

German enterprises' profitability and financing during the 2022 energy crisis

The energy crisis and high-inflation environment impacted on non-financial enterprises' profitability in 2022. Materials costs soared as prices of intermediate goods and energy skyrocketed, while sales saw exceptionally robust growth. These developments left the pre-tax profit margin only slightly lower at 4.5%, but still well up on its long-term average. This would suggest that the in part huge cost increases have been largely passed on to customers.

Dramatic upticks in gas, electricity and crude oil prices in 2022 barely impacted on profitability in energy-intensive sectors. Only the chemicals and pharmaceutical industry saw net earnings shrink noticeably – albeit from a record level in the previous year. That industry and, to a limited extent, the wood, paper and printing industry, had a higher need for liquidity as well, but this was not detrimental to balance sheet stability. Overall, energy-intensive sectors coped well with the immediate financial fallout from the energy price shock at first.

The primary outcome for enterprises of the monetary policy tightening in 2022 was an increase in the cost of external funds and of servicing new liabilities. The staggered maturity profile of existing liabilities and the gradual increase in the key interest rate mean that the monetary policy impulse is being transmitted with something of a lag, and will only impact fully on enterprises' profitability and financing in 2023 and 2024. Germany's corporate sector is in good shape overall, in terms of its profitability, liquidity and stability, to rise to the challenges presented by the reversal of interest rates.

With the economy experiencing a bout of weakness, the energy crisis is likely to have greater effects on enterprises' costs in their 2023 annual financial statements than it did in 2022. The increased energy costs are still weighing primarily on energy-intensive industry. Moreover, output in export-driven parts of the economy, and thus above all manufacturing sales, is also suffering from lacklustre foreign demand. In addition, cost-side pressures are likely to remain intense owing to high wage settlements and increased funding costs across all sectors. On balance, these factors will probably weigh more heavily on enterprises' profitability in 2023.

■ Underlying trends

Catch-up effects mean German economy grew significantly in 2022 despite higher energy prices

The German economy shrugged off the critical developments in energy markets brought about by Russia's war of aggression against Ukraine and expanded significantly in 2022. Buoyed by catch-up effects, real gross domestic product grew by a calendar-adjusted 1.9% on the year. As the year progressed, however, activity deteriorated, particularly on the back of sharply higher energy prices. On balance, this left German economic output still lagging behind its medium-term aggregate production capacity in 2022. But the below-potential output level was due not to an absence of aggregate demand, but in part to a variety of supply-side disruptions. These were transitory in nature and did more to dampen supply than demand in many sectors, driving strong price increases. The Bundesbank's concept of potential output, by contrast, is geared to a medium-term horizon, which means that it has limited scope to capture short-term supply effects of that kind. What is more, subdued demand and considerable increases in energy costs left German exporters operating amid less favourable global conditions. With most pandemic restrictions being phased out, private consumption registered substantial gains, while business investment also rose significantly on the year. But even so, construction investment continued to decline owing to higher construction and funding costs. Fiscal policy remained supportive, though somewhat less so than in the previous two years on account of the gradual rollback of government coronavirus support measures, which were replaced in part by extensive new measures addressing the energy crisis and high inflation.

Gross profit margin in 2022 down slightly from high prior-year level

Judging by the annual financial statements we currently have on file, the 2022 pre-tax profit margin, at 4.5%, was slightly down on the previous year's very high 5.1%, but still well up on the long-term average.¹ Materials costs soared as prices of intermediate goods and energy skyrocketed. However, it would appear that the in part huge cost increases were largely passed

on to customers, with the result that corporate sales likewise saw exceptionally robust growth and profitability did not suffer unduly. Profits remained high in 2022, and this is likely to have played a not inconsiderable role in the inflation observed last year.² The cost of materials was not the only expense item that increased; personnel expenses were also driven higher by staff growth, strong wage rises and other factors.³ On the income side, other operating income saw significant growth, just as it had done in the previous two years.

With profitability still high and capital adequacy remaining sound, corporate insolvencies saw only a slight uptick in 2022 on a broad sectoral basis, leaving them at a very low level by historical standards. Corporate insolvencies had bottomed out in the previous year, partly on account of the temporary suspension, subject to certain conditions, of the requirement to file for insolvency.

Corporate insolvencies up slightly in 2022 from low level

■ Effects of the energy price shock

The energy price shock presented considerable challenges for energy-intensive manufacturing sectors in 2022, with the chemicals industry, manufacturers of glass and ceramic products, manufacturers of metals and the paper industry in particular coming under intense pres-

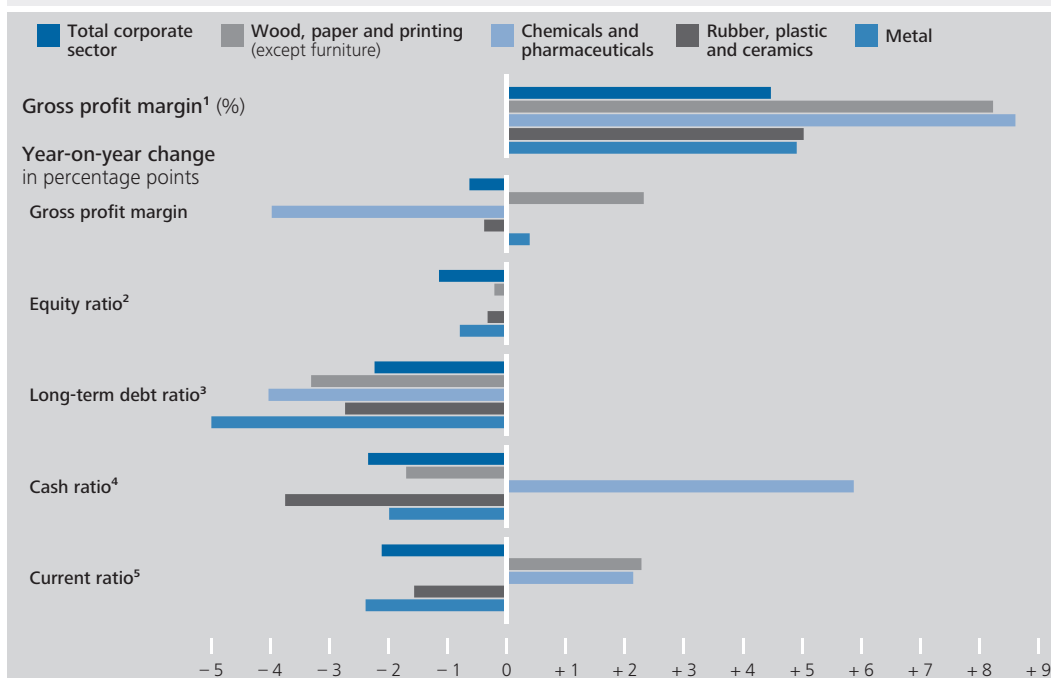
Energy-intensive industrial sectors see output decline as energy prices rise dramatically

¹ The analysis for 2022 is based on some 21,000 corporate annual financial statements, which were roughly extrapolated based on the evaluation of aggregate sales data from the business register.

