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**Article**

## The New ifo Business Climate Index for Germany

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Stefan Sauer and Klaus Wohlrabe

# The New ifo Business Climate Index for Germany

The ifo Institute has regularly conducted economic surveys at a corporate level since 1949. The survey results are used to calculate the ifo Business Climate Index, among other things, which generates a great deal of media attention every month. It is one of the most important early indicators for economic developments in Germany. The ifo Business Climate Index consists of two components: assessments of the current business situation (BS) and survey participants' expectations for the next six months (BE). Both variables are collected on a monthly basis for manufacturing, construction, wholesaling, retailing and the service sector. Participants have the option of responding to both questions on a three-tier scale (good/satisfactory/poor and/or more favourable/unchanged/more unfavourable). To calculate the indicator, the responses are weighted according to the size and/or the annual turnover of the company in question. Balances are then calculated for both variables based on the shares of 'positive' and 'negative' responses. The business climate is then calculated from both balance figures using geometric averaging:  $GK = [(BS + 200)(BE + 200)]^{1/2} - 200$ . More detailed information on the construction of the ifo Business Climate Index are featured in Goldrian (2004). The business climate index has also been the subject of many scientific analyses. Abberger and Wohlrabe (2006), Seiler and Wohlrabe (2013), as well as Lehmann (2018) offer detailed overviews and show that the ifo index is the most important early indicator for economic developments in Germany. Despite its success, changes have been necessary from time to time. In recent decades the service sector has gained in importance for the German economy. Tertiarisation is constantly expanding. To date, however, results for the service sector have been published separately. Another feature of the index requiring adjustment is the aggregation, which will be subject to a small-scale update after over 40 years.

This is why the following changes will be made in the ifo business surveys as of April 2018:

1. The ifo Business Climate Index for industry and trade will be replaced by the ifo Business Climate

for Germany. This now also includes the service sector and will form the basis for the ifo Institute's monthly press release as of April 2018.

2. The ifo Business Climate Index for industry and trade (excluding the service sector) will still be calculated, but no longer commented on by the ifo Institute.
3. The base year for the index calculation will be changed from 2005 to 2015.
4. The aggregation procedure will be changed in detail, whereby the basic method of calculation (balance methodology) remains unchanged. Company responses (micro data) are now assigned differently to the hierarchy levels in some cases. This change means that all of the time series have been recalculated using the adjusted methodology.
5. In this recalculation of all of the time series, responses from companies were also taken into account which in the past were only submitted after the survey deadline and thus excluded from the aggregations.

In the following, the changes are described in detail as well as the extent to which these led to diverging developments in the newly-calculated time series.

## THE NEW IFO BUSINESS CLIMATE FOR GERMANY

The most important change applies to the monthly key indicator the 'ifo Business Climate Index for Industry and Trade', which attracts a great deal of media attention and also directly influences share prices in the financial markets (see Mitnik *et al.* 2013a and 2013b). The term 'industry and trade' does not exist as an official definition in government statistics but was introduced by ifo to clarify that it does not cover all sectors relevant to the economy. To date it included manufacturing, construction, wholesaling and retailing, in which the ifo business surveys have been conducted since the end of the 1940s or since the beginning of the 1950s. The construction of a panel in the service sector did not begin until 2001, the first results having been published in 2005 (see Wohlrabe and Wojciechowski 2014). Now, the service time series are sufficiently long to allow integration into the overall index. Consequently, from April 2018, the 'ifo Business Climate for Germany' will be published, now including the service sector. This will acknowledge the increasing importance of the service industry for the German economy in recent decades. More than two-thirds of gross value added in Germany is now accounted for by the services sector. This tertiarisation is also reflected in the percentage weighting of the sectors that comprise the Business Climate for Germany: service sector (50.5 percent), manufacturing (30.2 percent), construction (6.0 percent), wholesaling (7.1 percent) and retailing (6.2 percent). The newly created index begins in January 2005; however, the previously



