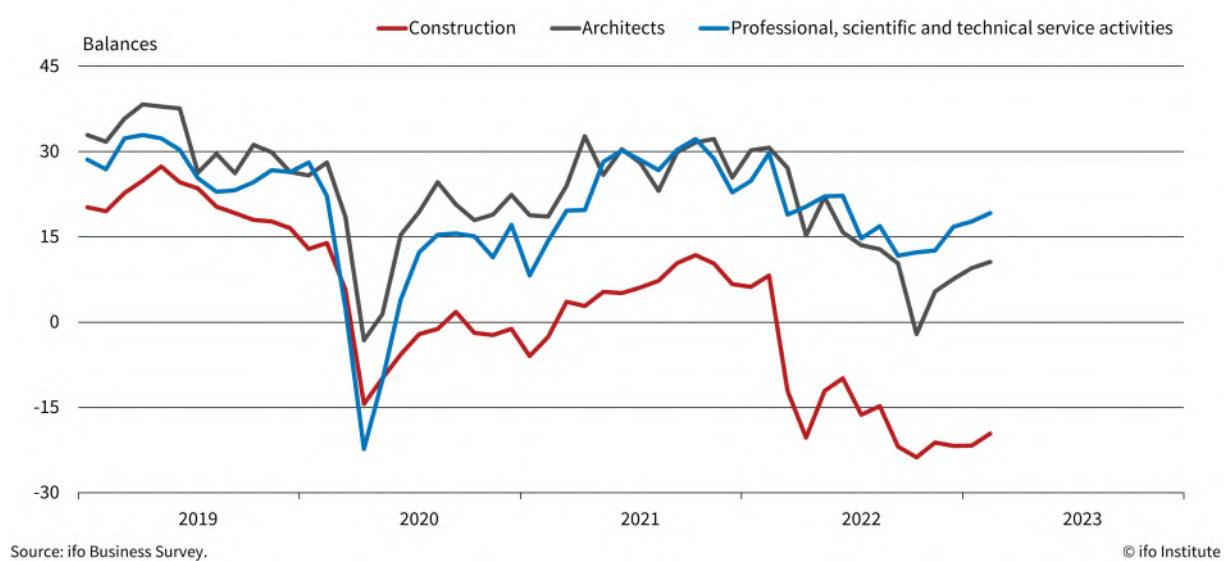
From the early project phase, some time series exist from 1980 onwards on, for example, new architect contracts, planning volume of new contracts, assessment of the order situation, and

¹³ For an example of the quarterly questionnaire used in the past, see Oppenländer and Poser (1989b).

order backlog (Gluch 1990, 2003–2017).

Time series for the service sector in general as well as most time series for architectural activities start in January 2005. Most of them are also available seasonally adjusted. The ifo Architects' Survey focuses on the ifo Business Climate which is calculated as an average of the balances of the current business situation and the business expectations for the next six months. The time series of the indicators (in tabular and graphical form) are delivered monthly to the Federal Chamber of Architects. In addition, a report is produced in which the developments of the respective previous quarter are presented verbally. This report covers the development in the entire federal territory.

Figure 4.31: ifo Business Climate of architects compared with construction and the service sector



Source: ifo Business Survey.

© ifo Institute

Architectural firms generate their revenue mainly in construction production, so their dependence on the construction cycle is high. Figure 4.31 shows the ifo Business Climate of architects since 2019, compared with the next highest level in the WZ2008, the “professional, scientific and technical services”, and the construction industry. These three time series often show a similar pattern: the climate indicators fell considerably at the beginning of 2020 with the start of the Covid-19 pandemic, but the situation gradually stabilized during the following months as the indicators moved toward their pre-crisis level. In March 2022, the war in Ukraine caused a slump in sentiment in the German economy. Since then, the ifo Business Climate among architects has deteriorated: There was a downward trend in the climate indicator up to October 2022. Reasons for this were, for example, inflation and material and supply bottlenecks. This exacerbated the negative knock-on effects for technical service providers, such as delays at construction sites or increased planning and administrative expenses (Demmelhuber 2022). Since November 2022, an improvement in the business climate among architects has been observed. Procurement prices for electricity and gas have fallen noticeably since late summer 2022, and government price brakes have been in effect since January 2023. At the

4 Other Indicators and Analyses from the ifo Business Survey

same time, construction output has recovered as supply bottlenecks have eased. However, further developments remain to be seen, as demand for construction services has slumped, not least as a result of rising financing costs (as of March 2023; Wollmershäuser et al. 2023).

4.13 Supplementary Questions in the ifo Business Survey

KATRIN DEMMELHUBER, STEFAN SAUER, KLAUS WOHLRABE¹⁴

4.13.1 Introduction

In addition to the ifo Business Survey's monthly, quarterly, bi-annual, or annual questions, its supplementary questions further increase the potential for economic research. These questions are either collected on a one-time basis or at irregular intervals, and typically relate to current economic topics or company-specific information that is of interest for ongoing research projects.

In recent years, supplementary questions have become a larger part of the ifo Business Survey, with the motivation of obtaining an ad hoc picture of the impact of certain economic policy or global economic developments on German companies and their reactions to them (e.g., the Covid-19 pandemic or the war in Ukraine). Another aim is to collect company-specific data for research projects: Since the ifo Business Survey is a panel survey, the answers to these questions can also be linked to other survey variables. In addition, they can serve as control groups or variables in statistical or econometric analyses. Supplementary questions both provide information on the current survey period and offer the possibility of ex post evaluations.

4.13.2 Question Development

Supplementary questions are designed in collaboration between the ifo survey team and researchers participating in the projects which the data is collected for. When drafting these questions, certain restrictions must be considered, such as the space available on the paper questionnaire that is still used by a non-negligible proportion of participants. This restriction does not apply to online participation in the ifo Business Survey. Although an exclusively online survey is possible, the relevant sub-panel might be less representative than the entire panel of all survey participants. In addition, it should be ensured that the frequency and scope of supplementary questions remain within bounds to not unnecessarily increase the time required to answer the questionnaires.

4.13.3 Topics

Tables 4.10-4.14 provide an overview of the various topics and contents of the supplementary questions asked in the ifo Business Survey from January 2009 to May 2022. In addition, the tables contain the survey date for each question, the economic sector in which it was asked,

¹⁴ This section is a summary of Demmelhuber et al. (2023).

and references to selected results. The exact wording of all the supplementary questions as well as further results and applications can be found in Demmelhuber et al. (2022).

The list of supplementary questions is divided into different topic blocks. Most frequently, “current economic policy questions” (Table 4.10) are asked to assess the consequences of political decisions or other important (geopolitical) events for the German economy. “Company or respondent-specific questions” (Table 4.11) can be used for research projects that require specific information about the responding company or the respondent. As this information can also be cross-checked with other variables of the survey or used as control variables, some additional questions were asked specifically with the purpose of creating group or control variables (e.g., family businesses versus other businesses). “Other research questions” cover a wide range of topics. Table 4.12 provides an overview of the questions collected since 2009.

After March 2020, the Covid-19 crisis overshadowed the global as well as the German economy. For this reason, several additional questions were included in the monthly survey. These questions focused on the short- and long-term economic effects of the pandemic on companies and include topics such as short-time work, working from home, government pandemic aid programs, or internal company problem areas during the crisis (Table 4.13). With a similar aim, several further supplementary questions were added after the start of the war in Ukraine (Table 4.14).

4.13.4 Summary

The broad spectrum of questions in the ifo Business Survey offers great potential for economic research and analysis. The supplementary questions are especially suitable for analyzing topics not covered by the standard questions as well as current developments in the German economy. The results can serve as input for various research projects. In addition, the supplementary questions can also be used to introduce new survey methods, such as randomly dividing the panel into different groups and asking them slightly different questions. This enables the analysis of the influence of the wording or the order of the answer categories. The microdata of the supplementary questions can be accessed by researchers at the EBDC together with all other microdata of the ifo Business Survey.

Table 4.10: Economic policy questions

Topics	Content	Date	Surveyed sectors	Selected Results
Introduction of the minimum wage in Germany	A priori and ex-post assessments of companies: Affectedness by the minimum wage, planned/taken measures, changes of employment structure within the company.	11/2014, 03/2016, 06/2022	All sectors	Link (2019), Blömer et al. (2022)
Refugee crisis	Potential of hiring asylum seekers in specific positions, hindrances for hiring asylum seekers in specific positions.	10/2015	All sectors	Battisti et al. (2015)
Brexit	Impact of a possible Brexit, impact of a hard Brexit, probabilities for a hard Brexit, percentage of sales affected by a hard Brexit, impact of hard Brexit on this percentage of sales.	06/2016, 12/2018	Manufacturing	ifo Institute (2018)
US trade policy under President Trump	Expectations on changes in trade policy, impact on operations in the U.S., expectations on the company's sales development in the U.S., economic relations with the U.S..	02/2017	Manufacturing	Braml and Felbermayr (2017)
Negative interest rates	Confrontation with negative interest rates, measures to avoid negative interest rates, effects on earning situation, number of company's main banks.	06/2017	All sectors	Hainz et al. (2017)
EU-Mercosur Free Trade Agreement	Exports to the Mercosur region, prerequisites for starting export business with Mercosur, reactions on a possible trade agreement with Mercosur.	08/2017	Manufacturing	
US tax reform	Percentage of turnover in the U.S., competition from companies in the U.S., development of tax burden (short and long term), reactions on the tax reform, probability of relocation of intellectual property to U.S..	03/2018	Manufacturing, Trade, Service	Boumans et al. 2020a, Krolage and Wohlrabe (2018)
Tax incentives for R&D in Germany	Share of R&D expenditures, received funding by specific institutions, acceptance and effect of planned tax incentives on R&D activity.	09/2019	Manufacturing	
Current European economic policy topics	Agreement on various statements about European economic topics, knowledge about topics (minimum wage, Immigration, robots/artificial intelligence, retirement age, free choice of residence/place of work, European champions).	02/2020	All sectors	
Supply Chain Act	Changes in procurement strategy, impact and effects of a national supply chain law on company.	05/2021	Manufacturing, Trade, Service	

Table 4.11: Company- or respondent-specific questions

Topics	Content	Date	Surveyed sectors	Selected Results
Export markets	Share of exports on total sales, world regions with biggest export share.	06/2011	Manufacturing	
Family Business	Self-classification as family business.	02/2014	All sectors	Stiftung Familiunternehmen (2020)
Characteristics of medium sized companies	Number of general managers, company shareholding of general managers, self-classification as “medium-sized” enterprise.	08/2016	All sectors	
Online shops and market places	Existence of sales via own online store/other online platforms, type of online sales channels, share of online trade, expected development of online trade.	08/2016, 08/2019	Trade	Rumscheidt (2020)
Export of services	Existence currently/planned of service offerings abroad, barriers for company's activities abroad.	08/2018	Service	
Outsourcing of business processes	Share of processes in specific areas provided by external service providers, expected developments for the next years.	08/2018	Manufacturing	
Share of foreign turnover	Percentage of the company's turnover generate abroad.	09/2018	All sectors	
Year of company foundation	Year of company foundation	09/2018	All sectors	
Characteristics of the respondent(s)	Department and position of the respondent(s), highest educational attainment, interest in economic policy, trust in experts (policy issues, Covid-19 pandemic), risk aversity.	11/2018, 02/2020, 11/2021, 03/2022	All sectors	Sauer and Wohlrabe (2019)
Importance of logistics services	Business constraints by specific factors of logistics, online business constraints regarding costumer delivery (only trade sector).	06/2019	Manufacturing, Trade	Brandt et al. (2019)
Decisions regarding production and price setting	Significance of factors influencing decisions on pricing and production (manufacturing, construction)/orders (trade)/human resources (service).	10/2020	All sectors	

Table 4.12: Other research questions

Topics	Content	Date	Surveyed sectors	Selected Results
Innovation	Rating of various factors for the company's innovation climate.	01/2009	Manufacturing	
Main bank relations	Intensive and long-standing business relations with a bank, types of banks.	06/2009	Manufacturing, Trade, Construction	Abberger et al. (2009)
Effects of extreme weather events	Effects of heat waves/cold waves/drought/heavy rain/storms on specific company areas, occurrence of extreme weather in the region of the company, expectations for extreme weather in the future, preparations for consequences of extreme weather.	11/2010, 02/2013, 05/2019, 05/2022	All sectors	Berlemann and Lehmann (2020)
Importance of flight connections	Significance of available flight connections for company to destinations: Germany, Europe, worldwide.	03/2013	All sectors	
Bank credits	Credit agreements with banks in the last year, conditions of the agreements as expected, reasons for non-occurrence, purpose of credits.	06/2016	All sectors	Hainz and Hristov (2017a)
GDP expectations of companies	Estimation of change of GDP in Germany in % for the current and following year, importance of general economic developments in Germany for the business situation (only 08/2018).	08/2018, 03/2019, 08/2019, 08/2020	All sectors	Dovern et al. (2020, 2023a,b)
Capacity utilization	Annual average of the capacity utilization of plants/machines in a normal economic situation.	01/2019	Manufacturing, Services, Construction	
Uncertainty about demand	Uncertainty regarding various factors for future demand.	12/2019	Manufacturing, Services, Trade	Lautenbacher (2020)
Satisfaction with institutions and administration	Satisfaction with local government and administration, satisfaction with social security institutions.	09/2021	All sectors	
Supplies from China	Dependency on supplies from China, future strategies regarding supplies from China, reasons for reductions of imports from China.	02/2022	Manufacturing, Trade	Baur and Flach (2022)

Table 4.13: Supplementary questions on the Covid-19 crisis

Topics	Content	Date	Surveyed sectors	Selected Results
Effects of the outbreak of the pandemic	Business impact of the outbreak, determination of negative effects.	03/2020	All sectors	Dorn et al. (2020a)
Current effects of the crisis and expectations	Effect on the business situation, expectations on duration of the pandemic effects, problems in specific company areas, current threat to the company's existence.	04/2020-03/2022	All sectors	Balleer et al. (2020), Buchheim et al. (2022a,b)
Short-time work	Current share of employees in short-time work, average reduction in working hours for these employees.	05/2020-05/2022	All sectors	Link and Sauer (2020)
Working from home	Share of employees working at least partly from home (starting 02/2021), long term effects of the pandemic on working from home (04/2020-07/2020).	04/2020-04/2022	All sectors	Alipour et al. (2021a,b)
Number of employees	Number of employees in the company.	05/2020-ongoing	All sectors	
Short-term effects of the crisis	Measures taken as a reaction on the pandemic, problems and needs, effects on sales, expected survival time (specific periods) if pandemic continues.	04/2020-11/2020	All sectors	Litsche et al. (2020)
Long-term effects of the crisis	Permanent changes in specific areas of the company, investment in specific areas.	05/2020-07/2020	All sectors	
Liquidity situation	Estimated time range of liquidity reserves, development of capital ratio, availability of credits, change of lending rates, cash and cash equivalents in % of total assets, development of specific financing options, development of equity capital ratio.	05/2020-02/2021	All sectors	Peichl et al. (2021)
Governmental pandemic assistance programs for companies	Use of tax deferrals, application for specific liquidity assistance programs, assessment of the programs.	04/2020-05/2020	All sectors	
Supply bottlenecks	Affection of supply bottlenecks, Changes in procurement, assessment of price developments for products and materials, indication of the products/materials concerned, expected duration of supply bottlenecks.	04/2020-ongoing	Manufacturing, Trade, Construction	Wohlrabe (2021), Leiss and Wohlrabe (2021)

4 Other Indicators and Analyses from the ifo Business Survey

Table 4.14: Supplementary question on the economic effects of the war in Ukraine

Topics	Content	Date	Surveyed sectors	Selected Results
Sanctions against Russia after the annexation of Crimea	Existence and nature of specific economic relations with Russia, current and expected constraints because of the conflict.	05/2014	Manufacturing	Grimme et al. (2014)
Consequences of the outbreak of war	Expected negative effects on the company.	03/2022	Manufacturing	Sauer and Wohlrabe (2022a)
Economic relations with Russia	Existence and nature of specific economic relations with Russia before the war and in the future.	03/2022, 04/2022	Manufacturing, Services, Trade	
Problems because of the war	Effects of the war regarding supply shortages, demand and sales, logistics and financing: Relevance and importance of these effects for the company.	04/2022	Manufacturing, Services, Trade	
Supply shortages	Assessment of the substitutability of products from Russia, Belarus, or Ukraine.	04/2022	Manufacturing, Services, Trade	
Energy	Energy intensity of the company, shares of specific energy sources in energy costs of the company, price developments, percentage of price increases passed on to customers, effects of possible gas shortages (only manufacturing).	04/2022, 05/2022	All sectors	
Expected effect on sales	Expected effect on sales for the year 2022 because of the war.	04/2022	Manufacturing, Services, Trade	

5 Other ifo Surveys

5.1 The ifo Management Survey

KATRIN DEMMELHUBER, AGNEZA NIMANAJ

5.1.1 Objectives and Concept

In addition to the ifo Business Survey, which focuses on variables describing both the current economic situation and the outlook for the near future, along with the ifo HR survey, which collects information on HR measures, the ifo Institute has created yet another instrument to survey important topics for the German economy: The ifo Management Survey.

The “Manager Survey” was originally introduced in 1988 as a telephone survey to complement the ifo Institute’s written surveys. Eventually, the methodology was replaced by a paper questionnaire. At that time, the ifo Institute collaborated with the magazine “WirtschaftsWoche” to identify interesting topics and publish the results. With its relaunch in 2020, the survey was renamed as the “ifo Management Survey”, which is now conducted exclusively online. In this survey, a selected group of decision-makers in German companies are asked about their opinions on current economic policy issues and changes in the macroeconomic environment. The aim is to understand these decision-makers’ assessments of these topics and their potential impacts on corporate planning, and provide vital input for current economic debates and information for the public. Regarding the choice of topics and development of questions, the survey team works closely with the department’s research staff.

Unlike other company surveys conducted by the ifo Institute, the Management Survey does not have a fixed monthly or quarterly survey period. This makes it possible to react flexibly to current topics and to send the online questionnaire to the survey participants when needed. The publications with the results of the surveys can be found on the online project page¹.

5.1.2 Composition of the Panel

To obtain a sample as representative as possible for the German economy, executives of companies from the manufacturing, construction, wholesale and retail, and service sectors throughout Germany take part in the online survey. As of May 2022, the panel currently consists of around 670 companies, though the ifo Institute plans to expand the panel further.

¹ <https://www.ifo.de/en/management-survey-2021>

5 Other ifo Surveys

The number of responses in the recent past has been around 400. Since statements are also to be made for different size classes and economic sectors, a sufficient number of responses is essential for a differentiated evaluation.

In terms of the distribution of the participating companies by employee size class, currently 9% of respondents are from companies with 1-9 employees, 20% are from companies with 10-49 employees, 44% are from Class 3 (50-249 employees), and just under 28% are from Class 4 (more than 250 employees). In terms of distribution by economic sector, participants from the service sector make up the largest proportion with just under 45%, followed by companies from the manufacturing sector with 35%, trade with 13% and construction with 7%. Compared with their distribution in the German economy, retail and service companies are currently somewhat underrepresented, while manufacturing tends to be overrepresented. The distribution is therefore not representative for the German economy as a whole, which is why no differentiated evaluation by sector is currently carried out. This will be made possible in the future by expanding the panel in the relevant sectors.

5.1.3 Question Program

In contrast to other surveys conducted by the ifo Institute, the ifo Management Survey, which takes place approximately every quarter, does not contain a fixed program of regular questions. The aim here is not to describe variables over a longer period of time, but to obtain the assessments of the surveyed managers on current developments and the associated potential effects – in other words, to query the effects on companies' plans in order to provide input for current economic discussions and information for the public. The ifo Management Survey usually combines qualitative and quantitative questions.

As the survey's topics often represent current economic issues or company-specific information, its flexibility holds potential for economic research. Many research projects, for example, often seek to obtain an ad hoc picture of the impact of certain economic policy or global economic developments on German companies and their reactions to them, which is exactly what the ifo Management Survey provides (Demmelhuber et al. 2020, Demmelhuber et al. 2021, Dorn et al. 2020b, Flach et al. 2020, Gröschl and Teti 2021).

5.1.4 Evaluation of the Answers

Unlike other ifo surveys, the ifo Management Survey does not focus on a central indicator derived from the survey results. Rather, its objective is a qualitative assessment of current issues. The survey is designed as an instrument for evaluating changes in the macroeconomic environment and as an indicator of the importance of issues for decision-makers in German companies. In the evaluation, shares of the given answer options are calculated. Unlike the ifo Business Survey, weightings of company sizes or of the various economic sectors are not used. The results are presented in graphs and tables and can also be broken down by company size.

5.1.5 Selected Results and Analysis Potential

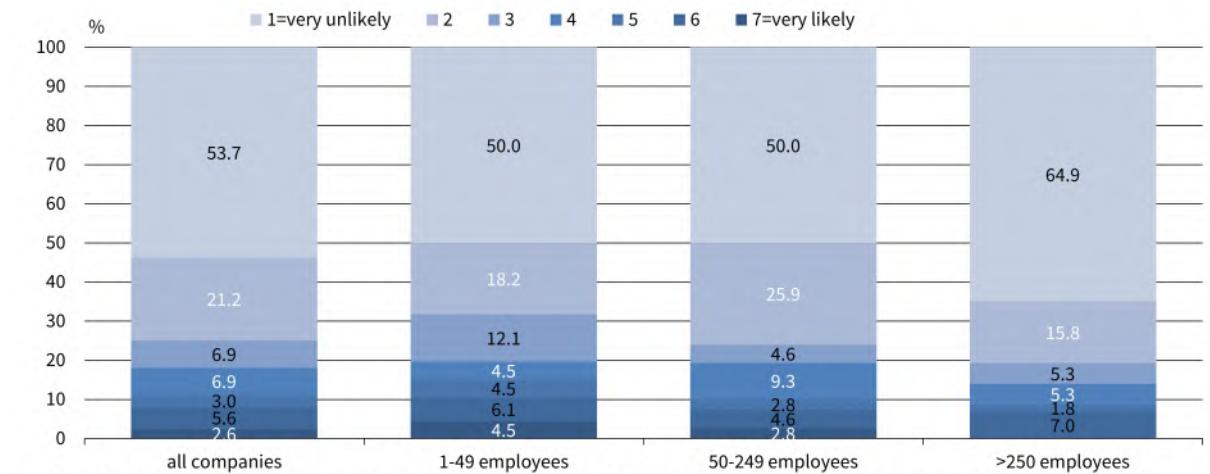
Since 2014, targeted economic sanctions (including export restrictions) have been imposed on Russia by the European Union and the United States in response to Russia's actions in Ukraine. Russia has also imposed import bans. This has created economic complications for German companies interested in trading goods and services with Russia. In order to estimate a more precise measure of this ongoing impact on individual industries and regions, a survey was conducted in September 2020 in cooperation with the ifo Center for International Economics and the Düsseldorf Chamber of Industry and Commerce (IHK) using the ifo Management Panel and an IHK distribution list (Flach et al. 2020, Gröschl and Teti 2021). The results showed Russia's dependence on the EU as a supplier e.g. of complex final goods and as a buyer e.g. of raw materials (commodities such as oil and gas, mining and metals). The survey also showed that East German companies were particularly affected by the sanctions, as were companies in the manufacturing sector. Above all, the increased bureaucracy resulting from the sanctions was a major hurdle, followed by export controls and specific export or import bans. Around half of all companies surveyed at the time estimated that they could benefit from the lifting of EU sanctions.

In the ifo Management Survey of March 2021, conducted by the ifo Institute in cooperation with ZEIT (Demmelhuber and Wohlrabe 2021, Nienhaus and Pletter 2021), the participating companies were asked one year after the start of the Corona crisis whether and how they had received aid measures so far. In addition, they provided an assessment of this aid and evaluated the measures taken to contain the pandemic. The results were very heterogeneous, which probably also had to do with the situations and experiences of the individual managers and their respective companies. For the most part, there was agreement among the participants with regard to the late disbursement of aid funds. The results also showed that by their own assessment many companies, especially smaller ones, would not have survived a third shutdown (Figure 5.1).