² The gross profit margin was well above the long-term average in the hotel and restaurant sector, in the wood, paper and printing industry, construction, transportation and storage, and the electrical engineering industry in particular. Further information on the evolution of profit margins can be found in Deutsche Bundesbank (2023a).

³ The strong year-on-year increase in wages can be traced back in part to the decline in short-time work.

Profitability, liquidity and stability of the total German corporate sector and of energy-intensive economic sectors in 2022*



* Extrapolated results from corporate financial statement statistics. **1** Annual result before taxes/sales. **2** Equity/total assets. **3** Long-term liabilities/equity. **4** (Cash+short-term securities)/short-term liabilities. **5** (Cash+short-term securities+short-term receivables+inventories)/short-term liabilities.
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sure.⁴ Data from the Federal Statistical Office show that output in energy-intensive industries was down by around 7% on an annual average, with output at year-end even lagging almost one-fifth behind the previous year's level. This decline was particularly evident in the chemicals industry, while manufacturers of metals suffered somewhat smaller losses in output. The annual financial statements on file deliver key insights into how the energy crisis impacted on liquidity, stability and profitability in the corporate sector as a whole and in specific sectors.

pharmaceutical industry. Unlike in previous years of crisis, liquidity requirements did not generally increase, as firms chose to dip into the liquidity reserves they had set aside during the pandemic. The stability metrics exhibited broadly similar patterns as well, with the long-term debt ratio, amongst others, continuing to recede. The equity ratio was the only metric to deteriorate, mainly due to the soaring cost of intermediate inputs, which drove up the figure for trade payables, advance payments received on account of orders and, in some cases, liabilities to affiliated companies.

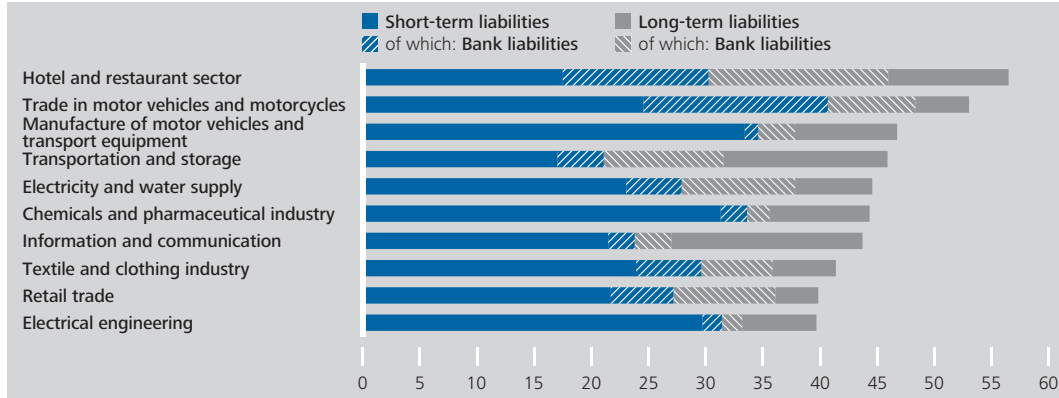
Aggregate-level liquidity and balance sheet stability barely impacted by energy crisis, ...

The energy crisis barely impacted on profitability and liquidity or solvency levels in the corporate sector in 2022. The cost of materials rose dramatically, in part due to higher energy costs, but profitability was hardly affected – probably, in first order, because the costs were largely passed on to customers.⁵ There was also an uptick in other operating income, chiefly on the back of one-off factors in the chemicals and

4 The manufacture of coke and refined petroleum products, which forms part of the manufacturing sector, is not reported separately in the annual financial statement statistics owing to the small number of firms. Besides some manufacturing sectors, the transportation sector also has a high level of energy intensity that is sourced almost exclusively from refined petroleum products, though German enterprises are likely to face fewer drawbacks in this area than international competitors.
5 See also Deutsche Bundesbank (2023b).

Interest-bearing liabilities in selected sectors in 2022*

As a percentage of total assets



* Extrapolated results from corporate financial statement statistics. Interest-bearing liabilities=liabilities–trade payables–advance payments received on account of orders. Chart shows the ten sectors with the highest value of interest-bearing liabilities as a percentage of total assets.

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... with energy-intensive industries likewise barely impacted in this regard

Extrapolated data from the corporate annual financial statement statistics can also be used to draw conclusions about developments in energy-intensive industrial sectors.⁶ As expected, materials costs rose more strongly in energy-intensive sectors than elsewhere in the corporate sector. The chemicals and pharmaceutical industry, which operates in a fiercely competitive international environment, appears to have had less scope to hike prices than other sectors. So although this sector saw its other operating income increase significantly, the gross profit margin was 4 percentage points down on the previous year's record level. However, this is likely to have been due, at least in part, to the pharmaceutical industry's profits returning to normal levels after the boost they had been given by the coronavirus pandemic. Despite the decline, sector profitability was close to its long-term average. The general patterns shown by liquidity and stability metrics were also reflected to a large degree in energy-intensive sectors. Only the chemicals and pharmaceutical industry and, to a limited extent, the wood, paper and printing industry saw their liquidity requirements increase.

Adjustment still needed in medium term

Energy-intensive sectors thus coped well, for the most part, with the direct financial impact of the energy price shock.⁷ Declines in energy prices plus action to cap businesses' gas and

electricity prices will probably make a further contribution this year. But even so, the increased energy costs are dragging on Germany's corporate sector. With energy prices likely to remain permanently higher than both pre-energy-crisis levels and prices in other large economic areas like the United States, Bundesbank estimates suggest that they will continue to noticeably dampen the German economy's potential output in the coming years.⁸

Corporate sector stable before interest rate reversal began

Against a backdrop of high inflation rates and increased inflation expectations, the European Central Bank (ECB) began to tighten its monetary policy stance in 2022. Net asset purchases under the pandemic emergency purchase programme (PEPP) and the asset purchase programme (APP) were discontinued as of the end

Monetary policy tightening drove up cost of external funds and of servicing new liabilities

⁶ Under the proviso that the definition of energy-intensive sectors relates to sectoral aggregates that also include other (non-energy-intensive) sectors. The extrapolated data for 2022, however, show that energy-intensive industrial sectors accounted for between around four-tenths and three-quarters of the respective sectoral aggregates.