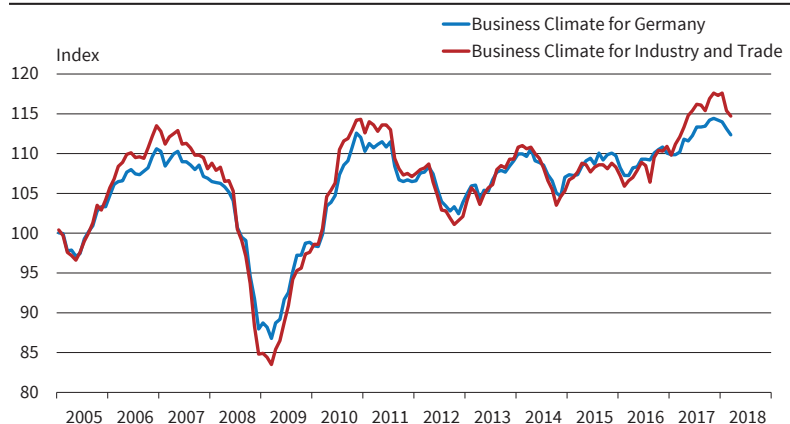
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Figure 1

Comparison 'ifo Business Climate for Industry and Trade' and 'ifo Business Climate for Germany' According to the New Aggregation



Source: ifo Business Surveys.

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published indices for industry and trade will continue to be available from 1991, but will no longer be explicitly commented on in ifo's own press releases.

Figure 1 shows the old and the new ifo Business Climate Index with 2005 as the base year. A very similar course with the old index is seen in the figure although the new index is somewhat 'compressed' by the addition of service providers. For example, the cooling of the business climate during the economic and financial crisis in 2009 is not as dramatic, but the increase over the course of the past year until the beginning of 2018 is also weakened somewhat. As a rule, the fundamental trends are very similar. The correlation between both series is very high at 0.98. In individual months, however, the service industry may develop differently than the other sectors so that the Business Climate for Germany may take a different direction than that of German Industry and Trade. Since 2005, this has been the case in 18 percent of all months, or an average of about twice a year. Table 1 compares the volatility of the time series with the standard deviation of the time series and their first difference. Wohlrabe and Wollmershäuser (2017) show that often the monthly differences are better suited to derive forecasts of macroeconomic variables. For the new index, the fluctuations over time are lower both in terms of level and monthly differences.

The ifo Index is a leading index. This property is achieved by the expectation component as well as by the fact that the official statistics are published after some delay. The gross domestic product is commonly considered to be the most

prognostic properties of the ifo indicators has been recently demonstrated by Heinisch and Scheufele (2018) using statistical and econometric methods.

#### THE EFFECT OF THE NEW BASE YEAR

In connection with the conversion, the base year for the index calculation will also be adjusted from 2005 to 2015.<sup>1</sup> The indexation to a base year, however, is only a pure scale effect (conversion of balance points into index points) and has no effect on the economic interpretation.<sup>2</sup> Figure 2 shows the 'ifo Business Climate for Germany' with base year 2005 and with base year 2015. As the balance of the 'Business Climate for Germany' in 2015 was significantly higher than in 2005, a rebasing on this year leads to a downward shift, which amounts to around 9 index points. While

<sup>1</sup> In its most recent publications, the Federal Statistical Office has also changed over to the base year 2015 (see Federal Statistical Office 2018).

<sup>2</sup> In interpreting the base year, note that values above 100 mean that the value is higher than the average of the base year 2015.

Table 1

#### Volatility Comparison (Standard Deviation) of the Old and New Business Climate

	Climate	Level	
		Situation	Expectations
Industry and Trade	7.05	9.59	6.03
Germany	5.80	7.92	4.91
First monthly difference			
	Climate	Situation	Expectations
Industry and Trade	1.42	1.70	1.64
Germany	1.20	1.50	1.44

Source: ifo business surveys; calculations by the ifo Institute.