The Covid-19 pandemic has had a major impact on business. In October 2021, the Management Survey looked at the existence of crisis management systems in German companies. The survey results showed that at the time, a crisis management system was in place in three quarters of the responding companies and that, since the start of the Covid-19 pandemic, there has been an increase in the number of crisis management teams of almost 17 percentage points. Permanently constituted crisis teams have increased the most. The majority of newly established crisis teams were implemented during the first lockdown in March 2020 (Figure 5.2). A good three quarters of companies still had a crisis management system in place in August 2022. In the meantime, crisis management teams were most likely to be dissolved again in small companies (Demmelhuber 2023).

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Figure 5.1: Probability of company shutdown due to third Corona-related shutdown

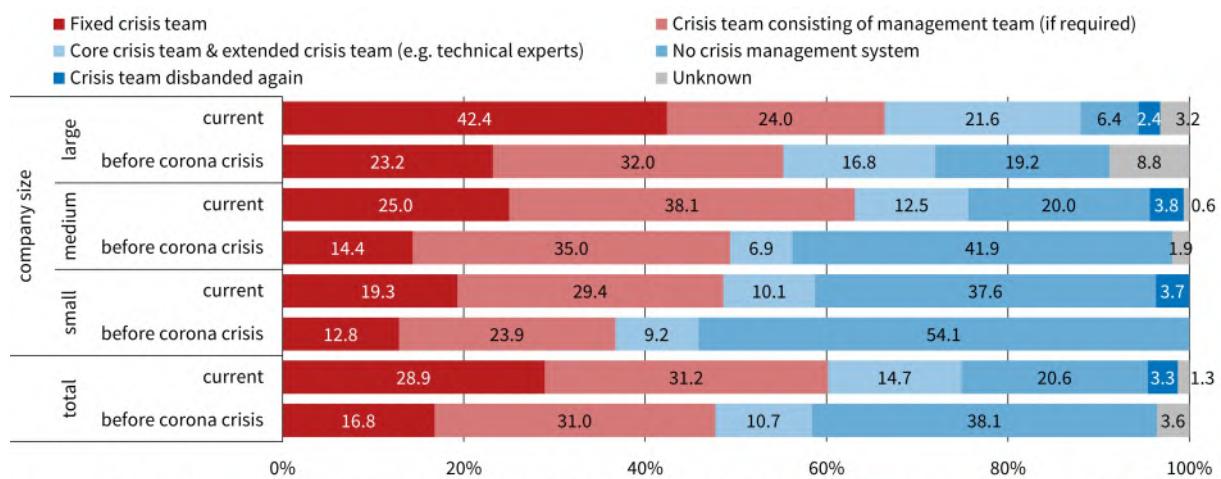


Question: "Suppose there is a third shutdown of more than 2 months within the next 12 months. How likely do you think it is at the moment that your company would not survive this?" [n=231; 7 scale]

Source: ifo Management-Survey, March 2021.

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Figure 5.2: Crisis management systems in companies



Questions: "Did your company have a crisis management system before the Corona crisis?", "Does your company currently have a crisis management system?" [n=394; forced-choice questions]

Source: ifo Management-Survey, October 2021.

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Due to its flexible design, the Management Survey is suitable, for example, for testing or introducing new survey methods, survey tools, new questions, experiments and randomization. The Management Survey benefits from the experiences gained from these tests and experiments. These findings also flow into other ifo survey projects, such as the ifo Business Survey. For example, one ongoing ifo research project deals with decision-making in companies. In companies, countless decisions are made every day, the sum of which contributes

significantly to the company's success. These decisions are based, among other things, on the individual goals, preferences, and desires of the people involved in the decisions. The study aims to find out more about how and why managers make decisions and what expectations they have regarding economic developments. As a pretest, in late 2019/early 2020 the relevant questions were asked as part of the ifo Management Survey in order to get an overall picture and feedback for possible improvements. In 2022, a number of these questions (related to entrepreneurial risk-taking) were repeated in the larger context of the ifo Business Survey. As this study is an ongoing research project, its final results are not yet available. Gödl-Hanisch and Menkhoff examined in 2023 the pass-through of cost-push shocks to customers at a granular level. Using hypothetical vignettes in the Management-Survey, they highlighted a new channel relevant for pass-through: beliefs about the expected duration of the shock and its interaction with price rigidities. They observed a gradual pass-through stretching over 24 months, especially for idiosyncratic shocks, undershooting the pass-through of aggregate shocks by 40%, in line with the presence of real rigidities.

5.2 The ifo Business Survey in the Insurance Industry

SIMON LITSCHE, ARTEM MARJENKO

5.2.1 Historical Overview

The ifo Business Survey in the insurance industry was launched in 1999 and is a joint project of the German Insurance Association (GDV) and the ifo Institute. The decision to implement the survey was made after a pre-test showed that the survey results had a significant correlation with the respective reference statistics of GDV. Since its inception, the survey has undergone several developments. The number of response choices for the questions has been scaled down from five to three to be in line with the monthly ifo Business Survey. The types of insurance covered by the survey and the list of questions have also slightly changed over time. From the summer of 2017 to 2020, companies were able to submit their answers via an online questionnaire as an alternative to the previously used paper questionnaire. Since 2020, the online questionnaire has been the only option to participate in the survey. Meanwhile, the time series of the survey results are long enough that they can also be seasonally adjusted.

5.2.2 Survey Timeline

The survey in the insurance industry is conducted quarterly, in January, April, July, and October. The reporting period is the past quarter – for instance Q1/2022 in the April 2022-survey. At the beginning of the month, the questionnaires are sent to the companies, who then have about 30 days to submit their responses. One week before the survey ends, ifo sends a reminder to the companies who have not yet responded. Shortly after the survey is closed, the data is aggregated and the results are added to the time-series database. This usually takes one or two days. GDV needs approximately three weeks to write an in-depth survey report, which is then published on the GDV's website and uploaded to the ifo's survey web portal as a service to the companies in the panel.

5.2.3 Types of Insurances and Questionnaire

In Germany, the insurance industry is typically divided into three main categories:

- Life insurance
- Private health insurance
- Property and casualty insurance

The ifo Business Survey follows this classification and also features sub-categories, as illus-

trated in Table 5.1. Consequently, there are three types of questionnaires – one for each of the main insurance categories – containing all the associated sub-categories.

Table 5.1: Main categories and sub-categories of insurance in the ifo Business Survey

Life insurance	Private health insurance	Property and casualty insurance
life insurance altogether	private health insurance altogether	property and casualty insurance altogether
lump-sum payout insurance	full health insurance	car insurance
annuity insurance	supplemental health insurance	personal property insurance
investment fund-based life insurance	compulsory long-term care insurance	commercial property insurance
insurance of biometric risks	employer-sponsored supplementary health insurance	liability insurance
employer-sponsored retirement plan		accident insurance
		legal protection insurance

Just like most other ifo Business Surveys, the survey in the insurance industry collects qualitative instead of quantitative information, i.e., the respondents are not asked to provide numerical data but to make an assessment using a typically three point rating scale. The method of balances is then applied to the gathered qualitative data to allow for statements on business tendencies (see Subsection 2.2.3 for an explanation of the method of balances).

Bearing in mind that there is a significant delay to the release of official statistics on the insurance industry, ifo's rapidly available data help to fill the void. Moreover, some questions in the survey ask for companies' expectations for the near future and therefore even give an outlook on further developments.

All regular questions of the survey are listed in Table 5.2. Time series for the entire insurance industry are available for questions that are asked in all three insurance sectors. Besides these regular questions displayed in the table, two additional questions on the companies' profits are asked once a year in July. The responses are evaluated exclusively for the GDV.

Expectations on market's premium rates in the property and casualty insurance is the only question that does not ask for the firms' own metrics, but for an opinion of the participants. Generally, querying businesses' own activities and metrics is a principle of the ifo Business Surveys.

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Table 5.2: Questions in the ifo Business Survey in the insurance industry

	Life insurance	Private insurance	health insurance	Property and casualty insurance
<i>Current situation</i>				
Assessment of the current business situation	✓		✓	✓
<i>Tendencies over the course of the year until now</i>				
Premiums generated from new contracts	✓		✓	✓
Premiums generated from new contracts (one-time premium)	✓		-	-
Premiums written	✓		✓	✓
Payouts	✓		-	-
Expenses for medical care	-		✓	-
Losses associated with or the cost of damage	-		-	✓
<i>Expectations for the whole fiscal year</i>				
Premiums generated from new contracts	✓		✓	✓
Premiums generated from new contracts (one-time premium)	✓		-	-
Premiums written	✓		✓	✓
Payouts	✓		-	-
Expenses for medical care	-		✓	-
Losses associated with or the cost of damage	-		-	✓
<i>Expectations for the next 6 months</i>				
Business expectations for the next 6 months	✓		✓	✓
<i>Expectations for the next 12 months</i>				
Premium rates on the market for existing contracts	-		-	✓
Premium rates on the market for new contracts	-		-	✓
<i>Derived question: business climate.</i>				
<i>This question does not appear on the questionnaire but is calculated as a geometric mean from responses to the questions "current business situation" and "business expectations for the next 6 month".</i>				
Business climate	✓		✓	✓

5.2.4 Survey Sample

In Germany, all major insurance companies – i.e. those operating nationwide – are supervised by the Federal Financial Supervisory Authority (BaFin). BaFin keeps a full register of insurance companies and provides quite detailed structural data of the industry. Therefore, the entire population of insurance companies is well-known. The survey panel consists of 138 reporting units, which is approximately 40% of all the units in Germany. However, since the panel includes more large companies than small ones (by gross premiums written), the actual representation of the insurance business in the panel is much higher. An overview of some key figures regarding the representativeness of the survey data is given in Table 5.3.

Table 5.3: Representativeness of the survey data in Q3/2022

Insurance sector	Completed questionnaires	Panel size	Response rate	Panel representativeness ¹
Life insurance	30	48	62.5%	75.9%
Private health insurance	19	25	76.0%	85.7%
Property and casualty insurance	42	65	64.6%	61.2%
Total	91	138	65.9%	71.8%

¹ Gross premiums written of companies in the panel divided by gross premiums written of the entire universe.

It is worth noting that recently the number of enterprises in the population has fallen. This is due to numerous mergers in the industry, a trend which may have a negative impact on the survey's explanatory power, given that it collects qualitative data. As of 2022, the tendency towards mergers and acquisitions shows no signs of abating.

5.2.5 Aggregation

When data is aggregated, single responses are weighted according to the company's size – measured by gross premiums written. Because written premiums are the principal source of an insurance company's revenues, they are commonly used as a measure of the company's size – for example by GDV in its statistics.

As Table 5.1 indicates, each insurance sector features an “altogether”-category. Unlike the monthly ifo Businesses Survey, the results for the major sectors are not determined by consolidating the results of their associated sub-sectors, but are computed directly from the data of the “altogether”-category. For one, the share of each individual line of insurance in the overall business varies from company to company, so that it would be inappropriate to consolidate sub-sectors by using fixed weights. Secondly, the qualitative data collected in the survey does not capture different magnitudes of changes in sub-sectors and hence cannot

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fully take account of possible offset effects. These issues are critical to the insurance survey because of its small sample size. By giving respondents the opportunity to provide answers in the “altogether”-category, more accurate results can be obtained.

Results for the entire insurance industry are available for questions that are asked in all three insurance sectors. These include the most prominent questions related to current business situation, business expectations, and business climate. The sectors are weighted according to their corresponding “gross premiums written”-shares in the entire field – as provided by BaFin’s official statistics – and then combined to construct the results for the entire insurance industry.

The aggregated data is usually reported as balances, which is the share of positive responses minus the share of negative responses (see Section 2.2.3 for details on the method of balances). Both original and seasonally adjusted data is available.

5.2.6 Results

The dynamics of the three most prominent indicators – business climate, business situation, and business expectations – for the major sectors of insurance are depicted in Figures 5.3,5.4 and 5.5. Not surprisingly, the COVID-19 shock hit all three sectors hard. After that the business climate indicator fully recovered for private health insurance. For life insurance, the indicator also recovered but did not reach the highs of 2018-2019. For property and casualty insurance, although the indicator has regained many of its losses, it has remained negative and well below its long-term average since the plunge. As Germany’s economic growth slowed significantly in 2022, the business climate deteriorated in all three insurance sectors. The latest survey results (Q3/2022) indicate that life insurers and property/casualty insurers were dissatisfied with their business situation and pessimistic about their business prospects for the next six months. Companies in the private health insurance sector were neutral in their assessment of both their current business situation and their business outlook, the corresponding balance values being approximately equal to 0. More results can be found in Marjenko (2021).

Figure 5.3: ifo Business Climate and its sub-indicators in the life insurance

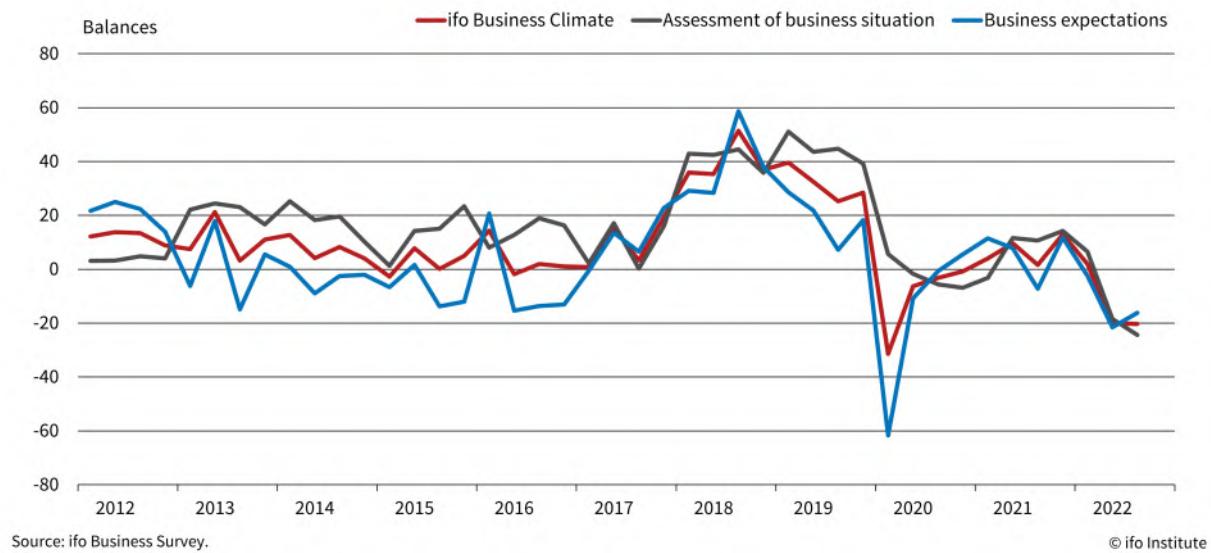
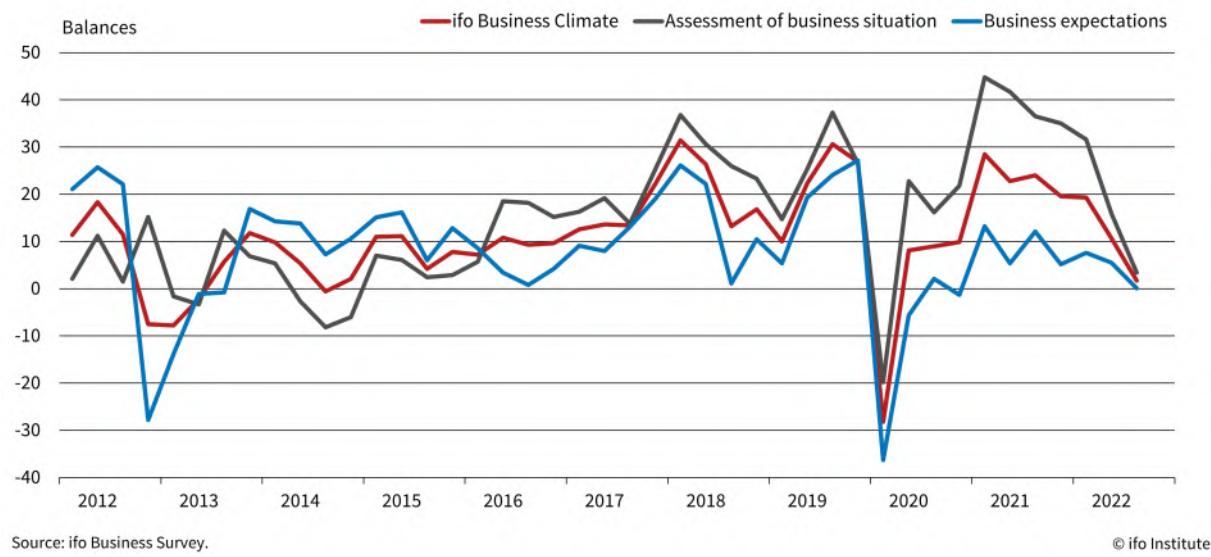
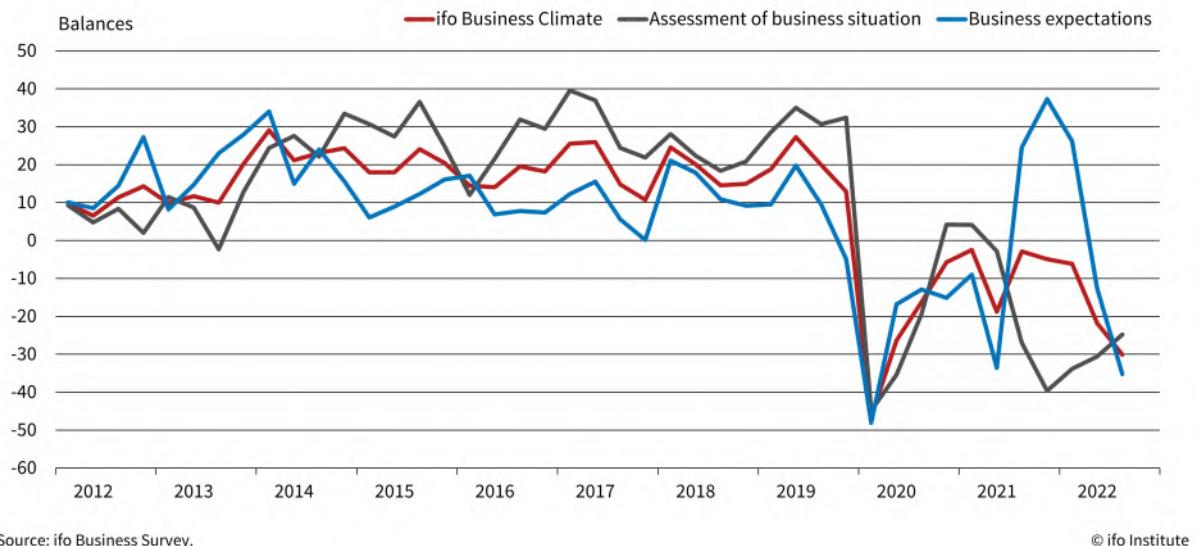


Figure 5.4: ifo Business Climate, and its sub-indicators in the private health insurance



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Figure 5.5: ifo Business Climate, and its sub-indicators in the property and casualty insurance



Source: ifo Business Survey.

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5.3 The ifo HR Survey

JULIA FREUDING, JOHANNA GARNITZ, BIANCA SCHORER

5.3.1 Purpose and Conception

In a rapidly changing work environment, it is important for companies to react flexibly to exogenous factors. For HR related topics there are various flexibility instruments available for this purpose, such as working time accounts and temporary work. However, there is little information in official statistics on the use and importance of such instruments for businesses. To obtain more precise information on the application and significance of these tools, the ifo Institute, in cooperation with Randstad Deutschland, has been conducting a quarterly survey of around 1,000 human resources managers from various economic sectors since 2008. The ifo HR Survey has been introduced to focus on these HR related topics and is a complement to the other ifo surveys that mostly deal with business cycle developments. The results of the survey can be used to illustrate how the use of flexibilization instruments changes over time and whether structural changes or cyclical influences have become visible. In addition, current personnel policy issues are examined with changing supplementary questions. The topics focus on current trends or problems, such as the apprenticeship situation or the shortage of skilled workers. The findings provide benchmark information for companies and valuable data for researchers.

5.3.2 Composition of the Panel

To attain a sample that is as representative as possible for the German economy, companies from manufacturing, wholesale and retail trade as well as from the service sector throughout Germany take part in the survey. Moreover, attention is paid to ensuring that small and medium-sized enterprises as well as large companies are represented in the panel. A total of about 1,000 companies are surveyed. By contrast, the banking and insurance sector, public service providers, and construction companies are excluded for various reasons. The latter, for instance, is heavily affected by seasonal fluctuations, which would distort the picture.

Table 5.4 provides an overview of the composition of the panel. Of the companies surveyed, 42% belong to the manufacturing sector and 38% to the service sector. The remaining 20% of firms relate to the trade sector. The firm size is determined by the number of employees: Almost one-third of the firms employ up to 49 people, and the majority (44%) have between 50 and 249 employees. Each 12% of the companies employ between 250 and 500 persons, and more than 500 employees, respectively.

In addition, the average overall response rate of companies in 2021 and 2022 is 55%. The response rate to the online questionnaire (58%) is clearly higher than the paper response rate

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Table 5.4: Distribution of participants of the ifo HR Survey

Economic sector	%	Firm size (employees)	%
Manufacturing	41.7	1-49	31.3
Trade	19.7	50-249	43.9
Service	38.6	250-499	12.1
		>500	12.7
Total	100.0	Total	100.0

(47%). The overall distribution of response rates is shown in Table 5.5.

Table 5.5: Response rates of the ifo HR Survey in 2021 and 2022

Quarter	Online (in %)	Paper (in %)	Overall (in %)
Q1 2021	68%	51%	63%
Q2 2021	55%	44%	52%
Q3 2021	60%	54%	59%
Q4 2021	57%	50%	55%
Q1 2022	58%	45%	54%
Q2 2022	52%	42%	50%
Q3 2022	57%	43%	54%
Q4 2022	55%	48%	54%
Average overall response rate	58%	47%	55%

Since the distribution of the companies surveyed in the HR panel across the size classes and industries does not exactly match with the distribution of the German economy across these characteristics, correction factors are used to calculate representative results for the surveys.

The target values for the business sectors and size classes are based on the data on employees subject to social security contributions per sector and size class, as published by the Business Register of the Federal Statistical Office (Federal Statistical Office 2021c). For this purpose, companies are divided into one of four size classes according to the number of employees subject to social insurance contributions, and the sum of the employees in the individual size classes is calculated.

In addition, the values are subdivided for each economic sector, so that the share of employees per size class can be calculated for each economic sector and a weighting is possible via the variables sector and number of employees. The economic sector of a company is defined on the basis of the standardized classification of economic activities WZ 2008, whereby for certain reasons some economic sections as described above are not covered in the survey

panel, e.g., mining and quarrying (B), electricity, gas and water supply (D, E), construction (F), financial and insurance activities (K), as well as public administration, education, health care, and other services (O, U, P, Q, R, S, T) (Federal Statistical Office 2009).

Thus, HR managers from the following economic sectors are part of the panel: manufacturing (C), trade and maintenance of motor vehicles (G), transport and storage (H), the hotel and restaurant industry (I), information and communication (J), real estate (L), professional scientific and technical services (M), and other economic services (N). Each participating company is assigned to a class in terms of its economic sector and number of employees. Hence, each of these classes is included in the calculation of the results according to its economic weight, which is determined by the target values of the Federal Statistical Office. Classes tending to be underrepresented in the company survey in terms of economic importance or number of employees are given a correspondingly higher weighting by the correction factors. This procedure ensures the representativeness of the results at the aggregate level. Since the number of cases for individual sectors is too small, results are only published for the four company size classes and for the economic sectors manufacturing, trade, and services.