⁷ See also simulations of the impact of energy price increases on the corporate sector in Deutsche Bundesbank (2023c).

⁸ See Deutsche Bundesbank (2022).

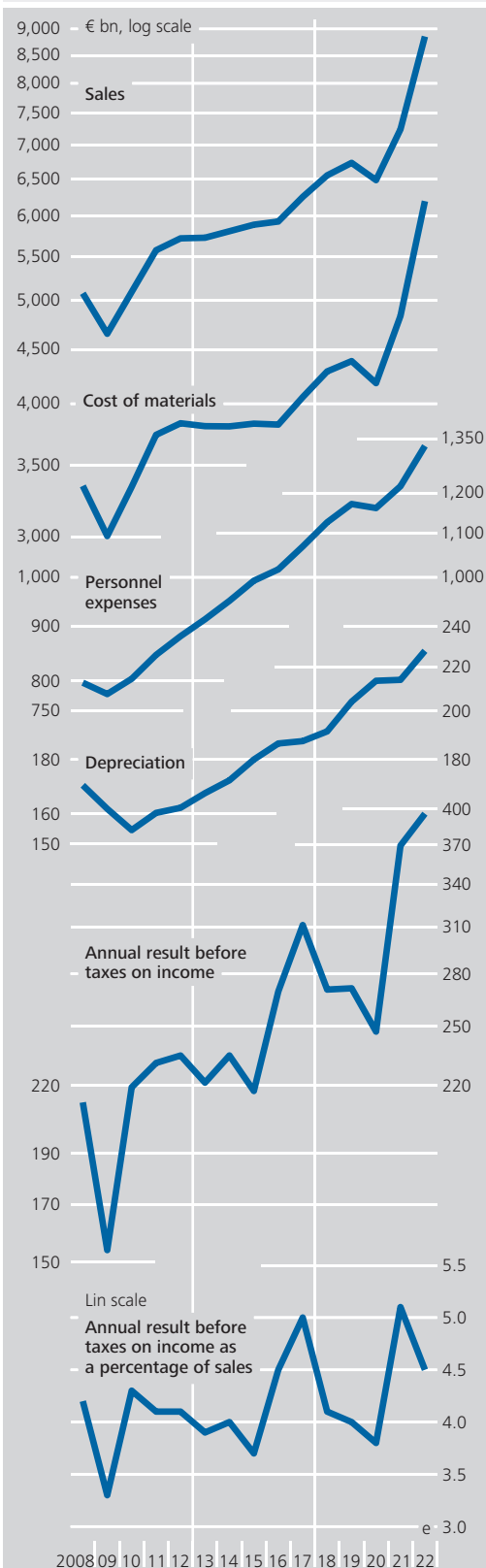
f March 2022 and the end of June 2022, respectively. The interest rate decision of 21 July 2022 set the reversal of interest rates in motion, with the monetary policy deposit facility rate gradually increasing from -0.5% to 2% at year-end 2022 and to 4% by 20 September 2023. These interest rates had been very low since the 2008-09 economic and financial crisis. The primary outcome of the monetary policy tightening for enterprises is an increase in the cost of external funds and of servicing new liabilities. Taken in isolation, this narrows the scope for investment. How the interest rate reversal impacts on enterprises' financing structure depends primarily on the ratio of liabilities to equity, the maturity profile of existing debt, and the extent to which enterprises can service interest costs out of their current receipts or liquidity reserves.

Two-thirds of interest rate hike likely to be passed on to enterprises within a year as existing liabilities are rolled over

The interest rate channel ranks as the key transmission channel of monetary policy. The pass-through of interest rates by banks to enterprises is of crucial importance, especially in Germany's bank-based financial system. The pace and degree of this transmission depends on the maturity structure of liabilities and the importance of bank liabilities. Interest-bearing short-term liabilities maturing in less than one year accounted for 27% of total assets in the reporting year, and long-term liabilities (maturing in over one year) for 13%.⁹ Viewed through the lens of enterprises' capital structure, it therefore stands to reason that around two-thirds of the interest rate hike will be passed through to enterprises within the space of a year when existing liabilities are renewed at the new interest rate conditions. Sectors such as trade in motor vehicles and motorcycles, motor vehicle manufacturers and the chemicals and pharmaceutical industry, which have a higher share of interest-bearing short-term liabilities, may thus feel the impact of the interest rate reversal sooner.

⁹ Interest-bearing short-term liabilities are short-term liabilities excluding trade payables as well as advance payments received on account of orders, which typically do not entail interest expenditure.

Indicators from German enterprises' income statement*



* Extrapolated results from corporate financial statement statistics.
 Deutsche Bundesbank

Enterprises' income statement*

Item	2020	2021	2022 ^e	Year-on-year change	
				2021	2022 ^e
Income	€ billion			%	
Sales	6,489.2	7,243.2	8,853.7	11.6	22.2
Change in finished goods ¹	3.9	86.6	117.6	2,097.4	35.8
Gross revenue	6,493.1	7,329.8	8,971.3	12.9	22.4
Interest and similar income	17.0	17.5	21.6	2.9	23.2
Other income ²	294.3	333.2	358.9	13.2	7.7
of which: from other long-term equity investments	54.4	58.8	59.3	8.1	0.8
Total income	6,804.4	7,680.5	9,351.8	12.9	21.8
Expenses					
Cost of materials	4,182.9	4,837.6	6,200.8	15.7	28.2
Personnel expenses	1,161.7	1,217.8	1,328.7	4.8	9.1
Depreciation	213.4	213.8	227.7	0.2	6.5
of tangible fixed assets ³	189.6	191.2	197.3	0.8	3.2
Other ⁴	23.8	22.6	30.3	- 4.9	34.3
Interest and similar expenses	69.7	64.2	77.9	- 7.9	21.2
Operating taxes	4.6	4.9	4.5	7.8	- 7.7
Other expenses ⁵	925.2	972.7	1,116.4	5.1	14.8
Total expenses before taxes on income	6,557.4	7,311.0	8,956.0	11.5	22.5
Annual result before taxes on income	247.0	369.4	395.8	49.5	7.1
Taxes on income ⁶	56.8	76.8	90.7	35.3	18.1
Annual result	190.3	292.6	305.1	53.8	4.3
Memo items:					
Cash flow ⁷	461.4	600.7	639.2	30.2	6.4
Net interest paid	52.7	46.7	56.3	- 11.3	20.4
	As a percentage of sales			Percentage points	
Gross income ⁸	35.6	34.4	31.3	- 1.2	- 3.1
Annual result	2.9	4.0	3.4	1.1	- 0.6
Annual result before taxes on income	3.8	5.1	4.5	1.3	- 0.6
Net interest paid	0.8	0.6	0.6	- 0.2	0.0

* Extrapolated results; differences in the figures due to rounding. **1** Including other own work capitalised. **2** Excluding income from profit transfers (parent company) and loss transfers (subsidiary). **3** Including write-downs of intangible fixed assets. **4** Predominantly write-downs of receivables, securities and other long-term equity investments. **5** Excluding cost of loss transfers (parent company) and profit transfers (subsidiary). **6** In the case of partnerships and sole proprietorships, trade earnings tax only. **7** Annual result, depreciation, and changes in provisions, in the special tax-allowable reserve and in prepaid expenses and deferred income. **8** Gross revenue less cost of materials.