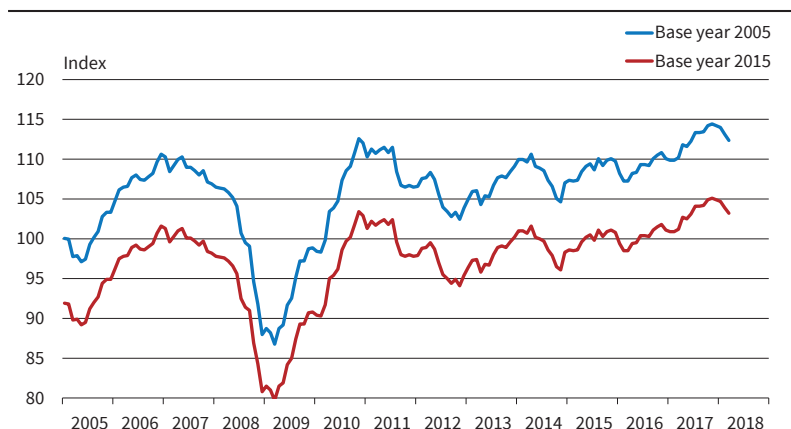
Table 2

#### Correlation Comparison between Gross Domestic Product and the ifo Business Climate

	GDP	Quarterly growth rate	Annual growth rate
Industry and Trade		0.585	0.805
Germany		0.543	0.854

Source: Calculations by the ifo Institute.

**Figure 2**  
Effect of the Base Year for the ifo Business Climate for Germany



Source: ifo Business Surveys. © ifo Institute

the index value of March 2018 with the new base year is 103.2, it would be 112.4 using 2005 as the base year.

**CHANGES IN THE AGGREGATION METHODS**

The previous aggregation in the context of the balance methodology was carried out in a tree-like structure based on the official economic branch classification WZ2008 of the German Federal Statistical Office (see Federal Statistical Office 2008). An exemplary section of this tree structure is shown in Figure 3 for the manufacturing sector up to the third level. The highest level, here the entire manufacturing industry, is the so-called one-digit level. On the two-digit level, well-known industries are listed, such as the automotive industry or mechanical engineering.<sup>3</sup> Below this level, the structure has different aggregation depths, some of which extend to the six-digit level. The aggregation of the responses within this tree structure is done from bottom to top. Each company response is assigned to a branch of industry at the lowest level of the hierarchy<sup>4</sup> and is given an individual weight. In the manufacturing sector,

this is determined by the number of employees. The responses of larger companies are thus more important than those of smaller companies. For each industry branch with sufficient

<sup>3</sup> In the official terminology of the Federal Statistical Office, one-digit items are referred to as sections and two-digit items as divisions. The levels below are called groups, classes, and subclasses.

<sup>4</sup> The responses are made at the product level. As a result, a company usually reports on its main product or, in some cases, even answers several questionnaires for its various products. Thus, the answers can be more accurately assigned to the economic sectors.

answers,<sup>5</sup> a balance is formed from the shares of positive and negative responses. Subsequently, the balances are aggregated to the next higher level according to their gross value added share.<sup>6</sup> In the example in Figure 3, the results of the machine tool industry as well as for gearbox and gear manufacturers (plus the other subsectors of mechanical engineering) are included in the balance for the mechanical engineering sector. Finally, all balances at a two-digit level are also aggregated with a weighting relative to the gross value

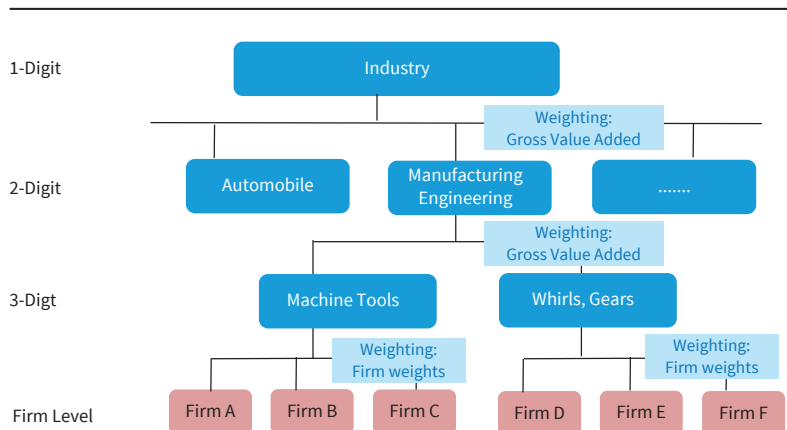
added shares to the total manufacturing sector.