5.3.3 Questionnaire

The questionnaire consists of both regularly repeated standard questions and changing supplementary questions on current HR topics. The standard questions in the first and third quarters are structured as follows (as of 2022): The questionnaire consists of both regularly repeated standard questions and changing supplementary questions on current HR topics. The standard questions in the first and third quarters are structured as follows (as of 2022): In the first section, the HR managers are asked about their assessment of the importance of various flexibilization instruments in their company. The possible answers are “high/medium/low” or “not used”. The instruments asked about overtime, fixed-term contracts of replacement staff, mini-/midi-jobs of additional staff, temporary work, freelancers, outsourcing, in-house implementation and working time/flexitime accounts. In addition, there is a response option on flexibilization measures in the personnel area in general, including instruments not previously mentioned (Figure 5.6).

In the second quarter, general data on the company is requested to be able to categorize by economic sector and company size in the evaluation. The data is also used to calculate the weighting of the responses. In addition, it is asked whether the company is a family business and what the composition of the workforce is in terms of the type of employment (see Figure 5.7). Figure 5.8 gives an overview of the standard questions of the last quarter. The focus lies on human resource planning for the coming year. It covers aspects such as staff planning, an associated need for temporary staffing, and qualification needs. Another aspect dealt with the issue of skilled workers.

Since the pilot survey in 2008, the original questionnaire has been slightly optimized and adapted several times. In 2010, the questionnaire was shortened in some places. In 2013, the

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Figure 5.6: Standard questions of the first and third quarter

What importance do you attach to the following flexibilization instruments in your company?
(The information relates only to your business(es) in Germany)

Instruments	The current importance in the company is ...			no application
	high	middle	low	
1) Extra hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Additional/replacement staff on the basis of temporary contracts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Additional/replacement staff on a minijob/midijob basis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Use of agency workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Use of freelancers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Outsourcing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Internal realizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) Working-time accounts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Flexibilization measures in the personnel sector in general (including measures not mentioned above)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 5.7: Standard questions of the second quarter

A) Questions about your company *(The information relates only to your business(es) in Germany)*

1) Would you describe your company as a family business? Yes No

2) How many employees work in your company (heads)? _____

of these...	full time _____	part time _____
temporary workers _____	trainees _____	marginal employees (up to 450€) _____

3) How much turnover did your company generate in 2021?

<input type="checkbox"/> < 1 mil. €	<input type="checkbox"/> 1 mil. – < 5 mil. €	<input type="checkbox"/> 5 mil. – < 25 mil. €	<input type="checkbox"/> 25 mil. – < 100 mil. €	<input type="checkbox"/> > 100 mil. €
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flexibility measures were supplemented by the “no application” option, providing even better insight into the significance of the various measures. This must be considered when evaluating the survey over time. As there was previously no “no application” response, this marks a structural break. Companies that did not apply the respective instrument very often attributed a low importance to it. This led to a distortion in the answers. Comparable analyses up to the current margin are therefore only possible since 2013. In addition, the expected development of the importance of the various types of instruments was assessed up to 2014. However, since the companies almost exclusively expected no changes the ifo Institute deleted this question at the beginning of 2015. A possible explanation for the response behavior regarding the expectation question could be that these are structural, and thus slowly progressing changes rather than economic developments, which would be clearly visible in the respective survey waves. Another change in the survey cycle for the standard questions was implemented at the end of 2019 by changing the survey rhythm for the flexibility instruments from quarterly to semi-annually. As a result, the first and third quarters cover the flexibility instruments. In contrast, in the second quarter focuses on general questions about the company. At the end of the year, the outlook for the upcoming year is surveyed.

Figure 5.8: Standard questions of the fourth quarter

Outlook for the coming year 2021**1) How do you expect your staff to develop in the next six months?**

increase sharply increase slightly remain the same decrease slightly decrease sharply

2) What kind of skilled workers do you expect to be looking for in 2021? _____ not any**3) Do you expect major problems in finding suitable skilled workers?**

very big great medium few not any

4) How will the demand for temporary work in your company develop in the next six months?

increase sharply increase somewhat remain the same decrease slightly decrease sharply

5) How do you assess the importance of external partners in qualification and further training in the next six months?

increase remain the same decrease I can't assess the development.

6) How important do you think the qualification and further training of employees will be for the future success of your company?

more important remain the same less important I can't assess the development.

7) How important do you think the following training and qualification offers will be for the future success of your company?

	clearly less important	rather less important	stays the same	rather less unimportant	clearly less unimportant
Open training and further education offer	<input type="checkbox"/>				
Company-specific training and further education offers	<input type="checkbox"/>				
Certifications	<input type="checkbox"/>				
In-service qualification (vocational qualification)	<input type="checkbox"/>				
E-learning offers	<input type="checkbox"/>				

5.3.4 Standard Questions: Methodology and Evaluation

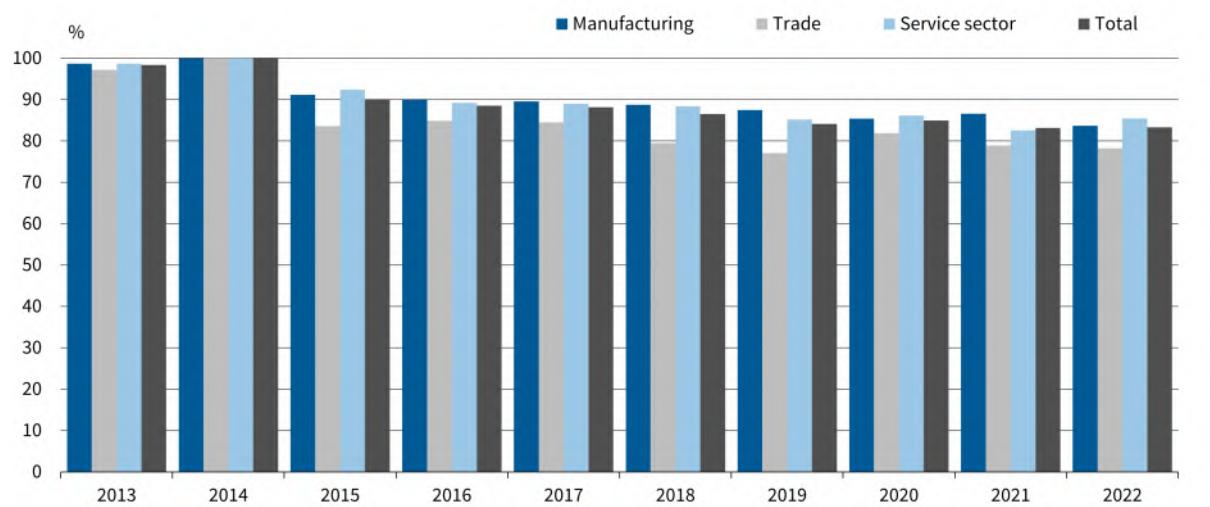
Since 2020, HR managers have been surveyed twice a year on the use of various flexibilization instruments in their companies. Before 2020, this was done on a quarterly basis. The aim is to use the answers to examine how the use of various flexibility instruments changes over time. In the first step of the evaluation, the use of the flexibilization instruments is considered, i.e., the proportion of firms that make use of the respective measure. This excludes those companies that have ticked the answer option “no application”. In the second step, the importance of the individual instruments is examined. In the questionnaire, the HR managers have the option of evaluating the individual instruments with the categories “high”, “medium”, “low”, or “no application”. These four answer options are given the respective values 3, 2, 1, or 0 to calculate an average value. This calculated average indicates higher importance with ascending value.

Although the survey results on the importance of the respective flexibility measures have been available since 2008, the structural break in the data from 2013 onwards must be taken into account. The addition of the “no application” category to the questionnaire makes it possible to consider only those companies that actually use the instrument when assessing its importance. For a comparison over the entire survey period, the results for the years 2008 to 2013 would have to be adjusted by a factor, but only an estimate is possible. The other adjustments to the questionnaire have no impact on the evaluation of the data and do not limit comparability.

5.3.5 Results

The analysis of the flexibility instruments examines the frequency of use and the importance of the respective measures. Figure 5.9 shows the change of flexibilization in general over time – both overall and according to economic sectors. As a result, the use of flexibilization has generally declined since 2014. It is clear that the use of flexibilization has generally declined since 2014. This change can be seen most notably in trading companies.

Figure 5.9: Application of the flexibility instruments in general over time by economic sector

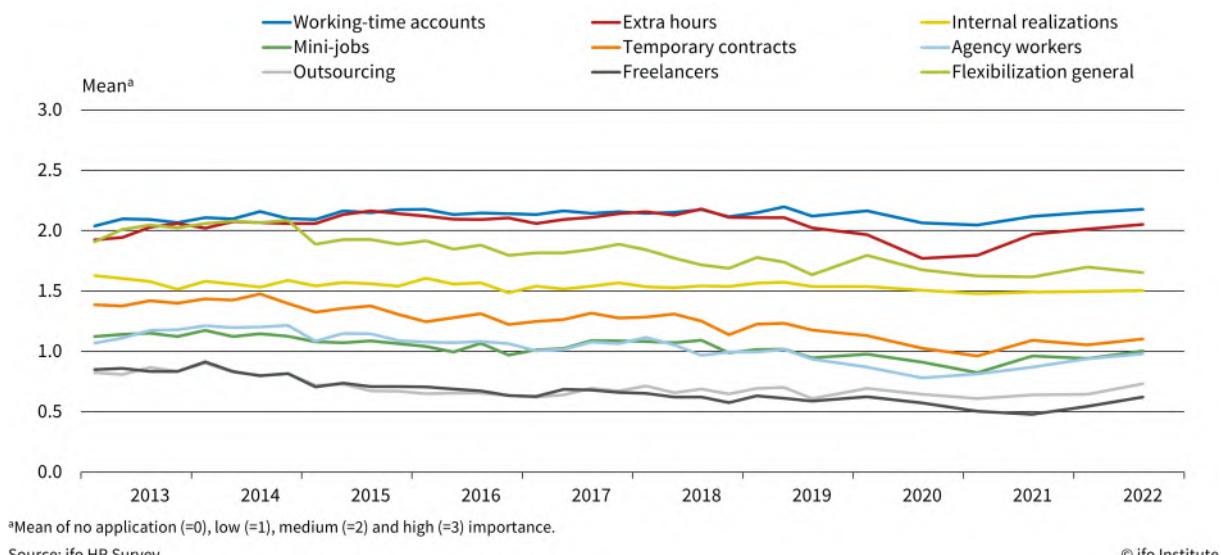


Source: ifo HR Survey.

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Over the entire observation period, by far the greatest importance is attached to the flexibility instruments of working-time accounts and extra hours (Figure 5.10). All other measures show less importance. The importance of working-time accounts and extra hours was simultaneous until the end of 2018. At the beginning of 2019, a greater spread between these measures can be observed as the importance of the working-time account increased. In the years dominated by the Covid19-pandemic, extra hours lost some importance as a flexibilization measure. Internal realizations remain constant on average at a medium level of importance. The importance of agency workers fell until mid-2020 but has regained importance since then. The manufacturing sector favors agency workers. A similar pattern applies to minijobs and temporary contracts for additional staff. Recently, the importance has risen to some extent in both measures, though at a slightly higher rate for temporary contracts than for minijobs. Outsourcing and use of freelancers are generally rated with lower importance than the other measures. While in the past years, development of both measures ran simultaneously, the spread between them has recently shifted towards a higher preference for outsourcing than for freelance work.

Figure 5.10: The development of the importance of flexibilization measures



5.3.6 Supplementary Questions: Selected Results

The supplementary questions in the second part of the questionnaire, which are developed individually for each survey, deal with current HR or economic policy issues. The topics vary from quarter to quarter and range from the handling of the 2010 World Cup to legislative changes (e.g., Pay Transparency Act 2017, Working Hours Act 2019, Bridge Part-Time Work Act 2019). Therefore, the ifo HR survey covers a wide range of topics. Some topics are taken up several times or there is a follow-up to analyze comparisons and changes. For example, the minimum wage (2008, 2014, 2019, and 2021) or the situation regarding vocational training (2014, 2015, 2018, 2020, and 2021) played a central role in several surveys (Brandt 2020b, Freudig and Garnitz 2021a, 2022b).

In addition to these special topics, the survey also addresses socio-political trends, such as diversity. The survey from the 2nd quarter of 2021 showed that there is still room for improvement in the compatibility of family and career: For as many as 40% of the companies, part-time employment in a management position is conceivable. Since the emergence of the Corona pandemic, special attention has been paid to the consequences for personnel planning and the shortage of skilled workers.

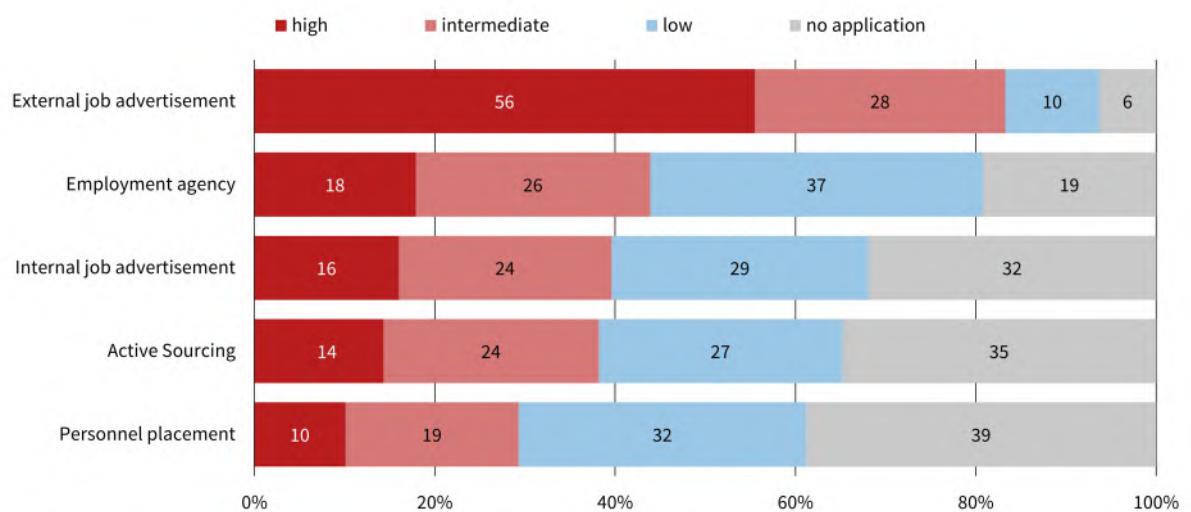
5.3.6.1 Recruitment

Recruitment and active sourcing for potential employees was also a special topic and each was surveyed before and after the Covid-19-pandemic. In the second quarter of 2011, companies were asked which recruitment channels are most appropriate for finding new staff. The results of the survey highlight that the most frequently used channels were job advertisements in print

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media (58%) or on their own homepage (53%). Another popular option was recommendations from current employees (56%). Companies also recruited skilled workers with the help of employment agencies (56%). Less common were job fairs (10%) or stands at universities (16%). About 9% of companies found skilled workers through social media. After the Covid-19 pandemic, HR managers were asked which recruitment channels they think are most important for their company. The results of the survey are illustrated in Figure 5.11: 84% of the participants indicated external job advertisements in online or print media as a common way to find skilled workers and attribute medium to high importance to this instrument. In contrast, internal postings are rated as high or moderately important by 40% of the companies. Companies also use the services of employment agencies. This is given medium to great importance by 44%. The services of personnel service providers or headhunters are mainly used by companies with 250 or more employees. About 29% of HR managers rate personnel service providers or headhunters as moderately important. Another way to find skilled workers for the company is active sourcing. For about 38% of companies, this instrument is of medium or great importance. However, most companies do not use this instrument. About 35% do not apply active sourcing and for 27% of HR managers it is only of minor importance.

Figure 5.11: Importance of different channels for advertising vacancies (weighted shares in percent)



Source: ifo HR Survey.

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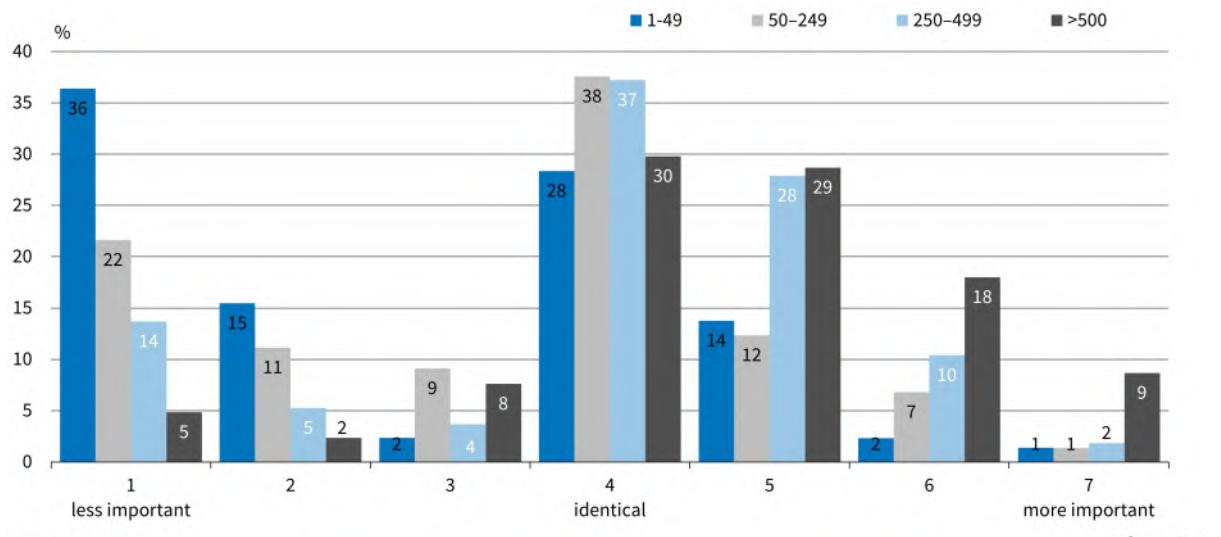
In 2019, companies were asked about their use of data-driven recruitment methods (ifo Institute 2019). The main field of application of these technologies is the selection and assessment of suitable future employees. Data-driven recruitment methods can also be used to pre-select applicants. However, so far only 4% of companies surveyed use those techniques; of those, most are in the service and manufacturing sectors. Furthermore, no differences in the use of these methods can be identified between companies employing a higher or smaller number of persons. These results raise the question why these methods are not yet widely used. The main reasons are both a lack of knowledge and a lack of available offers from companies

developing and selling these data-driven recruitment programs. HR managers also express concern about the risks associated with these methods, such as a lack of consideration of social competences and soft skills. The development of specific algorithms is also seen as problematic. In addition, the preference for face-to-face interviews on site remains widespread in companies (84%) and is preferred over digital interviews. A total of 29% of all companies use online job boards, such as Stepstone and Monster, for recruitment, and 4% use the career networks Xing and Linked-In. The latter are considered less important, especially regarding active sourcing. When differentiating between different targeted groups, larger companies mainly use social media to address trainees. As digitalization progresses, social media will be used more frequently, which will also lead to an increased use of data-driven recruiting programs. In 2022, 7% of HR managers could already imagine implementing those techniques (Freudling and Garnitz 2022a).

5.3.6.2 Diversity in Corporate Culture

Diversity in corporate culture mainly deals with gender, age, ethnic origin, physical and mental abilities, religion, world view, sexual orientation, and social origin. This topic was addressed in the second quarter of 2021 (Freudling and Garnitz 2021b). Figure 5.12 clearly shows that the focus on diversity for about one third of the companies has hardly changed in recent years. However, when considering the respondents' company size, it is clear that diversity has become more prominent in larger companies, whereas the topic is less important in smaller ones: the score of 4 is about the mean on a scale of 1 (less important) to 7 (very important).

Figure 5.12: Change in diversity focus in recent years by company size



Since HR departments are only able to record the age, gender, religion, and nationality of their employees, the focus of the study lies on the development of those criteria. Regarding

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age, the proportion of employees in individual companies who are between 51 and 60 years old is the largest (25%). All other employees are in descending order in the age structure: 41 to 50 (24%), 30 to 40 (23%), and under 30 (19%). In last place, with a clear gap between the age groups already mentioned, is employees 60 and over (9%). Concerning gender identity, the study accounts for men, women, trans*, and inter* people. The survey of the companies showed that the proportion of men in the respective companies is approximately 61%, women 39%, and diverse 0.06%.

Variation in nationality in the companies is medium or high. Variation in educational background is in the medium range. Variation concerning physical or mental limitations is the lowest. Regarding the latter, the legislator prescribes the following: Companies with 20 or more workplaces should employ 5% severely disabled people (§154 of the German social security statute book – SGB). Companies with 20 to 39 workplaces are obliged to employ one severely disabled person. In contrast, a company with 40 to 59 workplaces is obliged to employ two severely disabled persons. If this obligation is not met, the companies must pay a compensatory levy according to §160 SGB. The human resources managers state that 3.5% of the companies have employed severely disabled persons. The result of the survey indicates that about a half of the companies partially pay the compensatory levy. Another question was whether the companies have set up the working environment of their employees in a barrier-free way: 64% offer the possibility of such a workplace. In contrast to the barrier-free working environment, internet-presence can also be designed barrier-free based according to internationally defined regulations, but this is not yet possible in half of the companies surveyed.

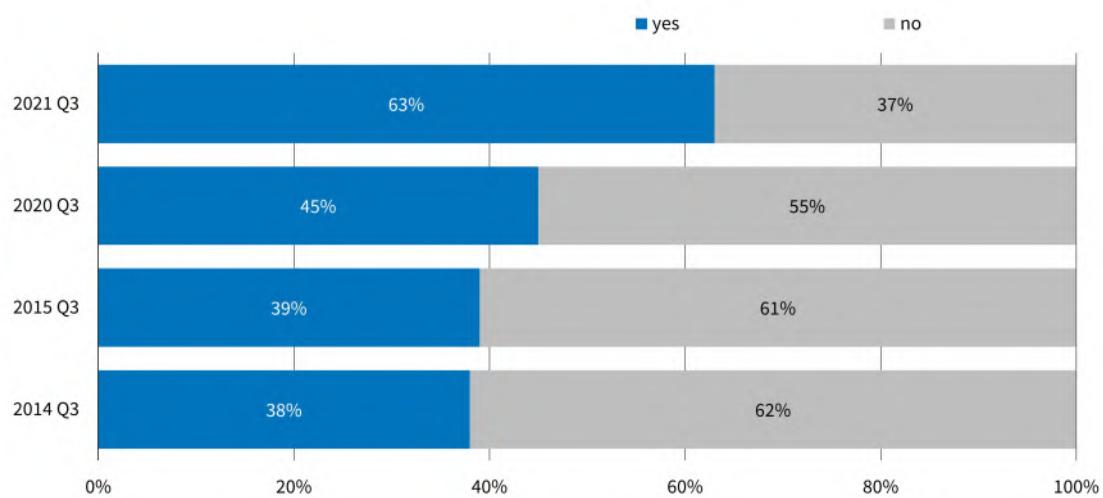
5.3.6.3 Vocational Training

The special topic of vocational training found its way into the ifo HR survey several times, having been addressed for the first time in the fourth quarter of 2014. In particular, the search for apprentices became a key issue. About 75% of the companies stated that they offer a training place. In the search for trainees, 62% had no difficulties and 38% had difficulties finding new trainees. Smaller companies with up to 50 employees stated somewhat more frequently that they had experienced difficulties. In the following year, the companies were asked about this again in a comparable form. The results show that a roughly similar proportion of training companies also had problems finding new trainees in 2015.

In 2020 and 2021, this topic came into focus again in light of the Corona pandemic. Therefore, the companies were once again asked about difficulties in finding trainees. 45% of the personnel managers surveyed reported problems finding trainees. This applies particularly for manufacturing companies (50%). The fewest problems with regard to finding trainees were experienced in the service sector (41%). Since this question was also asked in the same wording in the third quarter of 2020, a direct comparison is possible. Whereas in 2020 45% complained about difficulties, in the following year the proportion was 63% across all eco-

nomic sectors. Nearly all companies that were unable to fill their training places stated that they had had problems finding trainees (95%). HR managers in manufacturing and service companies complained about problems in filling training places. The reason given by about half of the industrial and commercial enterprises, as well as larger companies, was the insufficient qualifications of the applicants. Small companies as well as the majority of service companies complained that they had received no or too few applications (Brandt 2020b; Freudig and Garnitz 2021a).