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Enterprises' bank debt declining in importance

In the case of liabilities to banks in particular, the monetary policy impulse could be passed on relatively directly in the form of interest rate spreads. Bank debt as a percentage of total assets, which has declined significantly over the past two decades, only came to around 10% in the reporting year. Hence, the percentage of liabilities to affiliated companies was higher, at just over 23% of total assets. Viewed from this angle, the hotel and restaurant sector, trade in motor vehicles and motorcycles, the energy sector, transportation and storage, and the retail trade – all sectors with an above average ratio of bank liabilities to total assets – could be

affected particularly strongly by the interest rate reversal.

All in all, Germany's total corporate sector is in good shape overall, in terms of its profitability, liquidity and stability, to rise to the challenges presented by the reversal of interest rates. In addition, some enterprises are likely to benefit in the coming years from relief on the pension obligations front as the interest rate used for discounting purposes notches up again. Even so, mounting interest costs in the years ahead can be expected to erode profits at most enterprises and significantly increase the cost of capital expenditure and debt servicing.

Corporate sector well placed to meet challenges posed by interest rate reversal

Enterprises' sources and uses of funds*					
€ billion					
Item	2020	2021	2022 ^e	Year-on-year change	
				2021	2022 ^e
Sources of funds					
Capital increase from profits and contributions to the capital of non-corporations ¹	21.2	91.4	92.9	70.2	1.5
Depreciation (total)	213.4	213.8	227.7	0.4	13.9
Increase in provisions ²	57.8	94.2	106.3	36.4	12.0
Internal funds	292.4	399.5	426.9	107.0	27.4
Increase in capital of corporations ³	24.4	61.3	29.2	36.9	- 32.1
Change in liabilities	89.0	271.7	414.9	182.7	143.2
Short-term	- 14.3	288.9	401.1	303.2	112.2
Long-term	103.2	- 17.2	13.9	- 120.4	31.1
External funds	113.4	333.0	444.1	219.7	111.1
Total	405.8	732.5	871.0	326.7	138.5
Uses of funds					
Increase in tangible fixed assets (gross)	220.8	240.8	267.4	20.1	26.5
Increase in tangible fixed assets (net) ⁴	31.2	49.6	70.1	18.5	20.4
Depreciation of tangible fixed assets	189.6	191.2	197.3	1.6	6.1
Change in inventories	- 18.8	140.7	206.1	159.5	65.4
Non-financial asset formation (gross investments)	202.0	381.5	473.5	179.6	92.0
Change in cash	89.3	40.1	22.8	- 49.3	- 17.3
Change in receivables ⁵	36.8	221.5	283.1	184.7	61.6
Short-term	50.0	232.6	268.4	182.6	35.8
Long-term	- 13.2	- 11.2	14.7	2.0	25.8
Acquisition of securities	15.2	8.3	14.1	- 6.9	5.8
Acquisition of other long-term equity investments ⁶	62.5	81.1	77.6	18.6	- 3.6
Financial asset formation	203.8	351.0	397.5	147.1	46.5
Total	405.8	732.5	871.0	326.7	138.5
Memo item:					
Internal funds as a percentage of gross investments	144.8	104.7	90.2	.	.

* Extrapolated results; differences in the figures due to rounding. **1** Including "GmbH und Co. KG" and similar legal forms. **2** Including change in the balance of prepaid expenses and deferred income. **3** Increase in nominal capital through the issue of shares and transfers to capital reserves. **4** Change in tangible fixed assets (including intangible assets but excluding goodwill). **5** Including unusual write-downs of current assets. **6** Including change in goodwill.

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Sales and income

Sales growth exceptionally strong, mainly on the back of price effects and more post-pandemic catch-up effects

Non-financial enterprises' sales saw exceptionally strong growth in 2022, significantly surpassing even the rate of growth registered in 2021, which had previously been the strongest increase observed since records began back in 1997. Two factors will probably have been at play here: the continued impact of post-pandemic catch-up effects, and the fact that higher prices played a more significant role in the increase in sales than volume growth, as was the case in the previous year.¹⁰ Sales prices of goods and services rose considerably and even more strongly than in the previous year.

The onset of the interest rate reversal also pushed interest income significantly higher. Other operating income rose sharply, just as it had done in the crisis year of 2020, and remained at a high level relative to sales. Developments at enterprises from the chemicals and pharmaceutical industry and transport equipment manufacturers accounted for much of this.

Sales rose robustly in all sectors. Once again, the strongest sales growth was recorded by en-

¹⁰ Profitability and financing conditions in 2021 are presented in Deutsche Bundesbank (2023d).