Even though the aggregation displayed in the tree structure in Figure 3 may be intuitive, it has some practical disadvantages. The company panel in the ifo business surveys is not constant over time. Companies drop out and new ones are added. This also has an impact on the representation of individual economic sectors. First, in some areas there may be too few companies over time. The corresponding balances would then probably no longer be an accurate depiction of economic development. Balances based on fewer responses are more volatile than those with many responses. On the other hand, it is possible that the balance values have somewhat high (extreme) balance values such as +100.

<sup>5</sup> There is no definition of what is 'sufficient'. This depends on the sector of economic activity. In some cases, five companies have more than 80 percent market coverage, which would be sufficient to aggregate. In other areas, more companies have to be correspondingly gained.

<sup>6</sup> Vehicle construction in Germany, for example, has a significantly higher share of added value than, for example, the textile industry.

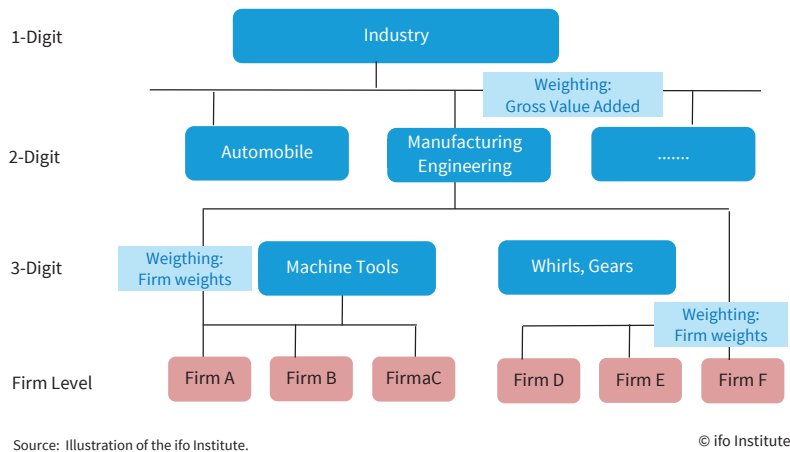
**Figure 3**  
Illustration Aggregation Scheme Valid up to March 2018



Source: Illustration of the ifo Institute.

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Figure 4  
Illustration Aggregation Scheme from April 2018



Source: Illustration of the ifo Institute.

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Table 3  
Correlations Between the New and the Old Aggregation

	Business climate	Business situation	Business expectations
Manufacturing	0.995	0.994	0.995
Construction	0.998	0.998	0.987
Wholesaling	0.957	0.955	0.931
Retailing	0.971	0.979	0.919
Services	0.979	0.982	0.971

Source: ifo business surveys; calculations of the ifo Institute.

There is thus the possibility that this will distort the upper aggregates as well. Another important aspect is that some responses cannot even be considered because there are not enough companies to form their own (sub) aggregate. Because of these problems, the aggregation requirements must be constantly examined and adjusted.

To alleviate these problems, a change is made in the allocation of the microdata for the calculation of balances, as illustrated in Figure 4. The most important difference is that balances from the

three-digit level are no longer used to calculate balances at the two-digit level. This means that all microdata allocated to mechanical engineering are directly included with their company weight in the balance calculation of mechanical engineering. This idea is also followed at the lower levels. All microdata, for example from the field of machine tools, are used in this way independently of further underlying four- or five-digit aggregates. This approach has the advantage that the maintenance of the aggregation scheme is easier and possible distortions from poorly filled sub-aggregates are minimised. In addition, all responses can be used at any time as they can be consistently assigned to a two-digit aggregate.

In the other economic sectors, the calculations are made as in the manufacturing sector. The aggregation method in the service industry, for example, was adapted in such a way that the responses flow directly with the company weight into the two-digit level. In distribution, the responses are now also grouped directly at the second-digit level. Only in determining the company weights are there differences between the individual sectors. Whereas in the construction industry the number of employees is used for this, in distribution and in the service sector the allocation of company weights is based on the respective annual sales.