Figure 5.13: Problems finding new trainees (as a proportion of all companies providing vocational training)



Source: ifo HR Survey.

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In summary, it can be seen that although the proportion of companies offering apprenticeships remained the same between 2014 and 2021, the search for new apprentices has become increasingly difficult. Figure 5.13 compares the results of the surveys, whereby it must be noted that the wording of the questions from 2014/2015 differs slightly from that in 2020/2021. To sum up, the challenge of finding new trainees – in the broader context of the shortage of skilled workers – is becoming more acute.

5.3.7 Conclusion

The ifo HR Survey is a labor market study that examines the importance of flexibilization instruments in German companies over the long term. Overtime, temporary work, mini-jobs, and other strategies for flexibilization are observed. The effects of changes in the law or more general trends and challenges are also part of the questionnaire. The input of HR managers is very important in this format. What moves them in their individual field of business makes larger contexts and developments visible as part of the survey. This is exactly where the ifo HR survey offers a perfect complement to the general economic surveys, with the ifo Business

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Climate Index as the core element.

Due to the extensive panel of participating companies, which represents a cross-section of the German economy, the ifo HR survey is a valid instrument for analyzing a wide range of research topics that involve flexibilization measures in the HR sector, and also offers numerous evaluation potentials beyond this. External researchers interested in the microdata can access the survey free of charge at the LMU-ifo Economics & Business Data Center for scientific research on-site analysis.

5.4 The Quantitative Expectations Module of the ifo Business Survey

RÜDIGER BACHMANN, KAI CARSTENSEN, MANUEL MENKHOFF, MARTIN SCHNEIDER

5.4.1 Introduction

This chapter introduces the quarterly quantitative expectations module of the ifo Business Survey. It describes its inception and its sample composition, provides a few summary statistics, introduces special questions and a one-time special survey related to the quantitative expectations module, and summarizes the existing research developed from it.

In the second quarter of 2013, in April 2013 to be precise, ifo added a quarterly online module with quantitative expectation questions to the manufacturing part of the ifo Business Survey (IBS).² The new questions concern the firm's own sales revenues.³ This initiative was pioneered by economists Rüdiger Bachmann, Kai Carstensen, and Martin Schneider. There was a pilot survey in December 2012.

Initially, the new module was featured as a separate addition to the online version of the regular IBS. Specifically, only after the main survey had been filled out and submitted, the survey participant was made aware of the new module on a "Thank you"-site and asked to fill it out as well. From April 2017 on, the module was placed more prominently jointly with the regular online manufacturing survey on the starting/overview page, although still as two separate links. This change increased the number of respondents considerably. From January 2019 on, the service and trade sectors were also included, increasing the overall number of respondents yet again.

The tradition of asking firms via surveys about (aspects of) their own business prospects and aggregate economic conditions is a long-standing one (see, for a historical overview, Bachmann and Carstensen 2022). As this overview also shows, the answer scale for such questions has traditionally been qualitative, in fact trichotomous, a variation of "decline", "stay the same", and "increase." It is also a tradition with ups and downs, especially in the United States, where, after the rational expectation revolution in the 1960s, business surveys took a backseat role. More recently, this has changed again because of increasing scepticism towards the paradigm of full-information rational expectations and, as a result, stronger empiricism towards expectations and expectation formation in the field of Economics.

² This module is in the field together with the January, April, July, and October IBS, in the first two and a half weeks of each month.

³ As is well known, the IBS does not elicit expectations on aggregate quantities such as GDP growth or inflation; also, for brevity reasons, we use "firm" to indicate the survey participant, noting that, for larger conglomerates, this could be a business unit of a firm rather than a stand-alone firm.

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To make progress in our understanding of how decision makers in firms form expectations, it is clear that we need to elicit and study them in a quantitative way. This is what the new quantitative expectations module added to the IBS is intended to make possible. It is not entirely without predecessors (again, see, for a cross-country overview, Bachmann and Carstensen 2022). The Banca d’Italia is one of the pioneers in asking firms about quantitative sales revenue expectations as described in Guiso and Parigi (1999) and Bontempi et al. (2010). Recently, economists in the United States and the United Kingdom have also introduced surveys eliciting quantitative expectations from firms as described in Bloom et al. (2019), Altig et al. (2020a), Altig et al. (2020b), Bloom et al. (2020), and Bloom et al. (2021).

5.4.2 Questionnaire

The quantitative expectations module of the ifo Business Survey asks firms, at the beginning of a quarter, a three-part question. Figure 5.14 displays the sample questionnaire for April 2014 in the original German (we provide a translation into English below).

The following questions refer to changes against the previous quarter.

1. *By how much in percentage terms have your sales changed in the first quarter of 2014?*
2. *By how much in percentage terms will your sales change in the second quarter of 2014?*
 - a. *In the best possible case:*
In the worst possible case:
 - b. *Taking into account all contingencies and risks, I expect for the second quarter of 2014 all in all a change of:*
3. *You can either answer with a probability or a probability interval:*
(a) *how do you assess the probability (in percentage terms) that your sales will increase in the second quarter of 2014?*
 - *Probability is ____% (please insert integers)*
 - *Probability lies between ____% and ____% (please insert integers)*

The questionnaire contains boxes for respondents to provide their numerical answers. Next to every such box, there is a reminder to provide positive or negative integers. In addition, respondents are given a “don’t know-”option (“weiß nicht” in German) behind the box, as shown in Figure 5.14. The default option is to skip the question with a “don’t know”, the option checked in the screenshot. Once a respondent enters a number, the “don’t know”-option becomes unchecked. Finally, underneath each of parts one, two, and three, firms are invited to provide free text comments (“Anmerkungen”).⁴

⁴ We note that, for the sake of brevity, we have left out the translation of parts 3(b) and 3(c), which repeat 3(a)

Figure 5.14: Original survey questionnaire in German

April 2014

Hinweis zu diesen Zusatzfragen:
Dass Wirtschaft zu 50% aus Psychologie besteht, wusste schon Ludwig Erhard. Ein wichtiges Element sind dabei Erwartungen über eine unsichere Zukunft, mit der Sie als Unternehmer täglich umgehen müssen. Das haben die Wirtschaftswissenschaften zu lange vernachlässigt. Diese Erwartungen und diese Unsicherheit zu messen und zu evaluieren, ist das Ziel der folgenden Fragen. Mit Ihren Antworten helfen Sie uns sehr.

Für Rückfragen steht Ihnen Frau Wieland zur Verfügung: Tel. 089-9224-1247 - E-Mail: wieland@ifo.de

Die folgenden Fragen beziehen sich auf Änderungen [gegenüber dem Vorquartal](#).

1. Um wieviel Prozent hat sich der Umsatz in Ihrem Bereich im [ersten Quartal 2014](#) verändert?
 Veränderung um: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht
 Anmerkungen:

2. Um wieviel Prozent wird sich der Umsatz in Ihrem Bereich im [zweiten Quartal 2014](#) verändern?
 a) Im bestmöglichen Fall: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht
 Im schlechtestmöglichen Fall: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht
 b) Unter Berücksichtigung aller Chancen und Risiken erwarte ich
 im [zweiten Quartal 2014](#) alles in allem eine Veränderung um: % (bitte ganze, positive oder negative Zahlen eingeben) weiß nicht
 Anmerkungen:

3. Bei den nächsten drei Teilfragen können Sie entweder eine Wahrscheinlichkeit oder ein Wahrscheinlichkeitsintervall angeben.

a) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im [zweiten Quartal 2014](#) steigt?
 Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)
 Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)
 weiß nicht

b) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im [zweiten Quartal 2014](#) gleich bleibt?
 Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)
 Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)
 weiß nicht

c) Wie hoch schätzen Sie die Wahrscheinlichkeit ein, dass der Umsatz in Ihrem Bereich im [zweiten Quartal 2014](#) sinkt?
 Wahrscheinlichkeit liegt bei % (bitte ganze Zahlen eingeben)
 Wahrscheinlichkeit liegt zwischen % und % (bitte ganze Zahlen eingeben)
 weiß nicht

Anmerkungen:

[Zurück](#) [Einträge löschen](#) [Absenden](#)

Notes: Original questionnaire from ifo's online quantitative expectations module in German; screenshot from April 2014.

To clarify the timing, consider a firm responding in April 2014, that is, in the first two and a half weeks of 2014:Q2. Part one asks for the change in sales revenue between 2013:Q4 and 2014:Q1. This is the most recent sales growth realization that the firm has experienced. Parts two and three then ask about the firm's outlook over the current quarter 2014:Q2, as compared to the previous quarter 2014:Q1. In part two, the survey asks about the next sales revenue growth rate realization that the firm expects. In part three, the survey asks about probabilities, or probability intervals, relating to the percentage change in sales between 2014:Q1 and 2014:Q2. In other words, the survey elicits subjective beliefs about the current quarter at the beginning of that quarter, at a point in time when sales revenues of the previous quarter are already known.

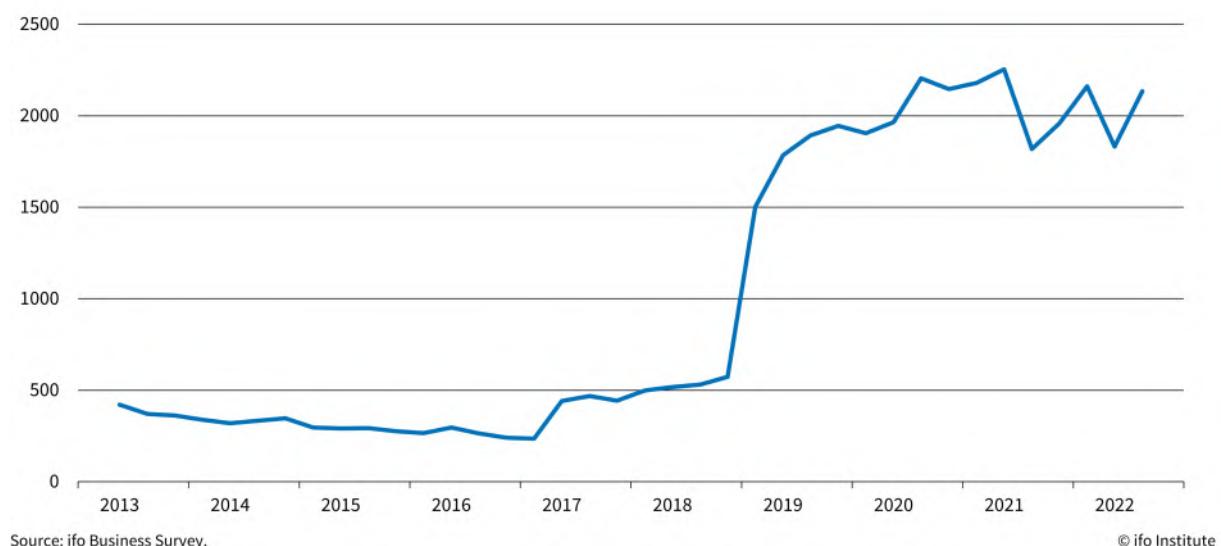
with "stay the same" and "decrease", respectively.

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5.4.3 Sample Development and Descriptive Statistics

As can be seen in Figure 5.15, the sample size at the start of the module in April 2013 was just over 400 complete responses for all questions; it started out in the manufacturing sector only (Figure 5.16).⁵ The manufacturing sample declined steadily to just under 250 complete survey responses in January 2017.

Figure 5.15: Number of complete survey responses over time

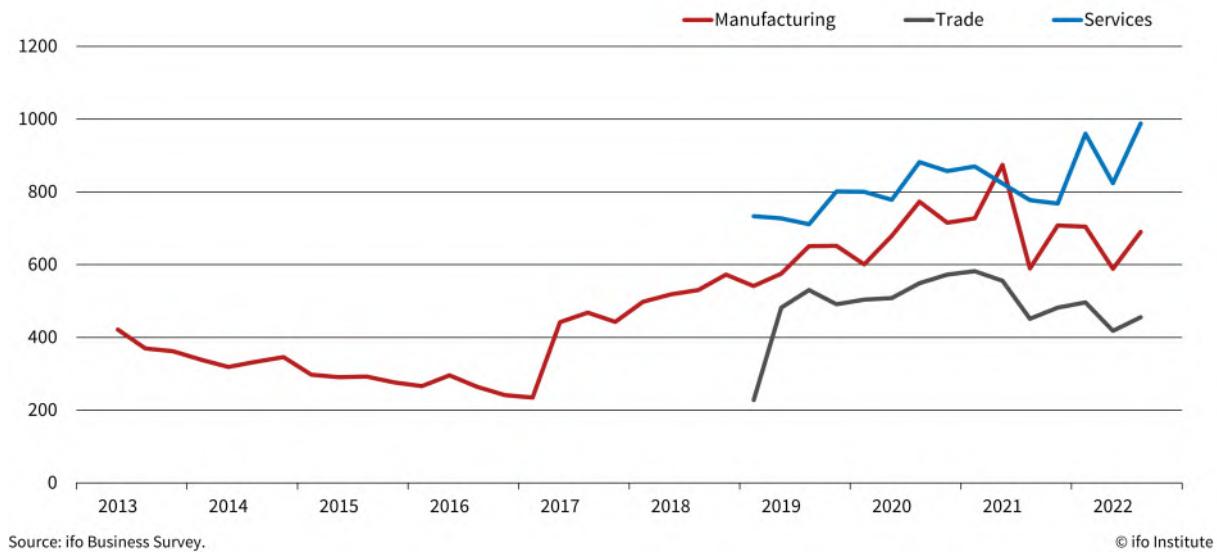


Notes: Number of complete responses from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS.

After that, as we describe in the introduction, ifo placed the quantitative expectations module more prominently, which increased the number of respondents and thus the sample size of complete responses considerably to well over 400 in April 2017. From then on, the manufacturing sample has been steadily increasing and fluctuates now between 600 and 800 complete responses. In January 2019, the trade and services sector started to receive the identical questions from the quantitative expectations module, boosting the total number of complete responses to around 2,000, with between 800 and 1,000 complete responses from the services sector, and between 400 and 600 complete responses from the trade sector.

⁵ If researchers are interested in studying only a subset of questions, they will typically have a few more observations at their disposal: for instance, while 421 answered all the module's questions in April 2013, 451 answered all questions in part one and two, and 469 answered all questions in part 3.

Figure 5.16: Number of complete survey responses by sector over time

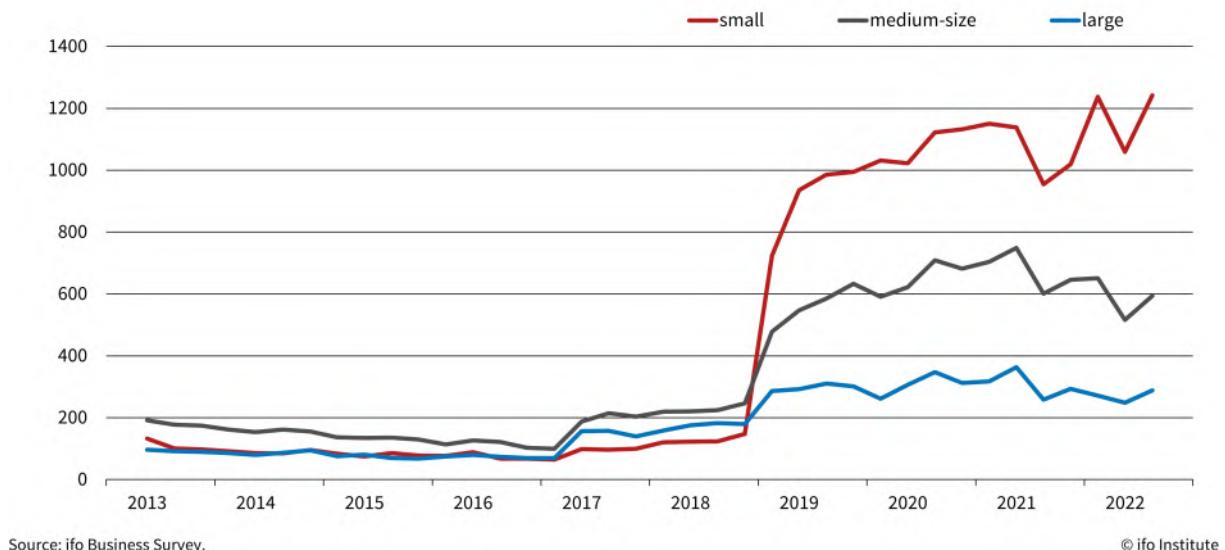


Source: ifo Business Survey.

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Notes: Number of complete responses by sector from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS.

Figure 5.17: Number of complete survey responses by firm size over time



Source: ifo Business Survey.

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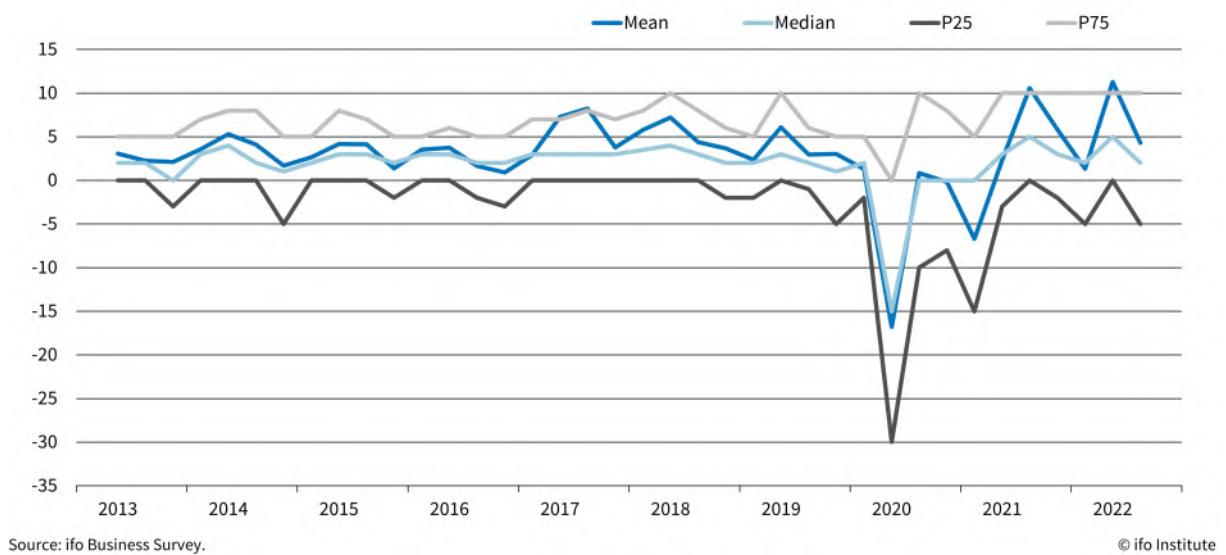
Notes: Number of complete responses by firm size from 2013:Q2 to 2022:Q3 in the quantitative expectations module of the IBS. Small firms are defined as having employees smaller than 50. Medium-sized firms have between 50 and 249 employees. Large firms have 250 employees or more.

Figure 5.17 displays the breakdown of complete responses by firm size: initially, responses coming from the manufacturing sector only, the medium-sized firms (between 50 and 249 employees) dominate in the survey, with approximately equal numbers of small and large

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firms. The more prominent placement of the module since April 2017 brought more large firms into the module. With the inclusion of the trade and services sector, perhaps unsurprisingly, responses from smaller firms dominate.

Figure 5.18: Cross-sectional summary statistics of sales revenue growth expectations over time



Notes: Cross-sectional summary statistics of sales revenue growth expectations, answers to part 2(b) of the quantitative expectations module of the IBS, from 2013:Q2 to 2022:Q3. We employed a mild outlier cleaning procedure but otherwise the underlying sample is that of complete responses.

Finally, Figure 5.18 shows the time series of four cross-sectional moments of sales revenue growth expectations: the mean, the median, and the 25th and 75th percentiles. It is clear that—especially for the median firm—the period from 2013 to 2022 was not a period of particularly strong aggregate cyclical fluctuations, underlying idiosyncratic changes for the surveyed firms notwithstanding, with one key exception: the Covid-19 pandemic. In April 2020, the first Covid-19 quarter with data from the quantitative expectations module, sales revenue growth expectations collapse across the entire distribution of firms, and particularly so for firms with low sales growth expectations. The average (and median) sales revenue growth expectation for the upcoming second quarter of 2020 was about negative 15 percent. Firms' sales growth expectations recovered relatively quickly at the beginning of the third quarter of 2020, but negative Covid-19 fears led to another, albeit much smaller decline for the first quarter of 2021, after a strong wave with many politically imposed restrictions on economic activity in the waning days of 2020. Interestingly, we see no discernible effect on sales revenue growth expectations of the Russian invasion in Ukraine in April 2022, the first module month after that invasion, nor in July 2022, when it became clear that Russian gas deliveries to Germany would come to an end. We will elaborate on this below in Section 5.4.5.

5.4.4 Special Survey and Special Questions

In the fall of 2018, in the months of October and November, but independently from the main survey, ifo fielded a one-time special survey in the manufacturing sector to provide a more in-depth background to the answers in the quantitative expectations module. Somewhat over 500 firms responded. The survey asked about the following topics: 1) external and internal factors influencing firms' expectations and probabilities with respect to their sales revenue development, and from which departments' information inside the firm they would draw on to answer these expectational questions; 2) whether, to answer the expectational questions, firms use existing quantitative analysis and, if so, of which nature; 3) which factors influence their choice of a probability interval over a probability; 4) the nature of competition firms perceive. Bachmann et al. (2021) and Bachmann et al. (2020a) provide summary statistics for subsamples of firms on some of these questions. They also provide the complete questionnaire in the German original.

In December 2018, after the decision about Brexit in the British House of Commons was postponed, participants in the ifo Business Survey were asked two special questions about Brexit, the first of which was in the mold of the probability interval questions in part three of the quantitative expectations module. This first question asked about the probability of a "hard" Brexit, that is, a Brexit without a deal between the EU and the UK. Firms could answer with a single probability or with a probability interval. The second question asked about the fraction of the firm's sales revenue affected by a hard Brexit, and—on a five-point intensity scale—by how much.

In May and July 2020, the IBS fielded special questions regarding expectations related to the worldwide Covid-19 pandemic. Specifically, in May 2020, participants were asked, following part two of the quantitative expectations module, when (in months) they expect their business situation to normalize in the best case scenario, the worst case scenario, and in the most probable case. In July 2020, this time explicitly as part of the quantitative expectations module, the survey repeated the regular one-quarter ahead survey question about sales revenue growth in the best and worst case scenarios as well as the overall expected scenario (part two of the module) also for the entire annual sales revenue growth in 2020 relative to 2019. Furthermore, in the mold of part three of the module, the survey asked about the probability of permanent changes in a firm's business model due to the Covid-19 pandemic. Again, firms could answer with a single probability or with a probability interval.

5.4.5 Research

Bachmann et al. (2021) is the first paper to systematically exploit the answers from parts one and two of the quantitative expectations module. The paper proposes to use the difference between the best case scenario and the worst case scenario sales growth expectations, that is, the span of a firm's expectations, as a quantitative measure of the firm's subjective uncertainty, and then characterizes empirically the properties of this measure on a sample of firms from

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2013:Q2 to 2016:Q3. Ever since the revival of interest in uncertainty fluctuations by the seminal contribution of Bloom (2009), summarized in Bloom (2014), correct measurement of subjective uncertainty in decision makers' heads, as opposed to concepts like disagreement, forecast error variances, volatility, etc., has become of paramount importance to economic research.⁶

The main finding of Bachmann et al. (2021) can be summarized as follows: firms' planning under uncertainty responds strongly to change in the firms' environment. At the firm level, the relationship between span and lagged growth is described by an asymmetric V with a minimum at zero, a steep negative branch and a flatter but significant positive branch. A second class of findings concerns the relationship between subjective uncertainty and the conditional volatility of shocks experienced by the firm. First, quarterly variation in subjective uncertainty is quite similar to that in the conditional volatility of forecast errors, estimated by fitting a power GARCH model: Both measures exhibit mild persistence and an asymmetric-V-shaped response to lagged growth. In the short run, managers' planning under uncertainty thus reflects their anticipation of the size of future shocks. Decision makers appear to understand experienced change. Over the medium term, by contrast, experienced change goes along with systematic bias in both forecasts and perceptions of uncertainty. Indeed, in firms on either good or bad growth trends, forecasts are consistently too close to the status quo. Moreover, subjective uncertainty cannot be proxied by the conditional volatility of forecast errors: planning in growing firms reflects lower uncertainty than in shrinking firms even when the firms are faced with shocks of the same size. The results are similar for large compared to small firms.