Enterprises' balance sheet*

Item	2020	2021	2022 ^e	Year-on-year change	
				2021	2022 ^e
Assets	€ billion			%	
Intangible fixed assets ¹	82.4	83.7	84.4	1.6	0.7
Tangible fixed assets	1,237.9	1,286.2	1,355.6	3.9	5.4
Inventories	800.7	941.3	1,147.5	17.6	21.9
Non-financial assets	2,120.9	2,311.3	2,587.4	9.0	11.9
Cash	444.9	485.0	507.8	9.0	4.7
Receivables	1,664.9	1,881.4	2,160.3	13.0	14.8
of which:					
Trade receivables	441.8	521.7	592.7	18.1	13.6
Receivables from affiliated companies	1,009.8	1,091.7	1,252.2	8.1	14.7
Securities	106.8	115.1	129.2	7.8	12.2
Other long-term equity investments ²	1,028.5	1,092.0	1,143.4	6.2	4.7
Prepaid expenses	26.5	39.3	38.8	47.9	- 1.1
Financial assets	3,271.7	3,612.8	3,979.5	10.4	10.2
Total assets ³	5,392.6	5,924.0	6,567.0	9.9	10.9
Capital					
Equity ³	1,664.9	1,817.7	1,939.8	9.2	6.7
Liabilities	2,874.0	3,145.7	3,560.6	9.5	13.2
of which:					
to banks	597.3	595.7	663.5	- 0.3	11.4
Trade payables	345.8	415.4	495.6	20.1	19.3
to affiliated companies	1,275.4	1,360.8	1,541.8	6.7	13.3
Advance payments received on account of orders	292.9	349.8	412.0	19.4	17.8
Provisions	805.8	898.8	1,001.6	11.5	11.4
of which:					
Provisions for pensions	294.4	318.6	362.6	8.2	13.8
Deferred income	48.0	61.9	64.9	29.1	4.9
Liabilities and provisions	3,727.7	4,106.4	4,627.2	10.2	12.7
Total capital ³	5,392.6	5,924.0	6,567.0	9.9	10.9
Memo items:					
Sales	6,489.2	7,243.2	8,853.7	11.6	22.2
Sales as a percentage of total assets	120.3	122.3	134.8	.	.

* Extrapolated results; differences in the figures due to rounding. ¹ Excluding goodwill. ² Including shares in affiliated companies and goodwill. ³ Less adjustments to equity.

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Sales growth strong in all sectors

ergy companies owing to the significantly increased energy prices brought on by the energy crisis. The hotel and restaurant sector recorded the second-highest increase in sales. With pandemic-related restrictions still in force in 2021, the post-pandemic catch-up process in the hotel and restaurant sector only began in 2022. The strong increases in food prices are also likely to have played a part in the higher sales numbers. Other services sectors, such as transportation and storage, wholesale trade and business service providers, also saw their sales grow considerably. Within the manufacturing sector, sales grew most strongly in the metal industry, the wood, paper and printing

industry, and the food industry. These are also industrial and services sectors in which price increases are likely to have played a significant role.

Non-financial enterprises' profits remained at a high, stable level in 2022 in spite of the immediate impact of the energy crisis. As overall expenditure rose roughly as strongly as income, the annual result before taxes was more or less the same as it had been in the previous year, which would suggest that enterprises largely passed on the increased costs to customers. The strong uptick in spending on materials was driven primarily by a sizeable increase in the

Profits still high, partly thanks to cost pass-through

prices of intermediate goods and energy, while personnel expenses also rose sharply as a result of staff growth, strong wage increases and increased pension provisions.¹¹ Interest expenditure rose considerably as well, probably on the back of the increased funding costs brought about by the monetary policy interest rate reversal in combination with the additional provisions set aside for pension obligations.¹² Other expenses also increased considerably, in line with the strong sales growth.

■ Sources and uses of funds

Sources and uses of funds still at very high level

On the revenue side, the large volume of additional funds was sourced internally and externally in roughly equal parts. Internal financing increased as a result of depreciation and transfers to provisions. External financing grew mainly owing to the considerable expansion of short-term liabilities. In contrast to the previous year, however, long-term liabilities were likewise built up again. Looking at the uses of funds, expenditure on non-financial assets increased sharply again as a result of strong stockpiling. Growth in tangible fixed assets accelerated further and was actually significantly greater than in the pre-crisis year of 2019. As in the previous year, the bulk of the sharp increase in financial asset formation came from the acquisition of additional short-term receivables. The build-up of liquidity in the form of cash moderated somewhat again.

■ Balance sheet developments

Share of financial assets in total assets down slightly; build-up also of long-term receivables

In line with the high sales growth, the total assets of non-financial enterprises expanded considerably in 2022. As with sales, the increase in total assets, at 10.9%, was larger than in the previous record year, 2021. In addition to the effects of the energy crisis, rebound effects after the crisis year of 2020 are likely still to have been a factor in some cases. On the assets side, the share of financial assets in total assets fell slightly. Following the decline in the two

Enterprises' balance sheet ratios*

Item	2020	2021	2022 ^e
	As a percentage of total assets ¹		
Intangible fixed assets ²	1.5	1.4	1.3
Tangible fixed assets	23.0	21.7	20.6
Inventories	14.8	15.9	17.5
Short-term receivables	27.5	28.9	30.1
Long-term equity and liabilities ³	52.5	50.4	48.3
of which:			
Equity ¹	30.9	30.7	29.5
Long-term liabilities	16.1	14.4	13.2
Short-term liabilities	37.2	38.7	41.0
	As a percentage of tangible fixed assets ⁴		
Equity ¹	126.1	132.7	134.7
Long-term equity and liabilities ³	214.3	218.2	220.1
	As a percentage of fixed assets ⁵		
Long-term equity and liabilities ³	109.1	110.8	111.6
	As a percentage of short-term liabilities		
Cash resources ⁶ and short-term receivables	98.4	97.9	94.3
	As a percentage of liabilities and provisions ⁷		
Cash flow ⁸	14.1	16.6	15.5

* Extrapolated results; differences in the figures due to rounding. **1** Less adjustments to equity. **2** Excluding goodwill. **3** Equity, provisions for pensions, long-term liabilities and the special tax-allowable reserve. **4** Including intangible fixed assets (excluding goodwill). **5** Tangible fixed assets, intangible fixed assets, other long-term equity investments, long-term receivables and long-term securities. **6** Cash and short-term securities. **7** Liabilities, provisions, deferred income and proportionate special tax-allowable reserve less cash. **8** Annual result, depreciation, and changes in provisions, in the special tax-allowable reserve and in prepaid expenses and deferred income.

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11 The strong uptick in recognised pension provisions in 2022 is largely due to the sharp decline in the fair values of assets offset against pension obligations (pursuant to Section 246(2) sentence 2 of the German Commercial Code (*Handelsgesetzbuch*)). Overall, the weak bond and equity markets in 2022 could be partly responsible for the decline in fair values. The post-employment benefit obligations themselves, by contrast, saw only moderate growth in 2022 by historical standards. Some of the strong year-on-year increase in wages can be traced back to the decline in short-time work. **12** Section 253(2) of the Commercial Code requires provisions for post-employment benefit obligations with a residual maturity of more than one year to be discounted at the average market interest rate of the past ten financial years according to their residual maturity. Because of this averaging, the strong rise in central bank interest rates only has a lagged effect on the discount rate and thus on enterprises' pension provisions. In fact, the discount rate applied under the Commercial Code fell slightly, dropping from 1.87% as at 31 December 2021 to 1.78% as at year-end 2022. As a result, the monetary policy reversal is only likely to be a source of relief in future periods.