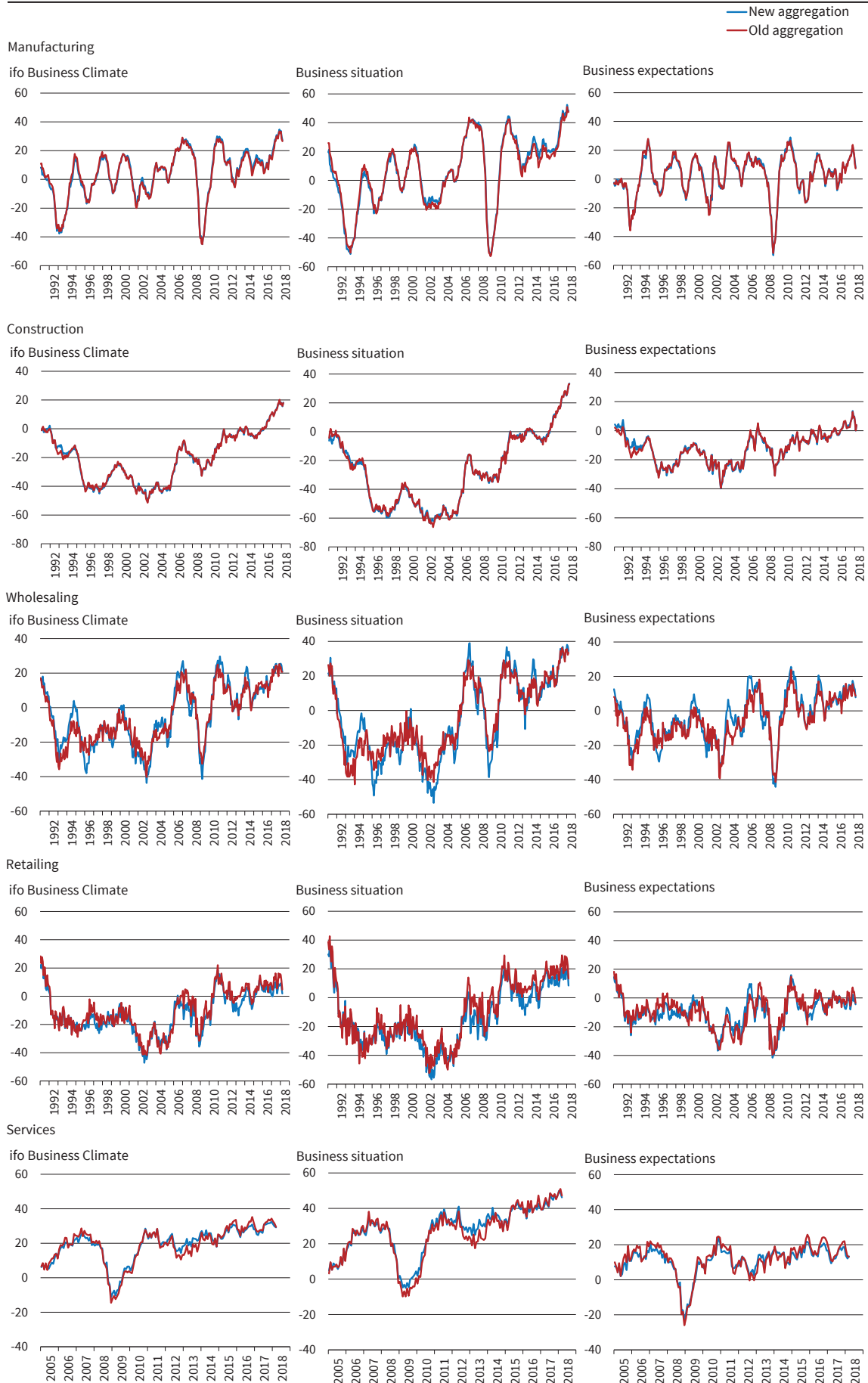
Table 4  
Comparison of the Volatility (Standard Deviation) of the New and Old Aggregation