The same span-conceptualization of uncertainty has been used by Bachmann et al. (2020b) and Bachmann et al. (2022), to characterize, respectively, the development of firms' expectations and uncertainty during the Covid-19 and Ukraine crises. In April 2020, the first Covid-19 quarter with data from the quantitative expectations module, firms' sales revenue growth expectations across all industries worsened and their uncertainty shot up, particularly in certain service industries like tourism and the restaurant business. Bachmann et al. (2020b) shows that higher uncertainty had an independent negative contribution towards reducing firms' payroll employment.

In April 2022, the first quarter after the Russian invasion of Ukraine with data from the quantitative expectations module, firms, on average, displayed some increased sales growth uncertainty, albeit not nearly as strongly as at the beginning of the Covid-19 crisis, while, unlike then, their sales growth expectations hardly changed. Perhaps surprisingly, Bachmann et al. (2022) shows that neither the development of expectations nor uncertainty is related to the gas dependency of firms. The Ukraine crisis confirms the finding of an asymmetric V of uncertainty this time conditional on a particular shock: expected sales losses of firms due to this crisis.

⁶ See Bachmann et al. (2013), Bachmann and Elstner (2015), and Bachmann et al. (2019) for the usage of (mostly qualitative) IBS data which proxy for uncertainty with these concepts.

To conclude this brief overview of existing research using the quantitative expectations module, we introduce Bachmann et al. (2020a), which is the first paper to exploit the answers from part three of the module. The paper proposes to use the choice by firms to respond with a probability interval to the question about sales revenue increases as an indication of Knightian uncertainty. It finds that Knightian responses are pervasive: 76% of firms choose a probability interval at least once in five years; the sample studied by the paper being 2013:Q2 through 2017:Q4. Furthermore, Knightian responses appear to be motivated by a lack of clarity about the future; they do not reflect a lack of sophistication, which can be shown by combining the answers from the regular quantitative expectations module with those from the aforementioned special survey from the fall of 2018. Finally, substantial switching between Knightian and Bayesian responses is shown to reflect both idiosyncratic and aggregate shocks.

5.5 The ifo Education Survey: An ifo Survey on Public Preferences for Education Policy in Germany

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5.5.1 Introduction

The ifo Education Survey (*ifo Bildungsbarometer*), an annual opinion survey on education topics in Germany, has been conducted by the ifo Center for the Economics of Education since 2014. The survey asks large representative samples of the adult population – over 4,000 participants per wave – about their opinion on education and education policies. Each year, the survey covers about 30 questions on topics at all relevant educational stages ranging from early childhood education and school policies to the apprenticeship system, universities, and lifelong learning. Each survey wave examines a specific focus topic – for example, education policies to integrate refugees in the 2016 wave or education policies during the Covid-19 pandemic in the 2020 wave.

The questionnaire of the ifo Education Survey is designed by the scientific team of the ifo Center for the Economics of Education. The actual implementation of the survey is carried out by different polling firms. The first four waves were surveyed both online and offline. Since 2018, the ifo Education Survey is conducted online-only. In addition to the representative sample of the German voting-age population, some waves include oversamples covering special interest groups such as parents, teachers, and adolescents.

The development and analysis of the first four waves of the ifo Education Survey was performed as part of the project “The Political Economy of Education Policy: Insights from a Public Opinion Survey”, which was generously funded by the Leibniz Association under its competitive funding procedure (SAW-2014-ifo-2). Since then, the project operates as an internal project of the ifo Institute. Since 2017, the survey has been co-financed by the project “Educational Choices, Market Design, and Student Outcomes” as part of the Collaborative Research Center Transregio “Rationality and Competition: The Economic Performance of Individuals and Firms” funded by the German Science Foundation (CRC TRR 190).

The aim of the ifo Education Survey is to strengthen research on the political economy of education policy. Despite extensive empirical evidence on how education policies may affect educational outcomes and equality of educational opportunity, this evidence is often not

⁷ We would like to thank Sarah Kersten and Laura Oestreich for their help in preparing the surveys and Elias Farnleitner, Ariz Weber, and Tim Heitmann for excellent research assistance in preparing the data files. Financial support by the Leibniz Competition (SAW-2014-ifo-2) and the German Science Foundation (CRC TRR 190) is gratefully acknowledged.

incorporated into actual education policy reforms. One possible reason for the discrepancy between insight and action could lie in the interactions between political considerations and opinions of the public – the political economy of education policy (West and Woessmann 2021). By providing new insights on public opinions on education policy, the results of the ifo Education Survey may thus help to better understand which educational reforms may be accepted by voters.

Each year, the survey includes a number of survey experiments. This allows to investigate how biased beliefs and information provision may affect the support or refusal of education policies. In these randomized information experiments, randomly selected sub-groups of respondents are provided with certain information before answering the same question as the control group which did not receive any information. The survey also includes experiments on framing and question design.

Descriptive results of the ifo Education Survey have been published annually in reports in the *ifo Schnelldienst*. The findings are regularly taken up in the public debate on education policy. A series of research articles published in academic journals investigate the causal effects of information provision, framing, and question design on answering behavior. The data from the ifo Education Survey waves 2014 to 2021 are published for scientific use and can be requested from the ifo Economics & Business Data Center (EBDC).

The purpose of this chapter is to give an introduction to the ifo Education Survey. Section 5.5.2 describes the content and implementation of the survey. Section 5.5.3 provides information on data access. Section 5.5.4 summarizes the existing research based on the ifo Education Survey and outlines the potential for future research.

5.5.2 General Information about the ifo Education Survey

This section provides an overview of the topics covered by the different waves of the ifo Education Survey (Section 5.5.2.1) and describes the survey design (Section 5.5.2.2), sampling and survey implementation (Section 5.5.2.3), and weighting and representativeness (Section 5.5.2.4).⁸

5.5.2.1 Topics of the ifo Education Survey

The ifo Education Survey elicits opinions on all levels of the education system, with a particular emphasis on the school system. Most waves contain around 25-35 substantive questionnaire items on preferences for various education policy topics, often with several randomized splits. Detailed information on the questionnaires is provided in the codebooks available for each wave (Section 5.5.3.1).

⁸ The remainder of this chapter draws directly on Freundl et al. (2022).

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Apart from general coverage of topics of education policy, each wave has a particular focus topic that is covered in depth (Table 5.6). The first survey in 2014 covered a wide range of topics to give a broad picture of public opinion on education topics in the German population. The 2015 wave oversampled parents of school-aged children and focused on attitudes towards education reforms. In 2016, the focus was on teachers, as reflected in the oversample of teachers and in a high number of questions asked about teacher topics (e.g., civil-servant status or required qualification of teachers). In light of the unprecedented arrival of refugees in Germany, an additional focus of the 2016 wave was on education policies to foster the integration of refugees. The 2017 wave focused on topics in digitalization of the education system. Furthermore, it included a follow-up survey conducted with the same respondents about two weeks after the main survey to study the persistence of information-treatment effects. In the wake of the #MeToo debate, the 2018 wave focused on gender equality and other gender topics in education. Furthermore, it elicited preferences of over 1,000 adolescents aged 14-17 years in addition to the representative adult sample. In 2019, the survey focused on measures to mitigate educational inequality and foster equality of opportunities and again included a follow-up survey. The 2020 survey had two priority topics: one was education policy in light of Covid-19-induced school closures, the other was educational federalism and measures to standardize the education system across the German states. The 2021 wave focused on education policies to address grand societal challenges during and after Covid-19.

Table 5.6: Annual Focus Topics of the ifo Education Survey

Wave	Focus Topic	Descriptive Report
2014	Overall picture of education topics	Woessmann et al. (2014)
2015	Reforms	Woessmann et al. (2015)
2016	Teachers; refugees	Woessmann et al. (2016a,b)
2017	Digitalization; trends	Woessmann et al. (2017)
2018	Gender	Woessmann et al. (2018a,b)
2019	Inequality	Woessmann et al. (2019)
2020	Federalism; Covid-19	Woessmann et al. (2020a,b)
2021	Societal challenges	Woessmann et al. (2021)

In addition to the substantive questions on education policy, the ifo Education Survey elicits a broad range of background information about the respondents (usually around 20-25 questionnaire items). In addition to standard demographic information such as gender, age, education, occupation, and monthly net income (mostly elicited in the same way across waves), it also elicits respondents' economic preferences such as risk and patience, as well as information that is particularly important from a political-economy perspective such as party preferences, voting behavior, and media usage.

5.5.2.2 Survey Design

Most substantive questions in the ifo Education Survey are asked as closed-ended questions with specified answer categories on a five-point Likert scale, such as “strongly agree”, “somewhat agree”, “neither agree nor disagree”, “somewhat disagree”, and “strongly disagree”. Often, the neutral category, e.g., “neither agree nor disagree”, is presented at the end of the Likert scale to avoid a central tendency towards a neutral middle answer category. Deviations from this general format are indicated in the codebooks of the respective waves.

The ifo Education Survey not only surveys the descriptive opinion of the German population on educational measures and education policy. Using randomized survey experiments, it also shows how public opinion is affected by information provision, framing, or alterations in the question design.

Information experiments investigate the extent to which correcting people’s misperceptions about underlying facts affects their policy support. For example, the survey investigated how information about levels of public education spending affects support for spending increases or how information about the extent of educational inequality affects concerns about inequality and preferences for equity-oriented policies (Section 5.5.4.1).

Methodological experiments focusing on framing and question design investigate, for instance, how the wording of questions affects survey responses or whether altering the number of answer categories or the position of the neutral answer category affect answering behavior (e.g., Woessmann et al. 2014, p. 32, box 2; Woessmann et al. 2015, p. 50, box 2; Woessmann et al. 2016b, p. 31, box 2). The survey also elicited respondents’ beliefs about important facts regarding education policy. In some of these questions, respondents were provided monetary incentives to give a correct answer (Grawenig et al. 2022). This practice is borrowed from laboratory experiments to ensure that respondents exert enough effort when providing their answers.

5.5.2.3 Sampling and Survey Implementation

In each survey wave, the sample size was about 4,000 respondents. This number ensures that the margins of error (in each of up to four random splits) are small enough to draw meaningful conclusions from the samples’ answers for education preferences in the population of voting-age persons in Germany.⁹ A sufficiently large sample size is particularly important for the informative value of survey experiments in which the sample is randomly split into several subgroups. In the 2020 wave, the sample size was much larger than usual, at 10,000

⁹ The degree of certainty with which one can infer the population’s opinion from the results of a representative survey can be expressed with statistical probabilities. For example, with 4,000 respondents, the margin of error for questions with an approval rate of 50 percent is 1.5 percentage points. This means that with a probability of 95 percent, the true value of the approval rate in the overall population lies between 48.5 percent and 51.5 percent.

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respondents, which allowed experiments to be conducted in a larger number of treatment arms.

The samples of the ifo Education Survey were drawn from online access panels so that they match the German population with respect to age, gender, state, school degree, and employment status. Between 2014 and 2017, the online survey was complemented with an offline survey to also reach people who do not use the internet. “Onliners” answered the survey online on their personal digital device. “Offliners” were sampled by interviewers at their homes using standard random sampling techniques. They were provided a digital device by the interviewer to complete the survey. However, many of these respondents needed assistance from the interviewer, who then effectively conducted computer-assisted personal interviews (CAPI). As the proportion of people who do not use the internet became smaller over time, the ifo Education Survey has moved to an online-only survey since 2018. This change in survey mode was done after extensive testing which revealed that online-only surveys produce the same results as mixed online-offline surveys when online observations are re-weighted to match the characteristics of the entire population (onliners and offliners; see Grawenig et al. 2020a for a detailed analysis).

Table 5.7 gives an overview of the number of observations for each survey wave.

Table 5.7: Survey Population and Oversamples 2014-2021

Wave	Online Participants	Offline Participants	Total	Of which: Oversamples
2014	3,152	1,106	4,258	–
2015	3,699	565	4,264	1,042 parents
2016	3,654	441	4,095	713 teachers
2017	3,699	382	4,081	–
2018	5,131	–	5,131	1,085 adolescents
2019	4,009	–	4,009	–
2020	10,338	–	10,338	–
2021	4,032	–	4,032	–

The survey questions were developed by a project team at the ifo Center for the Economics of Education. The survey was implemented by the survey providers Kantar Public (formerly known as TNS Infratest Sozialforschung) from 2014 to 2019, Respondi in 2020, and Talk Online Panel in 2021.

5.5.2.4 Weighting and Representativeness

In order to assure the representativeness of the sample, the dataset includes survey weights. The weights are constructed so that the characteristics of the sample match those of the

German population regarding observable characteristics such as age, gender, educational attainment, region of residence, municipality size, and interview mode where applicable (i.e., whether the interview was conducted online or offline). The weighting scheme follows Deming and Stephan (1940) and Cochran (1968). In general, using weights in the analysis does not substantively affect results. This is because the structure of the sample already ensures a good representativeness of the German population.

5.5.3 Data Access

This section informs about data access (Section 5.5.3.1) and terms of use (Section 5.5.3.2).

5.5.3.1 Access to the Scientific Use Files

The data of the ifo Education Survey can be requested via the LMU-ifo Economic & Business Data Center (EBDC).¹⁰ The research project must serve exclusively scientific purposes and must not pursue commercial goals. To ensure data security and protect the privacy of the respondents, anonymized scientific use files are provided. The scientific use files do not contain in-depth local information of the respondents (only information on federal state), nor do they include any other personal information that might serve to identify respondents. Answers to open-ended questions are not provided due to data protection. To avoid information loss, some open-ended questions have been coded into new variables.

The datasets are available in .dta (STATA) format. Each wave is provided as a separate data file. For each wave, a corresponding codebook is provided, containing the names of the variables, the original text of the survey questions and answer categories in German, an English translation thereof, and question types (e.g., scale or open ended). The codebooks also inform about whether the respective question was asked in previous survey waves. A separate “ReadMe” file provides further guidance for the data usage.

Detailed information on the data requesting process and the relevant documents can be obtained from the EBDC and the websites below. The DOIs for the respective survey waves are as follows:

ifo Education Survey 2014	https://www.ifo.de/node/69582	10.7805/ies-suf-2014-v1
ifo Education Survey 2015	https://www.ifo.de/node/69591	10.7805/ies-suf-2015-v1
ifo Education Survey 2016	https://www.ifo.de/node/69596	10.7805/ies-suf-2016-v1
ifo Education Survey 2017	https://www.ifo.de/node/69597	10.7805/ies-suf-2017-v1
ifo Education Survey 2018	https://www.ifo.de/node/69599	10.7805/ies-suf-2018-v1
ifo Education Survey 2019	https://www.ifo.de/node/69600	10.7805/ies-suf-2019-v1
ifo Education Survey 2020	https://www.ifo.de/node/69603	10.7805/ies-suf-2020-v1
ifo Education Survey 2021	https://www.ifo.de/node/69605	10.7805/ies-suf-2021-v1

¹⁰ <https://www.ifo.de/en/ebdc>.

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5.5.3.2 Terms of Use

The aim of making the data of the ifo Education Survey available and documenting them is to provide researchers with easy access to the data. It is the responsibility of the researchers to check whether the data of the ifo Education Survey are suitable for their research projects. Researchers using data from the ifo Education Survey are kindly requested to cite the following source:

Vera Freundl, Elisabeth Grawenig, Franziska Kugler, Philipp Lergetporer, Ruth Schüler, Katharina Wedel, Katharina Werner, Olivia Wirth, Ludger Woessmann (2022). The ifo Education Survey 2014–2021: A New Dataset on Public Preferences for Education Policy in Germany. *Journal of Economics and Statistics*, published online in advance (<https://doi.org/10.1515/jbnst-2022-0051>).

5.5.4 Research using the ifo Education Survey

This section summarizes existing research based on the ifo Education Survey (Section 5.5.4.1) and outlines the potential for future research (Section 5.5.4.2).

5.5.4.1 Previous Studies and Publications

Over the past years, data from the ifo Education Survey have been used in various scientific publications. Two overview articles summarizing the findings of the first survey waves are presented in Busemeyer et al. (2017) and Lergetporer et al. (2021c).

Once a year, the results of the ifo Education Survey are published as non-technical summaries in German in the *ifo Schnelldienst* (Woessmann et al. 2021, 2020a,b, 2019, 2018a,b, 2017, 2016a,b, 2015, 2014); Table 5.6). These articles give a comprehensive descriptive overview of the public opinion on the educational topics surveyed in each wave. They are released each year at press conferences which have the aim to contribute insights from the ifo Education Survey to the public debate about education policy in Germany.¹¹

Exploiting the experimental design of the survey, several academic papers show that providing information can affect public opinion on various education topics. For instance, Lergetporer et al. (2020) show experimentally that information about educational inequality affects concerns about inequality and preferences for equity-oriented reforms. Lergetporer et al. (2021b) show that information on the university-earnings premium has only limited effects on the educational-aspiration gap by parental education. By contrast, Lergetporer and Woessmann (2021) show that information on the university-earnings premium does affect preferences for introducing university tuition. In addition, Lergetporer and Woessmann (2022) show that citizens' preferences for charging university tuition increase sharply when they are designed

¹¹ See <https://www.ifo.de/en/survey/ifo-education-survey> for further information and selected findings on each wave.

as income-contingent, deferred payments.

Grewenig et al. (2020c) show that information about the policy positions of political parties affects preferences towards family policies. Grewenig et al. (2020b) document the effect of social-norms information on adolescents' labor-market expectations. Werner (2018) shows how information affects preferences for the distribution of education spending across different education levels from preschool to university. Lergetporer et al. (2021a) show that information about refugees' education level improves natives' attitudes towards them. Grewenig et al. (2021) study a parental time-use survey of students' activities during the first Covid-19 school closures that was fielded as part of the ifo Education Survey.¹²

The ifo Education Survey has also been used to study international differences in education policy preferences. Combining data of the ifo Education Survey with the U.S. survey conducted by the Program on Education Policy and Governance (PEPG) at Harvard University, Henderson et al. (2021) contrast policy preferences between Germany and the United States. Lergetporer et al. (2018) study experimentally how information about education spending levels affects support for education-spending increases in the two countries. Cattaneo et al. (2020) extend this comparative experimental analysis to include Switzerland. The ifo Education Survey is also featured in the book *Public Opinion and the Political Economy of Education Policy around the World* (West and Woessmann 2021) which provides a comprehensive overview of the political economy of education policies across countries.

Additionally, methodological contributions based on the ifo Education Survey study the role of incentives in belief elicitation (Grewenig et al. 2022) and the extent to which internet surveys can represent the entire population (Grewenig et al. 2020a; Section 5.5.2.3).

5.5.4.2 Potential for Future Research

Although the data from the ifo Education Survey have already been used in several scientific publications, they still offer much potential for future research projects. The data contain several randomized experiments that have not yet been analyzed, which may be particularly interesting for junior researchers who do not have the opportunity to run their own survey experiments.

Furthermore, it may be interesting to conduct detailed subgroup analyses to understand how education-policy preferences vary by respondents' characteristics. Besides descriptive analyses, the survey data may also be used to conduct more complex econometric analyses, for instance by exploiting variation across cohorts of respondents and states or by matching the data with other datasets at the state level. Finally, as future waves of the ifo Education Survey will be published in the coming years, new research opportunities may be opened in the years to come.

¹² Werner and Woessmann (2021) analyze a second survey fielded during the second Covid-19 school closures that was operated and funded independently of the ifo Education Survey.

5.6 The Economists' Panel (“Ökonomenpanel”) – A Survey Among German Economists

KLAUS GRÜNDLER, NIKLAS POTRAFKE, MARCEL SCHLEPPER

5.6.1 Introduction

The Economists' Panel of the ifo Institute and the Frankfurter Allgemeine Zeitung (FAZ) surveys tenured economics professors at German universities. The purpose of the Economists' Panel is to portray the views of economics professors on current economic policy issues. The first survey took place in February 2016. By the end of 2022, 41 surveys have been conducted.

The panel was initiated to portray economists' views on economic policies in an encompassing manner. The media usually reports the views of a few prominent economic experts. Often media outlets select one expert supporting an individual policy measure and another expert arguing against it. A prime example is the introduction of the German minimum wage. When the German national government introduced the minimum wage in 2015, journalists quoted some economists supporting and some economists opposing the introduction of the minimum wage. The media concluded that the German economics profession was divided about the minimum wage, but valid information on the opinion of the German economics profession as a whole was missing. Clearly, when only a hand-selected group of experts is asked by the media, the general public has hardly any means to know about the views of the profession as a whole, and will need to draw inferences only based on those experts who are prominently featured by the media.

Establishing a nuanced overview on the views of economic professors in Germany on economic policy issues such as the minimum wage was the main motivation of running the first Economists' Panel in February 2016. The results of this first panel were startling, showing that the claim that the economics profession has divided views on the minimum wage did not adequately capture the actual economists' views. Surveying the economics professors at German universities about the minimum wage, we find that 56% of the participants thought that introducing the minimum wage was a mistake, only 32% of the participants supported the minimum wage (Jäger et al. 2016). Since the first panel in 2016, we react quickly to new economic policy debates and deliver encompassing views of economists at German universities in a short period of time. We contribute to heated economic policy debates and continue to report nuanced views of the profession about economic policy measures.

In this chapter, we describe the sampling, its purposes, implementation of the surveys and results of the Economists' Panel over the last years.

5.6.2 Sampling

We survey the tenured economics professors at German universities. The panel includes close to 700 professors. On average, 150 professors participate in our surveys. Participating in surveys is always prone to selection: the individual experts being invited to a survey decide themselves whether they wish to participate in the survey. A major question, therefore, is to what extent the Economists' panel is representative. Based on observable characteristics such as gender, age and location, we have evidence that the group of experts participating in our surveys does not differ from the universe of tenured economics professors in Germany invited to participate in our surveys.

Table 5.8 compares the observable characteristics for the 693 economics professors in our panel to observable characteristics of those professors who participated in the waves 39 to 41 of the Economists' Panel. The waves 39 to 41 of the Economists' Panel were conducted between June and December 2022. We have collected information on their age, gender, geographical location, year of PhD and the number of google scholar citations (for those professors who have google scholar profiles). The results suggest that those economists who decide to participate are – over various characteristics – representative for the group of tenured economists in our panel. For example, 16.1% of tenured economists professors are based in East Germany. The share of participating professors being based in East Germany is only between 0.4 to 1.6 percentage points higher. Overall, we did 15 t-tests on the similarity of the mean for the participating and not participating professors. At the 5% significance level, we did not reject any. We conclude that based on a variety of observable characteristics there is no evidence for selection into the survey.

Table 5.8: Observable characteristics for invited and participating economics professors

	Panel	39. EP	40. EP	41. EP
Age	58.4	58.0	56.9	57.7
Females	16.0%	12.0%	12.4%	11.1%
East Germany	16.1%	16.7%	16.5%	17.6%
Year of PhD	1998.9	1998.2	1999.3	1998.5
Google Scholar citations	4011	3740	3442	3674
N	693	158	178	153

5.6.3 Purpose: Service and Research

The major purpose of the Economists' Panel is to benefit the public. The results are published on the webpage of the ifo Institute, with free access to the general public. The FAZ reports on the results. Other media do so as well. We describe the results in the *ifo Schnelldienst*. Some of our colleagues use the results of the Economists' Panel in introductory Econ classes.