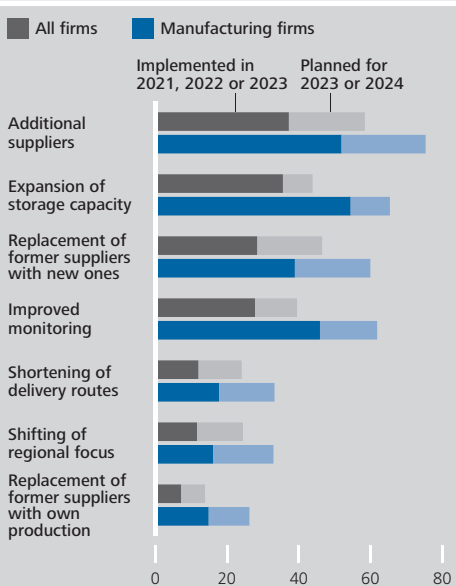
Adjustments to the international supply chains of German firms and impact on their production costs

In the wake of the coronavirus pandemic and the Russian war of aggression against Ukraine, disruptions to international supply chains became a widespread phenomenon, affecting numerous economic sectors and countries. There has also been an increase in protectionist measures and geopolitical tensions in the recent past, particularly between China and western countries.¹ According to existing surveys, firms have responded to these developments by introducing measures to strengthen the resilience of their supply chains.² However, there is still little insight into the impact of these initiatives on production costs. Cost increases and their pass-through to customers also determine how firms' profitability and sales prices develop.

In the Bundesbank Online Panel – Firms (BOP-F) conducted in the third quarter of 2023, the Bundesbank asked around 8,400 firms about their international supply chains, measures to restructure them and the associated costs. According to this survey, around 50% of firms obtained products via international supply routes.³ When asked about the most significant regions for global supply relationships, around 90% of the firms named the EU (excluding Germany), 40% China, and just under 25% the rest of Europe (i.e. excluding the EU).⁴ On the one hand, these responses indicate the key role played by the European single market for the cross-border supply chains of German firms. On the other, they show the significance of China, which is, moreover, somewhat more pronounced still in the manufacturing sector.⁵

Measures to improve the reliability of German firms' supply chains*

Responses (%)



Source: Bundesbank calculations based on BOP-F survey in Q3 2023. Representative data based on 4,350 firms (including 1,366 industrial firms). * Question: Has your enterprise implemented one or more of the following measures to improve the reliability of its supply chains, or is it planning to do so?
 Deutsche Bundesbank

Almost 60% of firms have introduced at least one measure since 2021 to improve the reliability of their international supply chains.⁶ The most important measures here were the expansion of supply networks through additional suppliers, the expansion of storage capacity, the replacement of former suppliers with new ones and improved monitoring of supply chains. In addition,

1 See Deutsche Bundesbank (2023e).
 2 According to a survey carried out by the ifo Institute in July 2022, almost 90% of German manufacturing firms initiated measures to adjust their supply chains following the outbreak of the coronavirus pandemic; see Aksoy et al. (2022).
 3 The following analysis relates to firms with international supply chains.
 4 Other regions named included Asia excluding China (17%), North America (11%) and other regions (5%).
 5 For more on the importance of China as a supplier of key intermediate goods, see Deutsche Bundesbank (2023f).
 6 Just under 30% of firms introduced three or more measures.

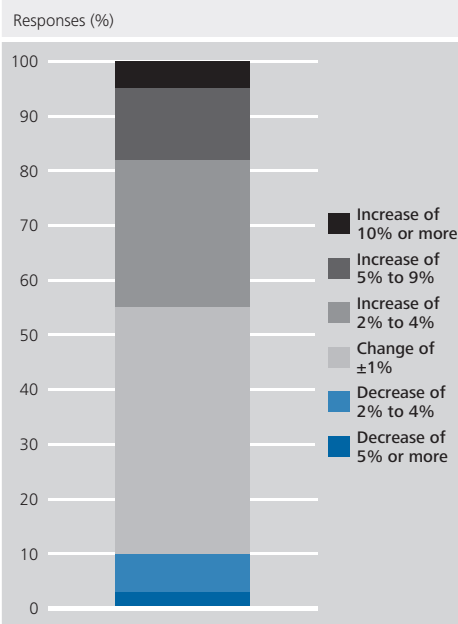
around 40% of firms planned to introduce further measures by the end of the coming year. Shorter delivery routes and a shift in the regional focus among current suppliers are also expected to play an important role here. The proportion of firms that have already implemented measures and intend to do so in the future is highest in the manufacturing sector. Furthermore, manufacturing firms typically took more measures than firms active in other sectors.

It is also worth noting that firms for which China played a key role in international supply chains implemented more measures or planned to do so in the near future than firms with a supply chain focus on the EU (excluding Germany). This is consistent with the results of another survey conducted in the second quarter of this year, according to which some firms sourcing critical inputs from China are switching to alternative supply sources.⁷

It is therefore clear that German firms are attempting to make their supply relationships more reliable. In all likelihood, these measures are also having an impact on the production costs of firms.⁸ According to the survey, 45% of German firms anticipate cost increases as a result of supply chain adjustments. Almost one-fifth of these firms expect these measures to increase their production costs – not insignificantly – by 5% or more. Firms tend to expect the highest cost increases for measures that significantly change the structure of their supplier network (shift of regional focus, replacement of former suppliers with new ones). In contrast, just over two-fifths of firms do not expect the measures to have any impact on their production costs. In addition, almost one in ten firms expect certain cost savings.

A rough estimate based on the firms' responses about the measures already imple-

Impact of supply chain changes on German firms' production costs*



Source: Bundesbank calculations based on BOP-F survey in Q3 2023. Representative data based on 3,472 firms. * Question: What impact do you expect the supply chain improvement measures you selected to have on your enterprise's production costs?

Deutsche Bundesbank

mented since 2021 suggests average cost increases of around 2% in the period from 2021 onwards.⁹ According to this estimate, the additional measures planned for implementation by the end of 2024 will lead to cost increases of another 2%. Any further adjustments to supply chains after 2024 could thus result in even more cost increases.

⁷ See Deutsche Bundesbank (2023f).

⁸ For example, costs can arise through the construction or rental of warehousing premises and warehouse staff. In addition, the establishment of new supply relationships can involve higher expenses for searching and coordination. Although shorter delivery routes can reduce transport costs, this may also mean moving away from the most cost-efficient suppliers. On the other hand, diversified supply relationships can also reduce procurement costs by alleviating the effects of supply chain disruptions, which can lead to short-term cost increases or production losses. Diversification can also increase competition among suppliers, which can likewise have a cost-cutting impact in the long term; see Schiersch et al. (2023).