	Level					
	Business climate		Business situation		Business expectations	
	old	new	old	new	old	new
Manufacturing	15.95	16.31	23.18	23.88	13.69	13.63
Construction	17.07	17.23	24.32	24.30	10.16	10.48
Wholesaling	15.98	17.62	20.83	23.12	12.53	13.66
Retailing	15.15	13.99	21.59	19.90	11.06	10.20
Services	10.67	9.64	14.47	13.25	9.28	8.02
	First monthly differences					
	Business climate		Business situation		Business expectations	
	old	new	old	new	old	new
Manufacturing	3.07	2.97	3.60	3.51	3.84	3.66
Construction	1.97	1.87	2.53	2.31	2.71	2.69
Wholesaling	4.30	3.97	5.68	5.21	5.03	4.16
Retailing	5.38	4.46	7.83	6.57	5.32	4.05
Services	3.08	2.67	4.27	3.58	4.19	3.39

Source: ifo business surveys; calculations of the ifo Institute.

Abb. 5

**Comparison of the Old and New Aggregation Scheme**  
Balances, seasonally adjusted



Source: ifo Business Surveys.

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## RECALCULATION OF ALL TIME SERIES FROM 1991

The above-described changes in the aggregation procedures necessitate that all time series created within the framework of the ifo business surveys must be recalculated retroactively from 1991 onwards. This applies not only to the most observed indicators such as the business climate, business situation and business expectations, but also to questions such as those about prices, production, exports, employment or inventories. As part of this recalculation, the microdata base was also adjusted. It happens every month that company responses arrive after the calculation of the different indicators and that they are thus not included in the survey results. These late responses, which typically account for less than one percent of total replies, are in the database and are now taken *ex-post* into consideration for the recalculation.

## COMPARISON OF THE TIME SERIES AFTER THE NEW AND OLD AGGREGATION PROCEDURES

Figure 5 shows the time series for each of the three main indicators (climate, situation and expectations) of the economic sectors according to old and new aggregation.

The results show that the recalculation changed very little in the basic runs of the time series, especially in the manufacturing sector and in the construction industry. In distribution, especially in wholesaling, the above-described change of the weighting method beginning at the two-digit level displayed somewhat larger changes. The time series are now much smoother, which enables clearer economic statements. Table 3 shows the correlations between the time series after the new and the old aggregation. The values are consistently very high and all greater than 0.91. For manufacturing and construction, the correlation is *de facto* 1.00. For the two distribution sectors, the correlations are somewhat lower, which is attributable to the lower volatility due to the new aggregation. All in all, this shows that the historically fundamental economic features have not changed. The reduction in the volatility of the time series already mentioned in relation to distribution, is confirmed by the standard deviation of the time series and their first difference, which are shown in Table 4. Also in the case of the service providers, volatility also falls significantly, especially in the case of monthly differences.

## CONCLUSIONS

This article describes the biggest changes to the ifo Business Climate Index in years. From April 2018 on, the proven 'ifo Business Climate Index for Industry and Trade in Germany' will be replaced by the 'ifo Business Climate for Germany'. The new index now includes service providers and thus represents an

even larger part of the German economy. The new business climate index is calculated with 2015 as the base year and available from 2005. The aggregation rules have also been partly redefined, whereby the basic method of calculation (balance methodology) remains unchanged. This simplifies the maintenance of the (sometimes deeply disaggregated) aggregation hierarchies and on the other hand reduces possible distortions in the calculations. This adjustment requires a recalculation of all time series that are formed within the ifo business surveys. The end effect is that the general economic forecasts and interpretations remain largely unchanged overall. The adjustment of the aggregation process has led to less volatility in many series, especially in distribution and the services, both of which now give clearer economic signals. In the near future, the ifo Institute will also publish a new handbook of ifo surveys and economic indicators (Sauer and Wohlrabe 2018), which will contain detailed information on all surveys of the ifo Institute and the indicators calculated from these surveys as well as their use in economic forecasts.

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