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The mission of the ifo Institute is, however, to inform the public about economic policies based on excellent research. We have therefore started to use the Economists' Panel for research as well. The first research paper based on data of the Economists' Panel was published in May 2022 as CESifo Working Paper (Dräger et al. 2022). We surveyed the economics professors in Germany about their inflation expectations and monetary policy recommendations from 22 February 2022 to 1 March 2022. We exploit the Russian invasion of Ukraine on 24 February 2022 as a natural experiment to identify the effect of a global political shock on inflation expectations. We find sizable effects on inflation expectations and monetary policy recommendations. For example, experts who were surveyed after the Russian invasion expected the inflation rate for 2022 to be 0.75 percentage points higher than those experts who were surveyed before the Russian invasion. Evaluating expectations one day before and after the invasion allows us to rule out confounding events and selection into treatment. A comparison with a representative sample of households shows that experts' expectations adjust faster and to a larger degree than expectations of the general population. Text analyses on open-ended questions reveal that the effects are caused by supply-side models underlying experts' formation of expectations.

5.6.4 Implementation of the Surveys

We distribute the surveys via *Qualtrics*, the most often used software for survey experiments (Fuster and Zafar 2022). We mainly employ questions that participants can answer by simply agreeing or disagreeing. Participants can always elaborate their view in open text fields. Figure 5.19 shows an example of how we present our questions. The survey period is one week and we send one or two reminders to the participants.

Figure 5.19: Example question in Qualtrics from 40th Economists' Panel

Are you in favor of imposing an excess profits or windfall tax on producers of renewable, nuclear, and coal power?

Yes, because...

No, because...

Don't know

5.6.5 Highlights

Highlights of the Economists' Panel include, for example, questions about managing the COVID-19 pandemic and surveys that elicit economists' views on measures to handle Russia's attack on Ukraine, inflation and the energy crisis.

5.6.5.1 The COVID-19 Pandemic

The COVID-19 pandemic drastically increased demand for economic expert advice (Gründler and Potrafke 2020a). Policy makers wanted to know, for example, about the economic costs of lockdowns as well as policy measures to handle the consequences of the pandemic.

We asked the German economics professors about their views on how to handle issues about the pandemic in late March 2020 (Blum et al. 2020). On 27 March 2020, the Bundestag and Bundesrat approved the largest supplementary budget in German history, worth EUR 156 billion. Around EUR 122.5 billion were intended for additional government spending and EUR 33.5 billion would compensate for a fall in tax revenues. 67 percent of participants considered the level of the supplementary budget to be appropriate given the exceptional circumstances of the pandemic (Figure 5.20). Another 14 percent of participants called for more extensive measures, mostly citing the high economic costs of the shutdown as a justification. Only 6 percent of the economists considered the sum too high.

The German federal government implemented many ad hoc measures to mitigate the negative effects on the country's economy. Almost all – 96 percent – of participants advocated for an extension of the short-time allowance as one of the most important economic policy measures (Figure 5.21). Meanwhile, 80 percent supported state guarantees for loans to companies. Nearly half the economists mentioned tax breaks for companies and one-time payments to companies, while over one-third supported the idea of the state holding equity in companies. Only 13 percent opted for one-time payments to all citizens. The economists also mentioned one-time payments to small businesses and citizens that are hit especially hard as well as investments in the health care system.

Support for the aid packages of the federal government remained high in May 2020 (Gründler et al. 2020). A total of 77 percent of the panel's participants in May 2020 were in favor of the aid package and had not changed their opinion since the end of March, justifying this on the grounds that the crisis situation was unchanged and still required extensive fiscal policy measures; 3 percent of the panel initially rejected the aid package, but supported it in May 2020; 4 percent had changed their opinion from initial approval to rejection; and 7 percent have rejected the aid package since the end of March on the basis that the measures would bring little benefit.

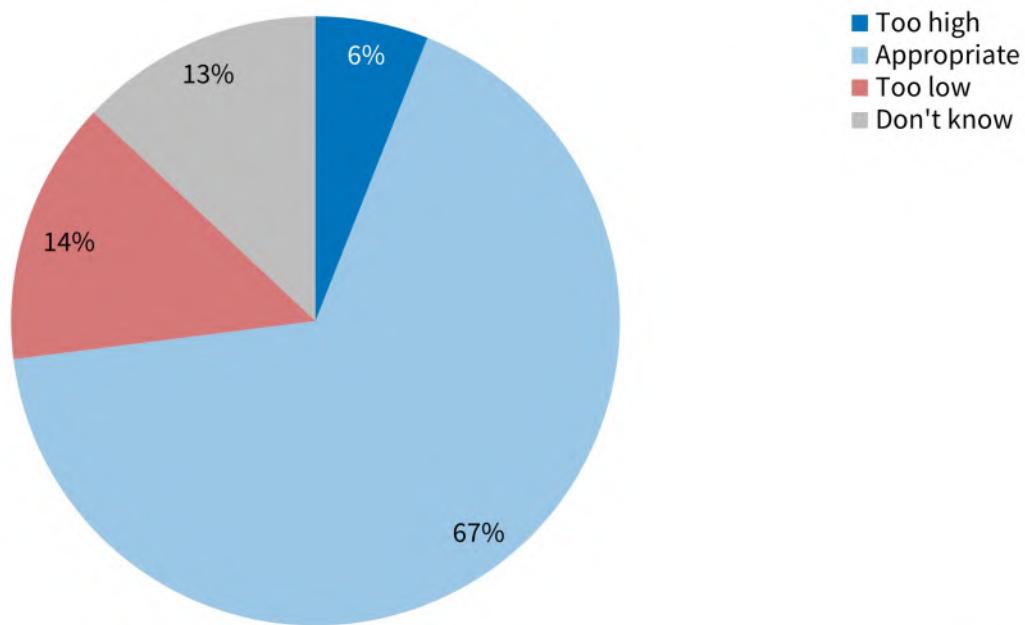
In October 2020, we asked about zombie companies resulting from the COVID-19 pandemic (Arth et al. 2020). 86 percent of the participants thought that the number of zombie companies

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Figure 5.20: Views on supplementary budget in context of COVID-19 pandemic

Historic Supplementary Budget with EUR 156 Billion of New Debt

How do you assess this sum, if the aim is to cushion the effects of recession?



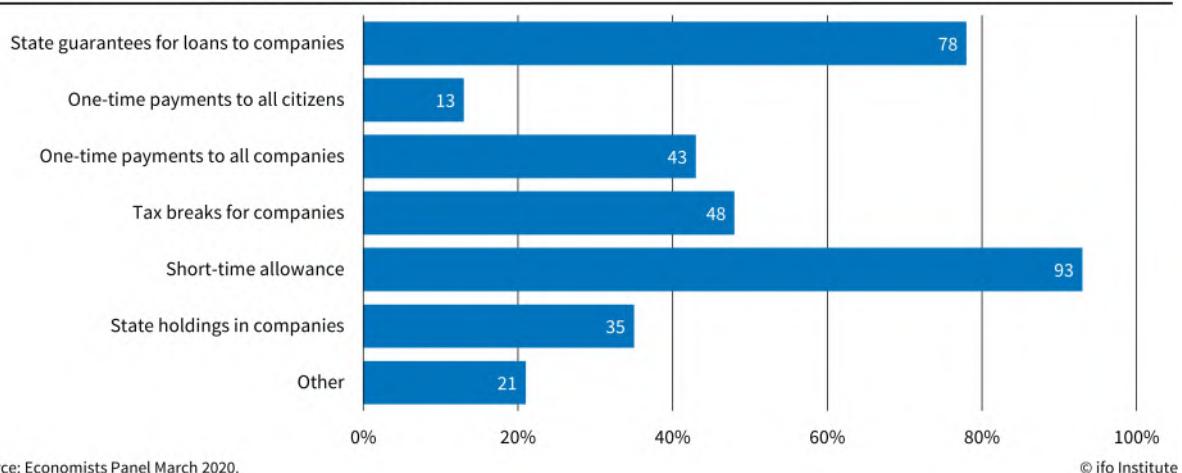
Source: Economists Panel March 2020.

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Figure 5.21: Views on economic policy measures during COVID-19 pandemic

Economic Policy Measures

What do you think are the most important economic policy measures at this time to respond to the negative economic consequences of the coronavirus crisis? [Multiple answers and free text possible]



Source: Economists Panel March 2020.

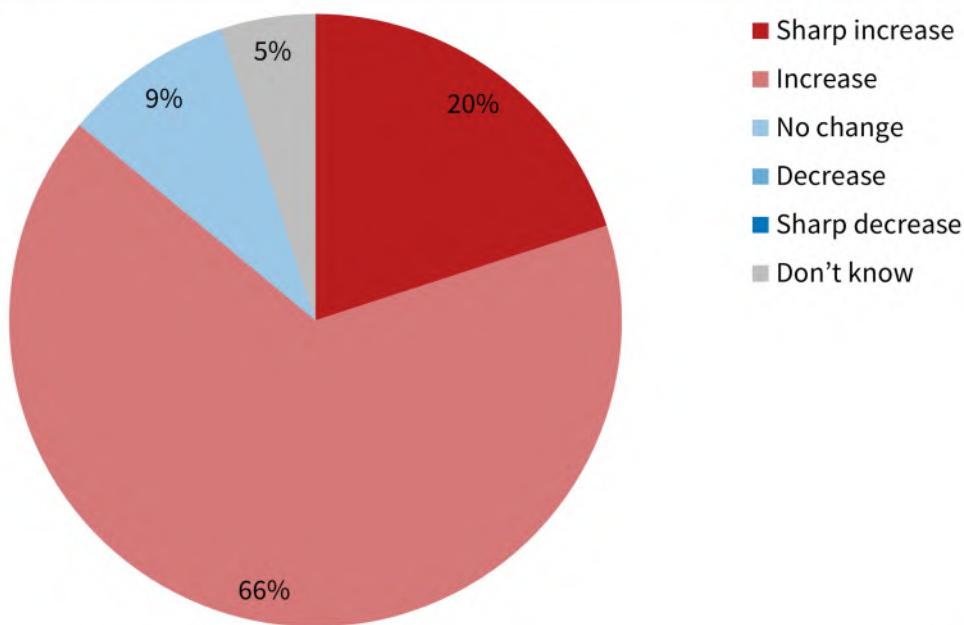
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in Germany had risen since the beginning of the COVID-19 pandemic in March 2020, while 9 percent saw no change from pre-crisis levels (Figure 5.22).

Figure 5.22: Views on the development of the number of zombie companies in context of COVID-19 pandemic

Development of the Number of Zombie Companies in Germany

How do you think the number of zombie companies in Germany has developed so far since the beginning of the coronavirus crisis in March 2020?



Source: Economists Panel October 2020.

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Why did zombie companies emerge? 86 percent of the participants shared the opinion that the waiving of the obligation to file for insolvency was one reason. Meanwhile, 50 percent thought it is due to the recent extension of the short-time work allowance until the end of 2021 (Figure 5.23).

In February 2021, almost half of participating economists were either “fairly dissatisfied” or “very dissatisfied” with the current COVID-19 economic policy in Germany (Gründler et al. 2021). The most frequently mentioned reasons were that the measures were not proportionate, that politics was responding too slowly and too rigidly, and that there were no plans for opening the economy again. Others argued that assistance programs were too bureaucratic and that the vaccination strategy to date had largely failed. Around 30 percent say they were “undecided”, but largely subscribed to the negative views mentioned above (Figure 5.24). Of participating economists, 20 percent were “fairly satisfied” with the current COVID-19 economic policy, while 2 percent were “very satisfied”. These economists thought that government measures were proportionate ex ante and succeeded in preventing a catastrophic collapse in manufacturing

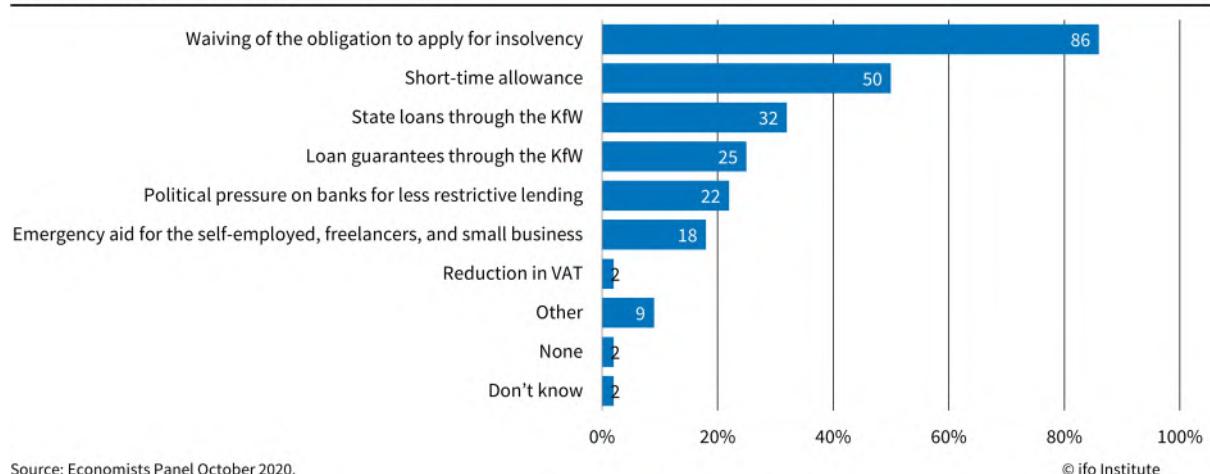
5 Other ifo Surveys

and an attendant wave of insolvencies.

Figure 5.23: Views on the reasons for the emergence of zombie companies in context of COVID-19 pandemic

Reasons for the Emergence of Zombie Companies

Of the following economic policy measures taken since the beginning of the coronavirus crisis, which do you think risk leading to the emergence of zombie companies? [Multiple responses permitted]



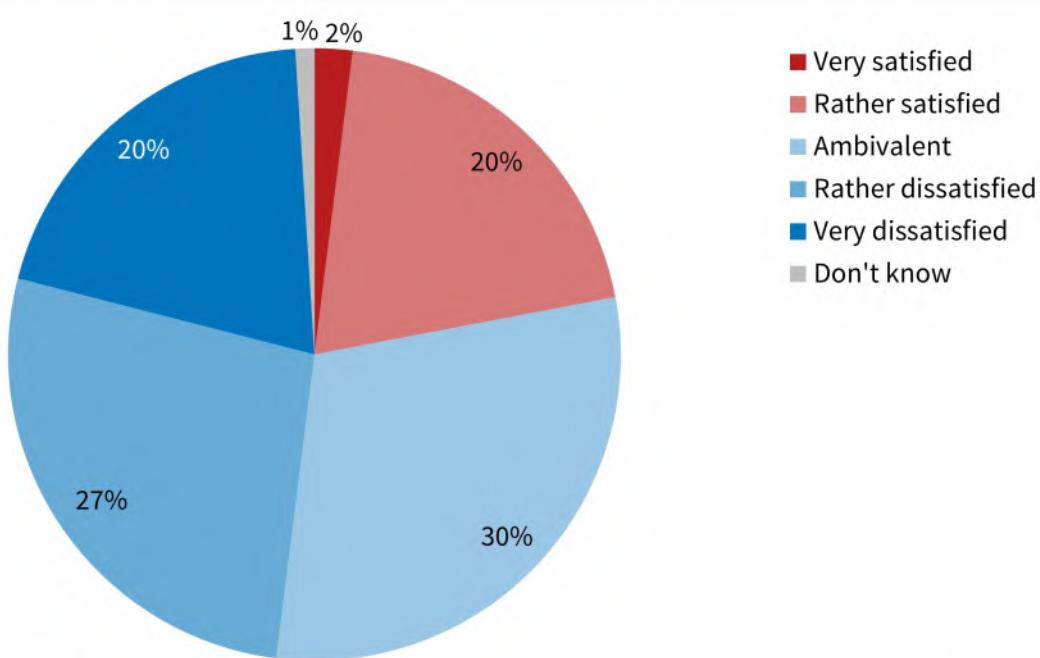
Source: Economists Panel October 2020.

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Figure 5.24: Views on economic policy in second year of Covid-19 pandemic

Coronavirus Economic Policy

How satisfied are you with the current coronavirus economic policy in Germany?



Source: Economists Panel February 2021.

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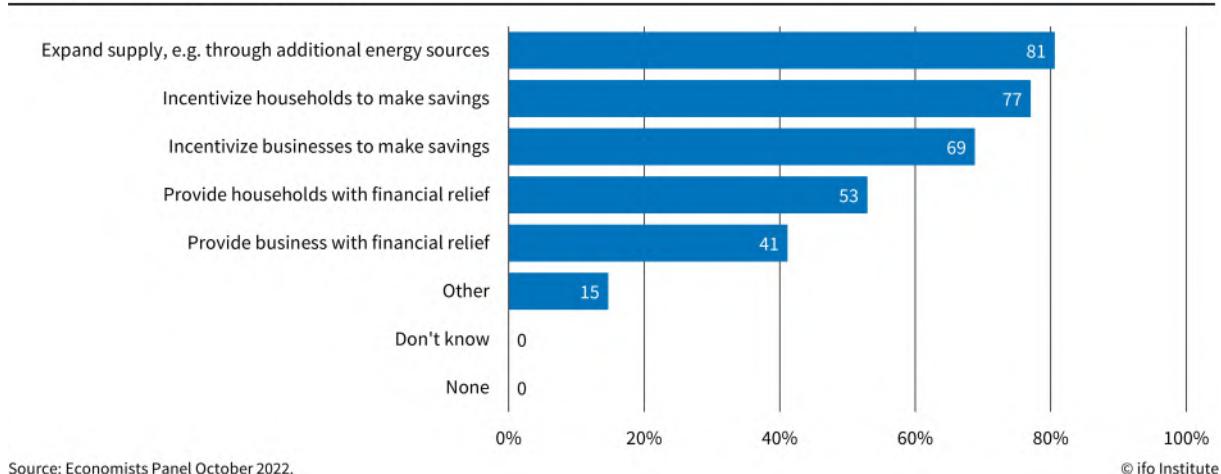
5.6.5.2 Energy Crisis

In fall 2022, a major public concern were shortages in energy supply and increases in energy prices. We asked the German economists about how to handle the energy crisis (Gründler et al. 2022). A total of 81 percent of the participating economists stated that in dealing with the drastic increase in electricity and gas prices, the German government should focus on expanding supply, e.g., through new energy sources (Figure 5.25). They expressed similarly strong approval for economic policy measures that provide incentives for households (77 percent) and businesses (69 percent) to save. The share of economists who thought the German government should focus on providing households (53 percent) or businesses (41 percent) with relief was significantly lower.

Figure 5.25: Views on economic policy measures to deal with increasing energy prices

Economic Policy Measures

In your opinion, what economic policy measures should the German government focus on in dealing with the drastic increases in electricity and gas prices? [Multiple responses permitted]



To expand the supply of electricity and gas in Germany, 81 percent of respondents supported the continued operation of the remaining nuclear power plants beyond 2022 (Figure 5.26). Other popular measures included pruning regulations that impede the expansion of renewables (74 percent), building more LNG terminals (71 percent), and expanding electricity transmission networks (70 percent). 61 percent of participating economists favored purchasing LNG “even from autocratic states” such as Qatar and the United Arab Emirates. Less than half of the economists support restarting retired coal-fired power plants (47 percent), financially supporting renewables (44 percent), and lifting the ban on fracking in Germany (42 percent).

5.6.5.3 The Tax Proposal of the German Council of Economic Experts

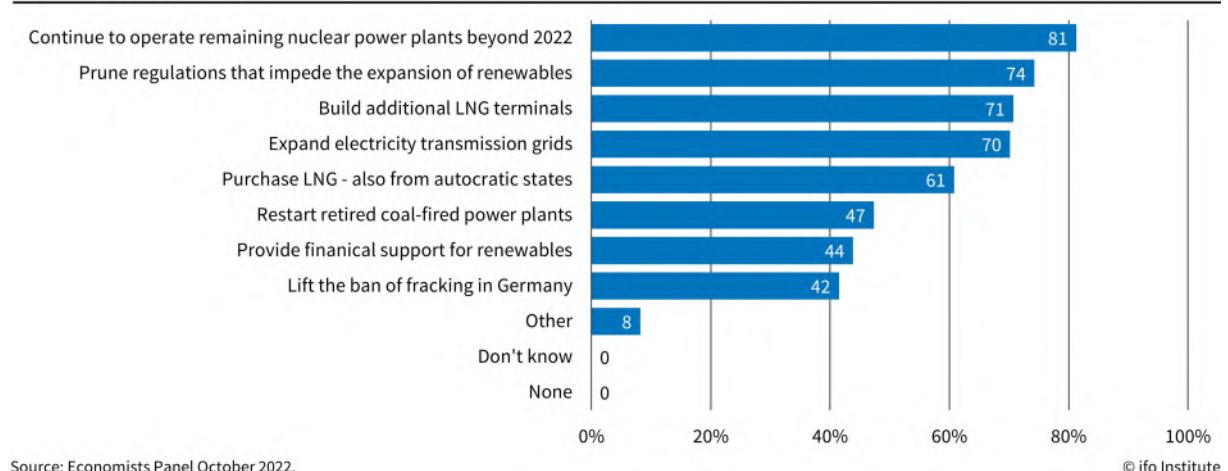
In November 2022, the German Council of Economic Experts proposed a temporary increase in the top tax rate, the introduction of an energy solidarity surcharge for top earners, and a postponement of the reduction of bracket creep. This proposal was remarkable because

5 Other ifo Surveys

Figure 5.26: Views on the expansion of electricity and gas supply

Expansion of Electricity and Gas Supply

Which of the following measures do you support to achieve an expansion of electricity and gas supply in Germany?
[Multiple responses permitted]



Source: Economists Panel October 2022.

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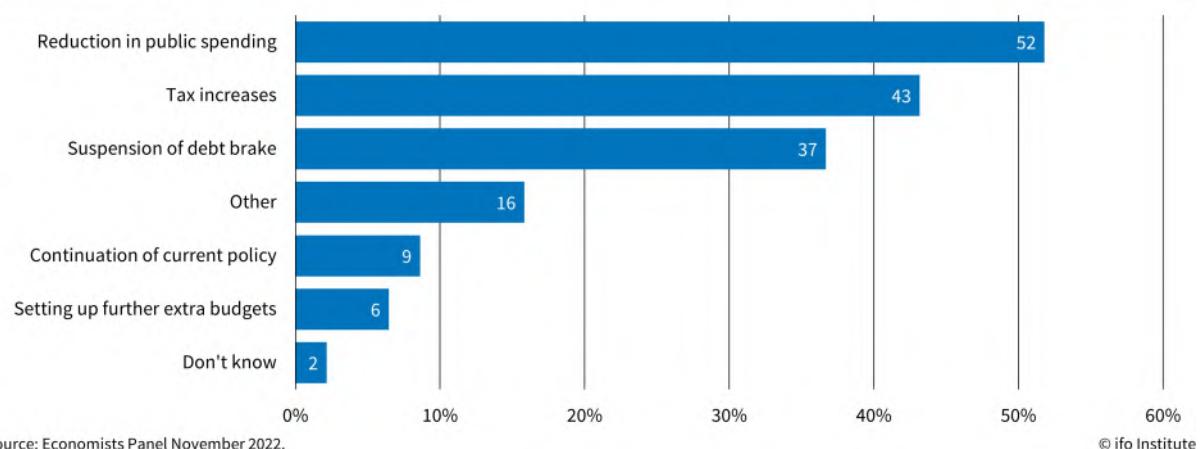
all the five members of the council agreed. Many of the previous proposals of the German Council of Economic Experts were contested (Potrafke 2013).

The Council of Economic Experts' proposal to temporarily increase the top tax rate divided economists into two roughly equal groups: 52 percent reject the proposal; 46 percent support it (Fuest et al. 2022). Only 2 percent were undecided. In 2022, the top tax rate has been applied to annual taxable incomes of around EUR 59,000 and above, and had stood at 42 percent.

In view of the increased burden on public budgets as a result of the COVID-19 pandemic and Russia's war of aggression, 52 percent of economists favored a reduction in public spending (Figure 5.27). In contrast, 43 percent of the participants were in favor of tax increases. At 37 percent, a similarly high level of support was found for suspending the debt brake. Only 6 percent were in favor of setting up further extra budgets; 9 percent were in favor of continuing the current policy; 16 percent of the participants supported "other" measures to ease the burden on public budgets, such as reallocations within the budget or the systematic expansion of energy supply to overcome the crisis.