⁹ If firm size is taken into account in the calculation by weighting by turnover, the cost increases work out somewhat smaller at 1.5%.

In the manufacturing sector, around 40% of firms anticipate a rise in production costs. Moreover, smaller firms tend to expect cost increases more often than larger firms. The regional focus of supply chains also has an impact on expected changes in production costs. Firms with a regional focus on China are more likely to assume that the restructuring of supply chains will lead to cost increases and that these will be comparatively high. Overall, the survey results suggest that, in a changing international environment, firms are placing greater emphasis on resilience – albeit at some additional cost – when weighing up between the efficiency and resilience of supply chains.¹⁰

10 One factor in this changing environment could be that supply chain disruptions are more systemic than in the past, as they have recently affected several countries and products simultaneously and had a longer-lasting effect; see Baldwin et al. (2023).

previous years, long-term receivables were also built up again in 2022, though they did not yet reach pre-pandemic levels. There was growth in both long-term receivables from affiliated companies and other loans and long-term financial assets. In line with the high sales growth, there was another significant rise in trade receivables. Short-term receivables from affiliated companies also recorded a considerable increase. The sizeable growth in other receivables and other assets was mostly driven by developments at enterprises in the energy and manufacture of transport equipment sectors. Securities also rose sharply. Unlike in the two previous years, efforts to conserve liquidity seemed to play a fairly minor role. For example, the increase in the cash item slowed, and more long-term securities were also purchased.

Stockpiling drives non-financial assets sharply higher

As in the previous year, the strong build-up of inventories was the main factor driving the increase in non-financial assets in 2022. In 2020, they had been scaled back in a bid to conserve

liquidity, partly in response to the crisis. Stockpiling was again broadly spread across sectors. Besides the ongoing economic recovery and price effects, efforts to make value chains more resilient may have been a factor here in some cases (see the box on pp. 64 ff.). Tangible fixed assets rose sharply, having already grown perceptibly again in the previous year. By contrast, intangible fixed assets, which include digital goods such as software, databases or patents, barely increased.¹³ The sharp rise in intangible fixed assets in the manufacture of transport equipment sector was offset by a decline in the chemicals and pharmaceutical industry.

The equity ratio of non-financial enterprises declined slightly on average across all sectors in 2022, but remained at a high level. That ratio

Equity ratio down slightly but still at a high level

13 According to the Commercial Code, intangible fixed assets include, amongst other things, internally generated industrial rights and similar rights and assets, purchased concessions, industrial and similar rights and assets, and licences in such rights.

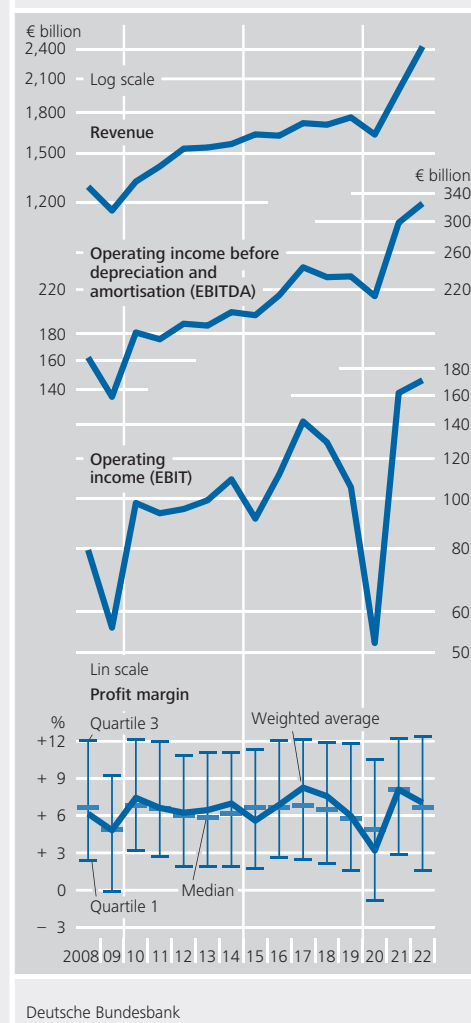
Profitability and financial position of German listed groups in 2022 and an outlook for 2023

German non-financial listed groups recorded a decline in their profit margin in 2022.¹ Price developments meant that revenue growth significantly outpaced the rise in profits. Equity increased markedly, including as a proportion of total assets. Estimates for 2023 point to a slight fall in revenues and a further decline in the profit margin.

Revenues recorded another strong rise of 21% in 2022.² Driving factors here were price effects and the weaker euro, which increased group revenues generated in foreign currencies and converted into euro. Overall, these two effects considerably overcompensated for the declining sales volumes reported by a number of groups. As prices also increased on the operating cost side, revenue growth only partially fed through into groups' earnings. Operating income before depreciation and amortisation (EBITDA) and operating income (EBIT) increased by 8% and 4%, respectively. As a consequence, the profit margin declined from its near-record level of 8.1% in 2021 to 7.0%. However, this figure remains above the long-term average since 2007.³ At the sector level, a decline was evident in the profit margin of the production sector,

namely from 7.5% to 6.0%.⁴ A significant portion of this decline was attributable to the losses of energy companies. These deficits were the result of the additional cost of procuring energy to make up for the cessation of Russian energy supplies, along with valuation effects in connection with transactions to hedge against price risks. In the services sector, the profit margin increased from 10.5% to 11.3%, buoyed by the recovery of the aviation industry and high freight rates in the logistics sector.

Revenue, earnings and profit margin of German non-financial groups



¹ The reporting population comprises around 230 non-financial groups admitted for trading on the Prime Standard segment of the Frankfurt Stock Exchange (excluding real estate activities) that publish quarterly or half-yearly IFRS consolidated financial statements and make a meaningful contribution to value creation in Germany. Information on the profitability and financial position of non-financial groups from other European countries can be found in the publications of the Working Group on European Records of IFRS Consolidated Accounts (ERICA WG) at <https://www.eccbso.org/wba/publications#listEI2>

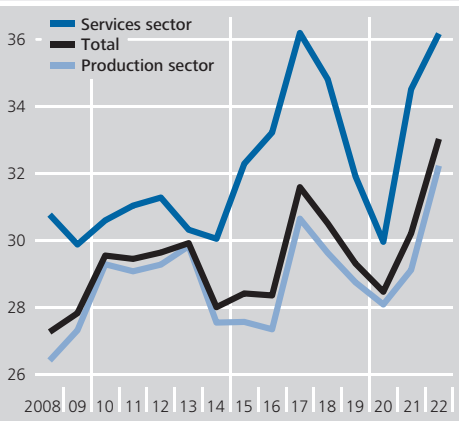
² The rates of change for the profit margin, revenue, EBITDA and EBIT are published with reporting and consolidation basis adjustments.