Figure 5.27: Views on measures to reduce burden on public budgets**Relief for Public Budgets**

What measures do you advocate to deal with the increased burden on public budgets in the wake of the Covid-19 pandemic and Russia's war of aggression? [Multiple responses permitted]



5.7 The Economic Expert Survey (EES): A Quarterly Global Survey of Economic Experts

KLAUS GRÜNDLER, PHILIPP HEIL, NIKLAS POTRAFKE, TIMO WOCHNER

5.7.1 Introduction

The Economic Experts Survey (EES) of the ifo Institute and the Swiss Economic Institute (IWP) surveys around 8,000 economic experts from 135 countries. The purpose of the EES is portraying the views of economic experts on economic policies and the political situation in their home country. It also covers views on current economic outcomes such as inflation. The first survey took place in February 2022. The EES is run quarterly. It succeeded the World Economic Survey (WES) that was installed at the ifo Institute in 1981. The WES asked around 1,500 experts from 100 countries primarily on business cycle expectations.¹³ The EES includes the 1,500 WES-experts and was extended by another 6,500 experts. We recruited these 6,500 experts via the research network repec. Our sample exceeds any international expert panel by an order of magnitude. Our survey includes participants from countries that cover around 99 percent of world GDP, 95 percent of world population, and 92 percent of global land area.

The EES complements the Economists' Panel of the ifo Institute and the Frankfurter Allgemeine Zeitung (FAZ) in an excellent manner. The Economists' Panel surveys tenured economics professors at German universities (Section 5.6).

The major purpose of the EES is to provide service to the general public. The results are published on the webpage of the ifo Institute. Press releases inform journalists about the results. We are prepared to respond to recent economic policy debates such as the drastic increase in inflation in the year 2022 and describe experts' views on the individual issues.

5.7.2 Implementation of the Surveys

We distribute the surveys via Qualtrics, the most often used software for surveys (Fuster and Zafar 2022). We identify the participants to be experts for an individual country. For example, the president of Germany's ifo Institute, Clemens Fuest, is identified to be an expert for Germany. At the beginning of the survey, we tell Clemens that he has been identified as an expert for Germany and ask him to confirm or choose another country. We invite participants to answer our questions within two weeks and send three or four reminders to the participants.

¹³ For more information on the WES see Garnitz et al. (2019).

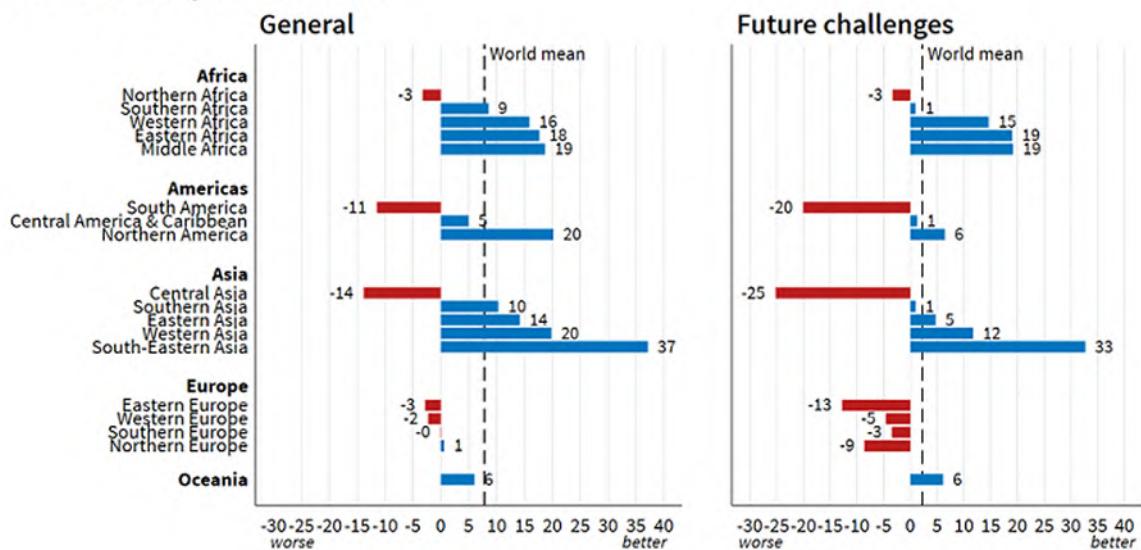
5.7.3 Questions on Economic Policies and the Political Situation

We ask four core questions about economic policies and the political situation. Regarding economic policies, we ask participants “How do you rate your country’s current economic policy?” and “How well does your country’s economic policies address the challenges of the future?” Participants are asked to make their assessments as compared to the previous quarter and express their views on a scale from –100 (worse) to 100 (better). We average data first at the country level and then for 18 regions worldwide.

The results for the fourth quarter (Q4) 2022 show, for example, that in a global comparison, the assessments of economic experts on current economic policy differed greatly (Figure 5.28). In Europe, a worse assessment was observed across all regions compared with Q3 2022. In contrast, the countries in Asia, except for Central Asia, had a more positive assessment of economic policy than in the previous quarter. Experts in Eastern, Central, and Western Africa were equally confident, while in contrast, economic policy in Northern Africa was rated more pessimistically. Regarding the assessments in the American regions, the picture in North and Central America was more positive than in the previous quarter, whereas the assessments in South America were more negative.

Figure 5.28: Economic Policy Assessment Q4 2022.

Economic Policy Assessment



Source: Economic Experts Survey in Q4 2022.

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Notes: The figure shows the regional average of the questions “How do you rate your country’s current economic policy?” (left panel) and “How well does your country’s economic policies address the challenges of the future?” (right panel). The questions are asked with a comparison to the previous quarter, with response options ranging from –100 (“worse”) to 100 (“better”). The data is first averaged at the country level and then within 18 world regions.

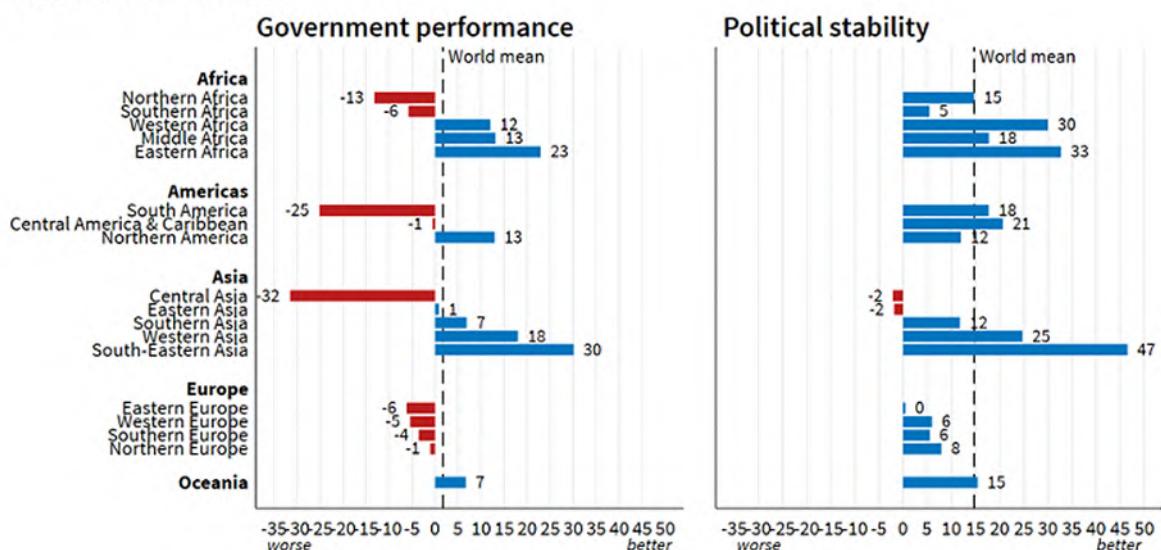
5 Other ifo Surveys

To describe the experts' views on the political situation in their country we ask "How do you rate the performance of your country's current government?" and "How do you rate the stability of your country's current political situation?" Participants are asked to make their assessments as compared to the previous quarter and express their views on a scale from -100 (worse) to 100 (better).

Overall, the economic experts assessed the political climate as better than in the previous quarter (Figure 5.29). This was particularly true of the assessments from Eastern, Central, and Western Africa and Southeast Asia, and to a lesser extent also from Western and Southern Asia, Oceania, and North and Central America. Assessments in Northern, Southern, and Western Europe also improved again compared with the previous quarter. In Central and Eastern Asia, Eastern Europe, and South America, there was a decline in the assessment of the political situation.

Figure 5.29: Political Assessment Q4 2022.

Political Assessment



Source: Economic Experts Survey in Q4 2022.

© ifo Institute / IWP

Notes: The figure shows the regional average of the questions "How do you rate the performance of your country's current government?" (left panel) and "How do you rate the stability of your country's current political situation?" (right panel). The questions are asked with a comparison to the previous quarter, with response options ranging from -100 ("worse") to 100 ("better"). The data is first averaged at the country level and then within 18 world regions.

Scholars examine consequences of political (in)stability. An example is how political instability influences economic growth (Jong-A-Pin 2009). Our expert assessments on political stability may well help contribute to the debate on measuring political (in)stability and investigating its consequences.

5.7.4 Inflation Expectations

Inflation was quite low before the COVID-19 pandemic. Over the period 2010-2019, for example, the World Bank reports a median inflation rate of 2.7 percent. In the year 2022, inflation rates increased drastically. We have asked the participants of the EES about their expected inflation rates. Doing so is a prime example of special modules in the EES. Inflation expectations are very important among macroeconomic expectations. Coibion et al. (2018, p. 1448) describe: “The crucial role played by inflation expectations on aggregate outcomes and policy decisions was highlighted by former Fed Chairman Alan Greenspan “I am not saying what [inflation expectations] is a function of. We know it’s a very difficult issue, but *that is the key variable*. It’s important, but just because we can’t make a judgment as to what these driving forces are in an econometric sense doesn’t mean that it’s not real.” [italics added]”. There is no other expert panel providing such a large coverage of inflation expectations in times of rising inflation rates.

The results of our survey in Q4 2022 show that, for 2023, the global average expected inflation rate was 7.1 percent. This is the median of the average expected inflation rates at country level. The median is used because expected inflation rates vary greatly from region to region and are drastically higher in individual countries and regions such as Africa than in the rest of the world.

The average rate of 7.1 percent expected in the fourth quarter represents a significant decrease compared with the expected rate of 9.5 percent in our survey in Q3 2022. In any event, the experts expected inflation rates to remain high worldwide in the years ahead. With an average inflation rate of 5.8 percent in 2024, a decline compared with 2023 was expected. In the longer term, too, with a view to 2026, inflation expectations remain high at 4.5 percent (Figure 5.30).

A breakdown by individual regions of the world reveals major disparities in inflation expectations. For 2023, experts expected the highest price increases in East Africa (almost 35 percent), North Africa (32 percent), South America (25 percent), and South Asia (23 percent). In North America (5.2 percent), Southeast Asia (5.3 percent), and Western Europe (5.4 percent), however, inflation expectations for 2023 were well below the global average.

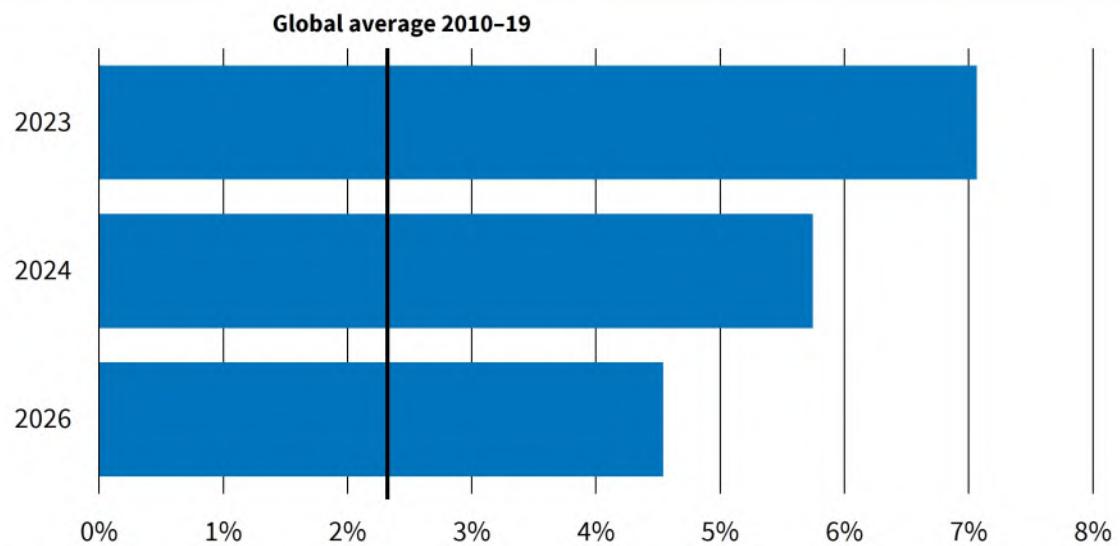
Within the continents, equally large differences were observed in the experts’ expectations. Within Europe, Eastern Europe has by far the highest inflation expectations for 2023 (15 percent), whereas within Africa, Southern Africa is a downward outlier at 6.5 percent.

5 Other ifo Surveys

Figure 5.30: Global inflation expectations in Q4 2022.

Global Inflation Expectations

Expected inflation as a global average for the year...



Notes: The figure shows the expected inflation rates on a global average for 2023 (7.1 percent), 2024 (5.8 percent) and 2026 (4.5 percent). The median of the averages at the country level is shown.

Figure 5.31: Inflation expectations for 2023 across regions (Q4 2022).

Inflation Expectation 2023



Notes: The figure shows the arithmetic mean of the expected inflation rates in the regions for 2023.

5.7.5 Growth Expectations

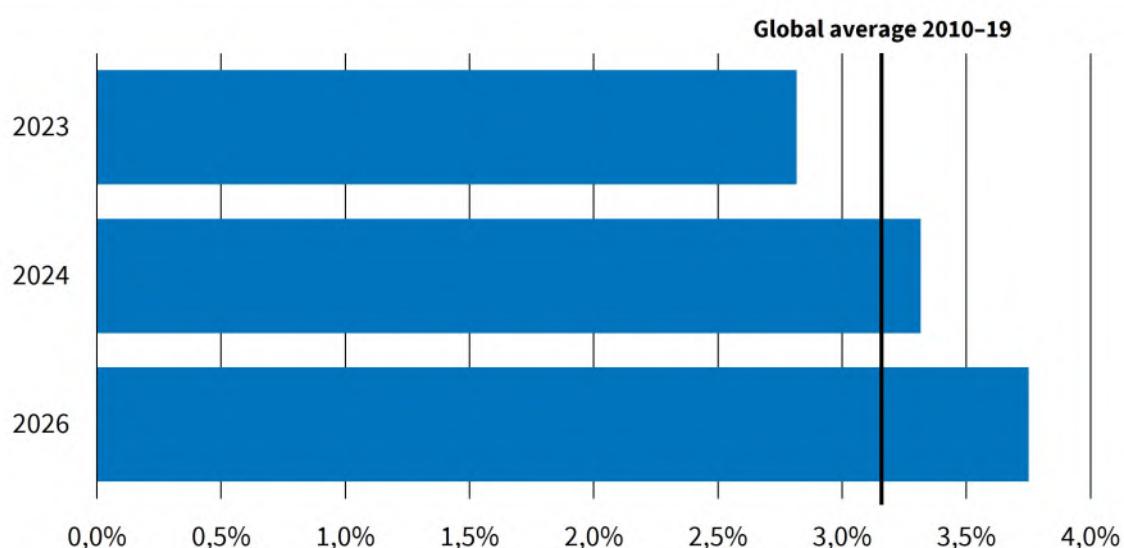
We have also asked the participants of the EES about their expected growth rates in Q4 2022. For 2023, the economists surveyed expected global average economic growth of 2.8 percent. This is the median of the average expected growth rates at country level.

In the coming years, the experts expected economic growth to increase again, to an average of 3.3 percent in 2024 and 3.8 percent in 2026.

Figure 5.32: Global growth expectations in Q4 2022.

Global Growth Expectations

Expected Growth as a Global average for the year...



Source: Economic Experts Survey 2022Q4.

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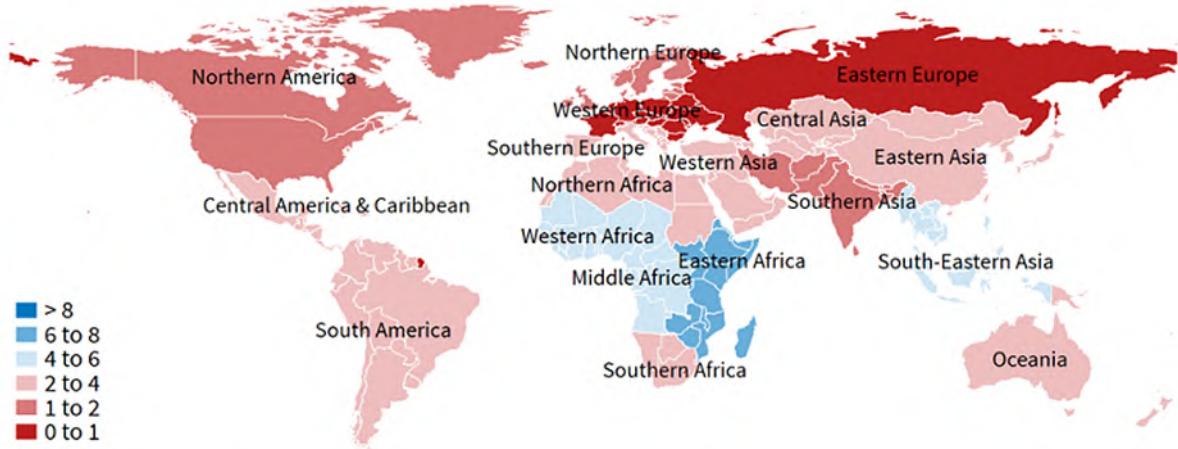
Notes: The figure shows the expected growth rates on a global average for 2023 (2.8 percent), 2024 (3.3 percent) and 2026 (3.8 percent). The median of the averages at the country level is shown.

The expectations for economic growth in 2023 differ a great deal between the world's regions. While economic performance was expected to stagnate in Eastern Europe (0.1 percent) and only slight growth of 1.2 and 0.7 percent on average was forecasted in Northern and Western Europe, expectations in other regions were much more positive. The experts expected the highest growth in East Africa at 8 percent, and very high growth expectations can also be observed in Southeast Asia (4.7 percent), Central Africa (4.7 percent) and West Africa (5.2 percent). With expectations of around 3 percent, experts in the regions of East Asia (2.9 percent), South America (3.0 percent), Oceania (3.0 percent), Southern Europe (3.1 percent), North Africa (3.2 percent), as well as West Asia (3.5 percent) and Central Asia (3.6 percent) were optimistic about the development of economic output. Moderate growth was expected in North America (1.6 percent), South Asia (1.7 percent), Central Asia (2.1 percent) and South Africa (2.3 percent).

5 Other ifo Surveys

Figure 5.33: Growth expectations for 2023 across regions (Q4 2022).

Growth Expectation 2023 (in %)



Source: Economic Experts Survey in Q4 2022.

© ifo Institute / IWP

Notes: The figure shows the arithmetic mean of expected economic growth in the regions for the year 2023.

5.7.6 Research

The EES (as was the WES) is also used for research on macroeconomic expectations of economic experts and assessments of economic policies. To investigate determinants of macroeconomic expectations, scholars employ, for example, information treatments: a randomly selected group of participants receives information. Research questions to be examined include whether providing this information influences respondents' views on individual economic policy questions and expectations. A prominent example is the study by Andre et al. (2022) that includes survey data from the final waves of the WES. The authors examine people's subjective models of the macroeconomy and disentangle beliefs of economic experts and households. They provide respondents with information about macroeconomic shocks on unemployment and inflation and show that households disagree more about the extent and the consequences of macroeconomic shocks than experts.

The first experimental evidence on peer effects in the formation of macroeconomic expectations among economic experts has been conducted based on EES data (Dräger et al. 2023). The survey was distributed in two waves: From 25 May to 4 June 2022, the authors elicited inflation expectations and monetary policy recommendations of a randomly selected subgroup of global experts. The central experiment, which was conducted in the second wave between 8 June and 18 June 2022, confronts a randomly selected subgroup of experts with their peers' views elicited in the first wave. We uncover large peer effects: when experts are informed about regional inflation expectations of their colleagues, they adjust their inflation

expectations by around 16 percent. The peer effects are driven by non-macroeconomists who are arguably less informed about inflation than macroeconomic experts. Peers' concerns about inflation gave rise to recommending immediate monetary policy action when experts did not believe that the current high inflation was supply-driven. This research on inflation expectations based on the EES endorses research on inflation expectations based on the Economists' Panel (Dräger et al. 2022).

Exogenous variation in information provision also arises when experts are asked to participate in a survey just before and after decisive events. An intriguing example has been the outcome of the 2020 US presidential election. Boumans et al. (2022a) distributed a survey in two waves, where each wave consists of a randomly selected subset of participants. The first wave was collected shortly before the election (the control group). The second wave was collected five days later, directly after Joe Biden had been called president-elect by major US media outlets (the treatment group). The results show that the US incumbent change had significant and economically sizable spillover effects on the formation of global macroeconomic expectations. Those experts who were surveyed after Joe Biden won the 2020 US presidential election expected real GDP growth in their host country in 2021 to be 0.98 percentage points higher than experts surveyed before the election date.

Exogenous events such as the initial global spread of Covid-19 during March 2020 have been shown to influence experts' assessments about economic policies (Gründler and Potrafke 2020a). Other previous studies from the final waves of the WES used experts' assessments on, for example, tax reforms, fiscal rules, public debt, the influence of the media on economic expectation building, terrorism, and the Covid-19 pandemic (Arnemann et al. 2021; Boumans et al. 2020a, 2018, 2020b, 2022b, 2020c; Gründler and Potrafke 2020b).

6 The LMU-ifo Economics & Business Data Center (EBDC)

SEBASTIAN WICHERT, HEIKE MITTELMEIER, VALENTIN REICH, MICHAEL RINDLER

6.1 General Information about the EBDC

The LMU-ifo Economics & Business Data Center (EBDC)¹ is the joint Research Data Center (RDC) of the ifo Institute, the LMU Munich's Department of Economics², and the LMU Munich School of Management³. It was founded in 2008 with the financial support of LMU's long-term strategy program "LMUexcellent". In 2011, the EBDC was accredited as an RDC by the German Data Forum (Rat für Sozial- und Wirtschaftsdaten (RatSWD))⁴. Therefore, the EBDC provides non-discriminatory access to its research data free of charge, is subject to annual monitoring, and participates in a standardized, impartial mechanism for resolving user complaints, among other things. In 2014, micro-data from official statistics became available at the EBDC through cooperation with the Bavarian State Office for Statistics. The EBDC is well connected in the research data sphere in Germany and beyond: It is i.a. part of the national research data infrastructure (NFDI), the Statistik Netzwerk Bayern as well as Leibniz research network "LeibnizData". In these networks, the EBDC and its partners are promoting better access to and linking of research data.⁵ In order to better address the growing importance of research data and the diverse tasks it has taken on since its foundation, the EBDC has been continuously expanded in terms of personnel and infrastructure and has become an independent research-oriented infrastructure and service center within the ifo Institute since 2022.⁶

When the EBDC was founded, its primary goal was "to establish a central place for the collection and supply of research data for economic and business sciences". More specifically, the main task was to make ifo's long-running surveys available to the broader research community since this data until then was only partially accessible within the institute. To this end, the EBDC team developed and maintains to this day well-documented, regularly updated, and pseudonymized research micro-data sets from ifo's surveys. After a retention period, these data sets are provided to ifo researchers and guest researchers only for non-commercial

¹ More, up-to-date information about the EBDC can be found on their webpage: www.ifo.de/en/ebdc.

² See www.en.econ.lmu.de.

³ See www.som.lmu.de/en.

⁴ See www.konsortswd.de/en/ratswd.

⁵ See www.konsortswd.de/en.

⁶ Earlier comments on EBDC can be found in Abberger et al. (2007), Becker and Wohlrabe (2008), Seiler (2012) and Mittelmeier (2020).

6 The LMU-ifo Economics & Business Data Center (EBDC)

academic research projects. They can be accessed in a safe and well-equipped environment at EBDC to secure the confidentiality of the survey responses. In addition to the micro-data from ifo's surveys, the EBDC team has developed and continually enhances innovative linked research data sets: the EBDC Business Panels. These data sets contain survey data from both the ifo Institute and external balance sheets. While the provision and further development of the (linked) ifo data sets is still an important task of the EBDC, the EBDC's functions have expanded considerably since its early days. Today, the EBDC considers itself a research-oriented service and infrastructure provider. Its mission is to enable and participate in innovative and challenging empirical research projects, especially with large unconventional data and/or new methods. The EBDC Advisory Board provides strategic guidance to the ifo Executive Board and EBDC management to continuously improve the EBDC and its services.

As of early 2023, the EBDC has hosted the following regularly conducted ifo survey data sets, which are all described in previous chapters:⁷

- ifo Business Surveys (Manufacturing industry, Construction industry, Trade, Service Sector)
- ifo Business Survey in the insurance industry
- **EBDC Business Panels** (EBDC Business Expectation Panel, EBDC Business Investment Panel, EBDC Business Innovation Panel)
- World Economic Survey/Economic Expert Survey
- ifo HR Survey
- ifo Architects Survey
- ifo Education Survey
- FamData – Database and Survey

The following sections of this chapter provide an overview of services and data that the EBDC offers to its external guest researchers. The EBDC Business Panels are presented in detail, followed by data protection measures during the preparation of the data sets and during use by guest users, access regulations, the EBDC research data repository, and lastly the branch office of the Research Data Center of the Statistical Offices of the Länder at the EBDC.⁸

⁷ Further, irregularly conducted or discontinued surveys and data sets that are processed and hosted by the EBDC are the ifo Investment Surveys (Manufacturing Industry, Trade, Leasing), the ifo Innovation Survey, the ifo Investment Database, and several meta-surveys. Further original and/or replication data sets are available through the EBDC repository (see Section 6.6) or the ifo webpage (e.g. iPEHD – the ifo Prussian Economic History Database).

⁸ Other ifo survey data sets such as the ifo Business Survey or the ifo Education Survey, which are provided by the EBDC, are explained in detail in other chapters of this handbook. Therefore, they are intentionally omitted here. Furthermore, the EBDC provides further services and fulfills other tasks in the areas of research data infrastructure management, Open Science, networking and committee work, and further education. More, up-to-date information about these services, all data sets available at the EBDC and their access regulations as well as all publications with them can be found on the EBDC's webpage: www.ifo.de/en/ebdc.

6.2 The EBDC Business Panels

Overview

In the EBDC Business Panels, namely the EBDC Business Expectation Panel (BEP), the EBDC Business Innovation Panel (BIMP), and the EBDC Business Investment Panel (BIP), each micro-data set from the ifo surveys, namely the ifo Business Survey (IBS), the ifo Investment Survey (IVS), and the ifo Innovation Survey (INS) - is combined with standardized financial and structural data from the very large external company database Orbis provided by Bureau van Dijk through a machine learning based record linkage procedure. As of 2023, the Orbis database contains more than 450 million companies worldwide, of which 45 million have detailed financial information with hundreds of variables from 170 local data providers.⁹ For Germany, the data is delivered by Creditreform and contains i.a. information of the German Commercial Register (“Handelsregister”), the Federal Gazette (“Bundesanzeiger”) as well as balance sheet data and win and loss statements from company reports and information from the press. For the EBDC Business Panels more than 50 positions were selected or recalculated from these sources. Through the record linkage, subjective company-specific expectations, estimates, and plans from the ifo survey data can be related to the objective, realized balance sheet and structural data in the company database. The EBDC Business Panels are published yearly with a one-year retention period. Table 6.1 gives an overview of the EBDC Business Panels and the underlying ifo surveys.

Structure

The structure of all EBDC Business Panels is very similar. The EBDC Business Panels contain the same three sets of variables as the respective ifo surveys: 1) identification variables (e.g. pseudonymous ID, survey month, etc.), 2) variables from regularly asked questions (e.g. business expectations), and variables from special irregularly asked questions (e.g. questions on effects of the Covid-19 pandemic or the war in Ukraine on business performance). If a company produces several goods or provides several services, it may fill in two or more questionnaires for different products/services or product/service groups. This is only the case for the ifo Business Survey. Therefore, it is possible that several survey observations of a company for different products or product groups are assigned the same financial information from Orbis. Since the ifo Investment Survey does not differentiate between products, each ifo survey participant is assigned to exactly one firm from the Orbis data base. Of course, this only applies if the firm is contained in the Orbis data base and can be linked with the record linkage procedure. Identification of an observation in the EBDC Business Panels is

⁹ See <https://www.bvdinfo.com/en-gb/our-products/data/international/orbis> for more information. Due to contractual obligations, the Orbis database is only available for ifo and LMU researchers. In earlier years the Amadeus database by Bureau van Dijk and/or the Hoppenstedt database (today: Dun & Bradstreet Firmendatenbank) have been used as well. For each company, the balance sheet information of the provider with the most balance sheet years is preferred.

Table 6.1: Overview of ifo surveys and EBDC Panels

Survey	Period	Observations	Companies	thereof in EBDC panel
<i>Business surveys:</i>				
Industry	since 1980	1,775,268	18,946	7,445
Construction	since 1991	1,102,681	5,958	2,693
Trade	since 1990	873,718	11,530	5,299
Service provider	since 2004	485,140	9,378	6,578
Insurance	since 1999	46,213	156	-
<i>Investment survey:</i>				
Industry	since 1964	393,528	23,901	7,076
Trade	2000 - 2014	15,696	4,546	-
<i>Innovation survey:</i>				
Industry	1982 - 2015	41,996	7,862	3,060

As of early 2023.

based on a company EBDC ID, the observation year and other data set-specific time variables. The financial information in the EBDC company panels is based on individual rather than consolidated financial statements when available.¹⁰ However, the financial statement data from the company data bases has not simply been adopted. Rather, a new EBDC balance sheet scheme was developed which integrates variables from all company data bases and abstracts them from the existing differences in the original data sets.¹¹ The EBDC balance sheet format is based on the balance sheet and income statement structure of the German Commercial Code (HGB) and in some cases also shows variables according to the total cost method or the cost-of-sales method.¹² For a detailed and appropriately structured overview of the available balance sheet and income statement variables, please refer to the respective variable list of the corresponding EBDC Business Panel.

EBDC Business Expectations Panel

For the EBDC Business Expectations Panel (BEP), the link results in a combination of monthly data from the ifo Business Survey and annual data from the financial company data bases. The BEP-ID consists out of three components: the variable “bep_company_id”, which is a serial company number, the variable “questionnaire_id”, which consecutively numbers the questionnaires per firm, and the variable “sector_id”, which contains the sectors surveyed. The

¹⁰ The respective trade type is indicated by the variable “reporting_basis”. Limited financial data means here that the balance sheet information was not published, but mostly requested individually.

¹¹ The conversion scheme used to convert the original variables into the newly generated EBDC data balance sheet variables has been used, can be viewed at the EBDC. A detailed standard balance sheet is also available, which can be used for orientation purposes.

¹² Upon request and in exceptional cases, original balance sheet variables from Orbis can be provided.

ifo Business survey in the manufacturing industry (KTVG) asks for products, the ifo Business Survey in the service sector (KTDL) for service branches, the ifo Business Survey trade (KTHAN) for product groups and the ifo Business Survey in the construction industry (KTBAU) for construction types. One questionnaire can contain questions for several divisions.

The EBDC Business Expectation Panel data set is sorted by BEP-ID, year, and month and hence provided in a (unbalanced) long format. Each observation in the survey can be uniquely identified by these three variables, of course without disclosing the name of the firm. Since the ifo Business Survey is conducted monthly, up to 12 monthly reports per BEP-ID can be available for each year. This is followed by the balance sheet information in an additional month denoted “99” constructed for this purpose. This data set structure facilitates the handling of monthly and annual information and keeps the size of the data set comparatively small. The data set contains the variables ordered by their function: 1) Identification variables, 2) balance sheet and P&L information from the company data bases, and 3) the ifo survey variables. In addition to the BEP-ID, the year and month, the identification variables also include information on industry codes, size classes of persons employed, federal state, stock exchange listing, legal form, etc.¹³ The variable lists provided by the EBDC give an overview of all variables, their significance and special features, and contain all the questions of the individual ifo Business Survey, including the survey period and periodicity.

EBDC Business Investment Panel

Due to the semi-annual cycle of the ifo Investment Survey (IVS), the EBDC Business Investment Panel has a slightly different structure than the EBDC Business Expectations Panel. The data set no longer contains monthly data, but a variable “season” indicating whether the data come from the spring (1) or autumn (2) survey or from a balance sheet (99). The data set is sorted by BIP-ID (“bip_company_id”), “year”, “season”. The rest of the data set structure matches that of the EBDC Business Expectations Panel. The IVS was discontinued in 2022 and the last survey wave was conducted in spring 2022. However, the data sets of the IVS are available at the EBDC just like all other ifo research data sets.

EBDC Business Innovation Panel

The annual ifo Innovation Survey (INS) refers to individual products of a company like the ifo Business Survey (IBS) for the manufacturing sector. Participants for this survey were sampled from the IBS. Therefore, these two data sources together form the EBDC Business Innovation Panel (BIP). The INS surveyed both innovation activities and objectives as well as innovation impulses and obstacles. Product and process innovations were addressed, and there were changing special questions in specific years. The INS is attached to the IBS from the manufacturing sector as an annual data set with the month specification “98”, just like the balance sheet data with the month specification “99”. The INS was discontinued in 2017 and

¹³ For reasons of anonymity, the federal state information was deleted for large companies (> 10,000 employees).

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the last survey wave was conducted in 2016. However, the data sets of the INS and the BIP are available at the EBDC just like all other ifo research data sets.

Record Linkage

To link the ifo surveys to balance sheet data from Orbis, the address information of firms in both data sources is accessed. The procedure ultimately leads to a mapping table that allows to combine information from the ifo surveys and Orbis into the EBDC Business Panels.

Since there is no common identifier between the two data sources, a probabilistic linkage procedure has to be applied based on various similarity metrics. To this end, the EBDC uses a five steps procedure:

- (i) The records containing name and address information are cleaned and standardized.
- (ii) A set of pairs that are considered potential matches is identified based on simple heuristics.
- (iii) For each pair in this set, various similarity metrics are computed.
- (iv) A supervised machine learning algorithm is trained on the similarity scores of a set of pairs that were manually labeled as matches or non-matches as training data. For the remaining pairs, this algorithm uses their similarity score to predict whether the pairs refer to the same entity.
- (v) Predicted matches are manually reviewed and corrected if necessary.

The linkage is especially successful for companies that have been added to the survey since around 2005 with nearly perfect coverage for the most recent years. Figure 6.1 illustrates the process of creating the EBDC Business Expectations Panel. More information about this procedure and the results can be found in Reich (2023).

6.3 Data Protection and Data Security Measures during Processing and Usage at the EBDC

Legal data protection, technical data security as well as the confidentiality of the survey participants and their answers have the utmost importance for the researchers at the ifo Institute and the EBDC team.¹⁴ This is reflected in the way how the research data sets are created from the raw survey data by the EBDC team as well as in strict data usage regulations

¹⁴ All ifo researchers, and in particular the EBDC team, are dedicated and bound to confidentiality by their employment contract and the obligatory principles of good scientific practice.

for guest researchers.¹⁵

After completion of their surveys, the ifo researchers in charge transmit their data to the EBDC, usually in a standardized process (i.e. within a predetermined frequency, content, and granularity).¹⁶ In the case of the ifo Business Survey, the EBDC team gets access to the raw micro-data (i.e. the survey answers), only after the ifo Business Climate Index for Germany is published. To be precise, following the need-to-know principle, only certain members of the EBDC team can transfer the raw data for further processing and publication from a protected internal ifo micro-database onto the dedicated internal EBDC server. It is hosted on ifo premises and in closed-shop mode under the 24/7-surveillance of ifo's IT department. Identifying or contact information of participating firms (e.g. company names, addresses etc.) is strictly separated from their survey answers. They are only temporarily combined for the generation of the panel data sets, consistency checks, and record linkage. EBDC guest users never get access to this raw data or any other identifying firm information. The term "raw" refers to the fact that this new data is not yet fully documented, variables and values are not labeled, variable (names) are not standardized over time, etc. All these tasks and many more are performed by the EBDC team. Additionally, the data is further pseudonymized. To this end, among other things, the remaining location information (i.e. the federal state variable) – is deleted for large firms to ensure their anonymity. Furthermore, the EBDC team conducts the machine learning-based record linking procedure of the ifo survey data with the external company data bases, but deletes any identifying information afterward as described above.

Despite anonymization and pseudonymization as well as a data retention period, to safeguard the identity of the firm survey participants and the confidentiality of their survey answers, guest researchers can only work at protected, supervised, and well-equipped guest researcher workstations in the isolated premises of the EBDC within the ifo Institute. Identities of all first-time guest researchers are checked by the EBDC team before granting access to the data. During visits by guest researchers, the EBDC team is always present and available to provide assistance and answer questions. Each guest researcher is assigned a password-protected user account and working folder to which only he/she has access. Data is stored on a dedicated and encrypted EBDC server run in closed-shop mode and backed up regularly. Any direct data import or extraction (through the internet or physical storage media) by guest researchers is technically disabled and contractually prohibited. Therefore, all data imports to the working folder (e.g. prepared statistical program code or additional external data) and exports of research results from the workstations have to be performed by the EBDC team. Only aggregated results can be exported for guest researchers (e.g. regression tables, figures, etc.). Furthermore, the EBDC data experts review all results to ensure that guest researchers comply with the contractual prohibition on re-identification and that individual firms cannot be identified (intentionally or accidentally). In addition, the EBDC team is happy to provide

¹⁵ Personalized data of guest researchers (e.g. from their applications etc.) is of course compiled and stored securely, GDPR-compliant, and is only accessed for the intended purposes as well.

¹⁶ As of early 2023, the EBDC does not conduct surveys of its own, but receives the data from the respective ifo Centers (e.g. the ifo Business Survey from the ifo Center for Macroeconomics and Surveys).

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in-depth advice on the ifo micro-data sets, since they have years of experience in creating them.

These and other technical, organizational, and contractual security measures are specified in the ifo/EBDC IT security concept as well as the data protection concept. The EBDC team reviews these documents regularly with ifo's legal counsel, ifo's data protection officer as well as ifo's head of IT to ensure the highest level of confidentiality and security of the data sets.

6.4 FAIR Data

Most of ifo's research data sets published regularly by the EBDC are created in a way to fulfill the so-called FAIR principles (Findable, Accessible, Interoperable, Reusable). The EBDC creates standardized metadata and assigns an unique persistent digital object identifier (DOI) to them. Hence the data can be easily found via all common (data) search engines on the Internet.¹⁷ Furthermore, the EBDC has a standardized process in place to access the data (see Section 6.5) and the documentation provided by the ifo Centers as well as the EBDC team (e.g. this handbook, variable lists, questionnaires) enables guest researchers to familiarize themselves with the data quickly. The data sets are usually provided in DTA format for Stata, but it can be converted easily. Lastly, the whole purpose of the EBDC is to make ifo's surveys reusable. Guest researchers themselves can make their analyses reusable if they decide to archive them at the EBDC as well (see Section 6.6).

6.5 Data Access

In general, the EBDC offers non-discriminatory access to its datasets (and several other services) free of charge. Most data sets are published regularly, but the periodicity of data publication and the length of the retention period depends on the particular data set, as described above. Guest researchers with an affiliation to a research institution or university may use the ifo micro-data sets during a short-term research stay at the EBDC in Munich for strictly academic, non-commercial research projects.¹⁸ Guest researchers have to submit an application form including a short project description and acknowledge EBDC's terms and conditions. The application is reviewed and approved (or in rare cases declined) by the head of the EBDC and by the EBDC Board in case of special requests. In addition, since the number of secure workstations is limited, all visits to the EBDC have to be scheduled in advance. In

¹⁷ As a member of the Dara consortium (<https://www.da-ra.de>), the EBDC can assign its own DOIs (e.g. <https://doi.org/10.7805/ebdc-ibs-ind-2022a> for the ifo Business Survey in the manufacturing industry of 2022).

¹⁸ Only few ifo data sets such as the ifo Education Survey are available as scientific use files and will be sent to researchers after (granted) application. More, up-to-date information about access regulations for each data set provided by the EBDC as well as the application form and EBDC's terms and conditions of use can be found on the EBDC webpage: www.ifo.de/en/ebdc.

addition, researchers are obliged to cite the micro-data appropriately and to provide a copy of their publication(s) free of charge, unsolicited, and promptly after publication. As of early 2023, data access is restricted to the secure workstations at the EBDC (and in some cases to remote execution by the EBDC team). However, the EBDC team is working on several secure interactive remote access solutions to simplify data access, especially for international guest researchers.

6.6 The EBDC as a Data Repository

As an accredited research data center, the EBDC acts and is listed as a trusted research data repository in the Registry of Research Data Repositories (Re3data), which is endorsed i.a. by the American Economic Association and for EU Horizon projects.¹⁹ Research results from EBDC guest researchers based on ifo/EBDC data sets can be safely archived on a long-term basis and, if requested, published for replication and/or secondary analysis in the secure environment of the EBDC. In this way and as an institutional member of the LMU Open Science Center, the EBDC directly supports the implementation of the principles of good scientific practice, promotes the idea of Open Science and thus increases the trustworthiness, transparency, and efficiency of the research process.²⁰

If replication data for research projects conducted at the EBDC are to be archived and/or published, all data must be submitted by the guest researcher to the EBDC team in a structured form with documentation and metadata. The EBDC team is happy to guide researchers in preparing the necessary documents and provides advice on data preparation according to the FAIR principles. However, the documentation itself has to be done by the researchers. The EBDC checks the completeness of a data package to be archived (data set, documentation, and program code). Undocumented, unstructured “data dumps” are not accepted for archiving. Furthermore, the EBDC team does not check the scientific validity of the methods and results. The EBDC can register the standardized metadata, add an appropriate usage license and assign a persistent digital object identifier (DOI) for these data packages, so that the data can be easily found via all common (data) search engines on the Internet. Depending on the sensitivity of the data, data access for secondary users can be defined as download, provision on request, or data processing only at the secure workstations in the EBDC.

A Data Archiving Agreement and Data Transfer Protocol regulate the details regarding archiving/publication between primary researchers and the EBDC. Among other things, the method of publication, the access concept, as well as the duration of archiving, are determined in the

¹⁹ See www.re3data.org, https://social-science-data-editors.github.io/guidance/Requested_information_hosting.html#list-of-additional-acceptable-trusted-repositories-in-economics, and https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf.

²⁰ See https://www.dfg.de/en/research_funding/principles_dfg_funding/good_scientific_practice/index.html and https://www.osc.uni-muenchen.de/about_us/index.html.

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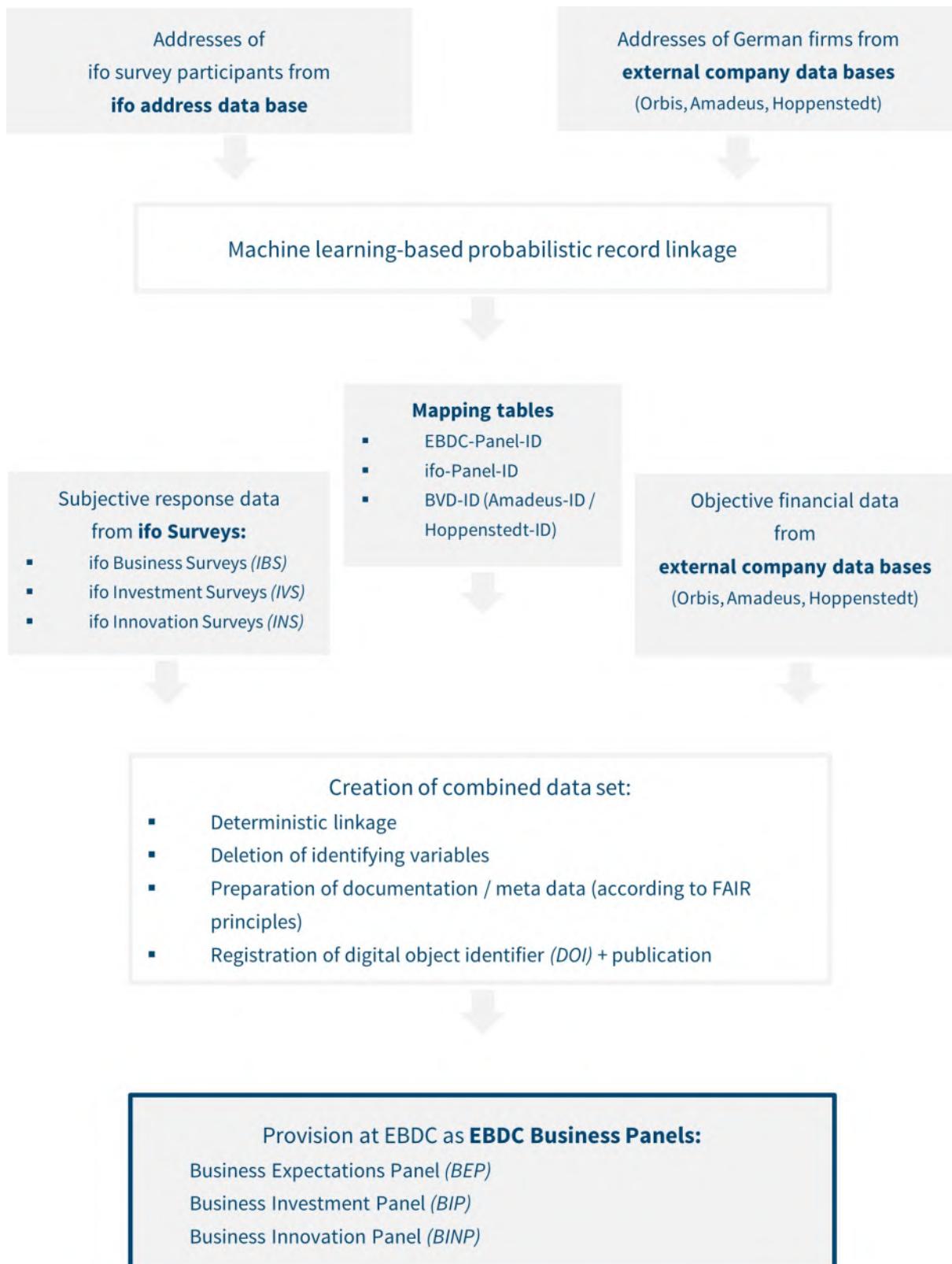
agreement. Secondary researchers who wish to use the data deposited at the EBDC have to apply for the data and accept EBDC's terms and conditions.

6.7 The Research Data Center of the Bavarian State Office for Statistics in the EBDC

In addition to survey data from research institutes, such as the ifo Institute, and the private sector, high-quality micro-data from official statistics are a vital source for empirical economic research and evidence-based policy advice. For this reason, the ifo Institute and the Bavarian State Office for Statistics have been cooperating since 2013 and have created a branch office of the Research Data Center of the Statistical Offices of the Länder at the EBDC, which is administratively and spatially separated from the rest of the EBDC. Upon application and by appointment, guest researchers from academic institutions can work there under supervision at two secure guest workstations.²¹ Over 100 formally anonymized micro-data sets from all areas of life are available there. These data sets have greater information content than factual anonymized Scientific Use Files, which are typically sent to researchers directly.

²¹ More information about the Bavarian Statistical Office and its Research Data Center can be found here: <https://www.statistik.bayern.de/service/forschungsdatenzentrum/index.html> (German only). Further Information (in English) about specific data sets, the application process, etc. can be found here: <https://www.forschungsdatenzentrum.de/en>.

Figure 6.1: Organization chart of the EBDC



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