³ The profit margin is defined as EBIT as a percentage of revenue.

⁴ Groups from the production sector account for around 80% of total revenue reflected in the statistics.

Equity of German non-financial groups

As a percentage of total assets



Deutsche Bundesbank

Groups' assets grew by 4% in 2022, with the build-up of inventories in the production sector contributing almost 40% of this increase. On the one hand, the general rise in prices caused the value of inventories to go up. On the other, there was also a volume effect at work. This was the result of higher raw material and intermediate product inventories as well as inventory increases in finished products and goods earmarked for delivery. Groups' cash and cash equivalents declined by 7%. However, the 2022 figure for this item was still significantly higher than the levels recorded in the years prior to the onset of the coronavirus pandemic in 2020. Intangible and tangible fixed assets, which each accounted for more than one-fifth of groups' assets, grew by 5% and 4%, respectively.

On the financing side, short-term and long-term liabilities in 2022 were almost unchanged on the year. At the same time, trade payables rose by 15%, with three-quarters of all groups recording an increase in this balance sheet item. This expansion was more or less offset by a decline in short-term financial debt. In the long-term sphere, energy companies reported marked rises in derivative liabilities. These were the result of developments in transactions to

hedge against commodity price risks. A significant fall in groups' pension obligations overall due to the rising reference interest rate had a mitigating effect. The resulting liability shift together with the high level of retained earnings largely explains the 14% rise in equity capital. The equity ratio increased strongly, climbing by 2.8 percentage points to 33%. Both equity capital and the equity ratio rose significantly more in the production sector than among service providers. Notable factors here included special effects from transactions involving subsidiaries in the automotive industry and relating to the fair value of derivatives of energy companies.

According to estimates based on the financial statements of the largest groups in the reporting population for the first three quarters of 2023, revenues recorded a slight year-on-year decline and pre-tax profits a marked decline. This would suggest that a further fall in the profit margin is likely for 2023.⁵ Viewed at the sector level, the picture that emerges is mixed. In the production sector, the automotive industry recorded higher delivery volumes and revenues thanks to the growing global market, but, due to higher costs (amongst other things), this has not fed through into rising pre-tax profits.⁶ Revenue increases here were offset by revenue declines in both the chemicals sector and amongst energy companies. The chemicals sector reported declines in both demand and prices in a challenging economic environment. The fall in energy prices – from the very high values recorded in 2022 – and attempts to save energy by end users had the effect of reducing the revenues of energy companies. In summary, the revenues of the production

⁵ Profit margin is defined here as the revenue-weighted ratio of the annual result before taxes on income to revenue.

⁶ In addition, the pre-tax profit of the automotive industry in 2022 was boosted by a one-off effect relating to the consolidation of subsidiaries.

sector can be expected to stagnate and its pre-tax profits to fall. In the services sector, both revenues and pre-tax profits could decline noticeably. The logistics sector, which was a driver of the strong rises of previous years, experienced weaker demand and a considerable decline in freight rates.

The profitability of groups as an indicator of the picture for individual enterprises should be viewed with a degree of caution, as the former is essentially subject to greater fluctuations. Unlike the single-entity financial statements, which primarily paint a picture of business in Germany, consolidated financial statements reflect above all the development of the global economy and the domestic economic parameters of the countries in which the respective subsidiaries are located.⁷

Annual result before taxes on income

As a percentage of revenue



Deutsche Bundesbank

⁷ Furthermore, the metrics derived from the financial statements are materially shaped by differences between the accounting standards applied (German GAAP for corporate financial statement statistics (single-entity), IFRS for consolidated financial statement statistics).

fell most sharply in the manufacture of transport equipment, energy supply and mechanical engineering sectors. In most sectors, there was an increase in the volume of equity, but this was, overall, outpaced by the growth in liabilities and provisions. Equity declined noticeably only in the manufacture of transport equipment sector, while it largely stagnated in the information and communication sector.

ities to banks also increased considerably. By contrast, long-term liabilities to banks stagnated. As in the previous year, provisions increased sharply in 2022. This was largely due to higher provisions for pensions and to other provisions set aside in line with positive business developments. Provisions for tax also increased sharply, as in the previous two years.

Strong growth in liabilities and provisions; ongoing shift from long-term to short-term liabilities

As in the previous year, growth in liabilities and provisions was very strong in 2022. On balance, there was a further shift from long-term to short-term liabilities, as in 2022. In 2020, liquidity considerations related to the pandemic had caused a short-term shift in the ratio of long-term to short-term liabilities in favour of long-term liabilities. The uptick in business activity and price effects caused trade payables and advance payments received on account of orders to rise sharply. Short-term liabilities to affiliated companies also grew significantly. Unlike in the previous two years, short-term liabil-

■ Trends for 2023

In view of the bout of weakness the German economy is experiencing, it is likely that non-financial enterprises did not expand their business activities or, in some cases, reduced them in 2023. Although energy markets calmed down somewhat, energy prices remained at elevated levels. In addition to the increased energy cost burden, industry is also likely to have suffered as a result of weak foreign demand. Real exports of goods fell, for example. Meanwhile, supply bottlenecks in industry as a whole

Delayed economic recovery detrimental to business activities in 2023; high energy prices and increased wage and financing costs weighing on profitability

continued to ease according to ifo Institute and S&P Global surveys. The impact of the reversal of monetary policy interest rates is likely to be felt more strongly in 2023. The increased financing costs brought about by this could dampen private investment and thereby also weigh on domestic demand for industrial goods and, in particular, construction work. Furthermore, order backlogs decreased further, absorbing less and less of the decline in demand in industry and the construction sector. Overall, this puts a strain on output in these two sectors of the economy. In addition, real government consumption declined as pandemic-related spending came to an end, which was only par-

tially replaced by new measures to address the energy crisis and high inflation. What is more, consumers held back on additional spending despite strong wage growth, declining inflation rates and stable employment. This is likely to hurt consumer-related service providers, in particular, although the period of economic weakness could well also dampen business activities at business-related service providers. Overall, enterprises' profit margins could come under stronger pressure in the current year than in 2022 given high energy prices, increased wages and financing costs and gloomier sales prospects.

Long series with extrapolated results from the corporate financial statement statistics are available at <https://www.bundesbank.de/en/statistics/enterprises-and-households/-/corporate-financial-statements-796226>

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