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Slight Reduction in Cash-Flow-to-Sales Ratio

Profitability of Austrian Manufacturing in 2013

Slight Reduction in Cash-Flow-to-Sales Ratio. Profitability of Austrian Manufacturing in 2013

In 2013, the cash-flow-to-sales ratio of the Austrian manufacturing sector reached an estimated 9.0 percent, a value significantly below the long-run average of 9.6 percent. The persistently muted performance of the manufacturing sector has affected the cash-flow-to-sales ratio, which declined substantially in the aftermath of the financial crisis. The sector's real value added growth amounted to a mere 1.2 percent in 2012 and 2013. According to the estimates of a dynamic panel-econometric model at industry level, the cash-flow-to-sales ratio in manufacturing declined slightly against 2012 (2012: 9.2 percent).

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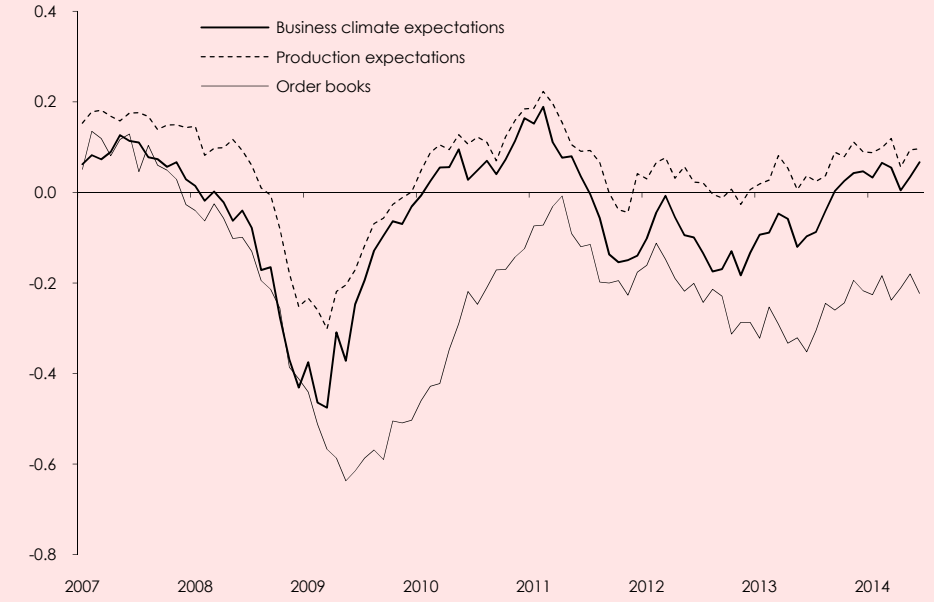
In 2008 and 2009, Austrian manufacturing was affected by the global economic crisis. While the years 2010 and 2011 saw a recovery, the dynamics noticeably slowed again in 2013. Austria's GDP grew by only 0.4 percent in 2013 – the weakest development since the 2008-09 recession, when overall production fell by 3.8 percent. Both the investment volume and the consumption of private households declined in real terms in 2013. The real value added of manufacturing rose by only 1.2 percent compared to the previous year in 2012 and 2013. As a result, by long-term comparison the year 2013 saw only a slight improvement in hourly productivity of about 2.4 percent. Real gross fixed investments declined (–0.9 percent in 2013, +1.6 percent in 2012). Investments in equipment in particular dropped (–3.1 percent) after increasing by 2.1 percent in 2012 (*Scheiblecker et al.,* 2014).

The present assessment of the development of Austrian manufacturing in 2013 is based on indicators from the WIFO Business Cycle Survey. Since the end of 2008, the business cycle survey has revealed the slump in manufacturing resulting from the financial crisis. The business cycle outlooks of companies have worsened since mid-2009 (Figure 1). In 2010 and 2011, production expectations developed relatively dynamically due to the recovery of the worldwide economic condition. However, companies' outlooks worsened again in mid-2011. The confidence indicator of the European Commission (Figure 2) paints a similar picture for the years 2011 to 2013 for the EU 28 and Germany in particular. In 2012 and 2013, German companies had a more optimistic business cycle outlook than Austrian companies.

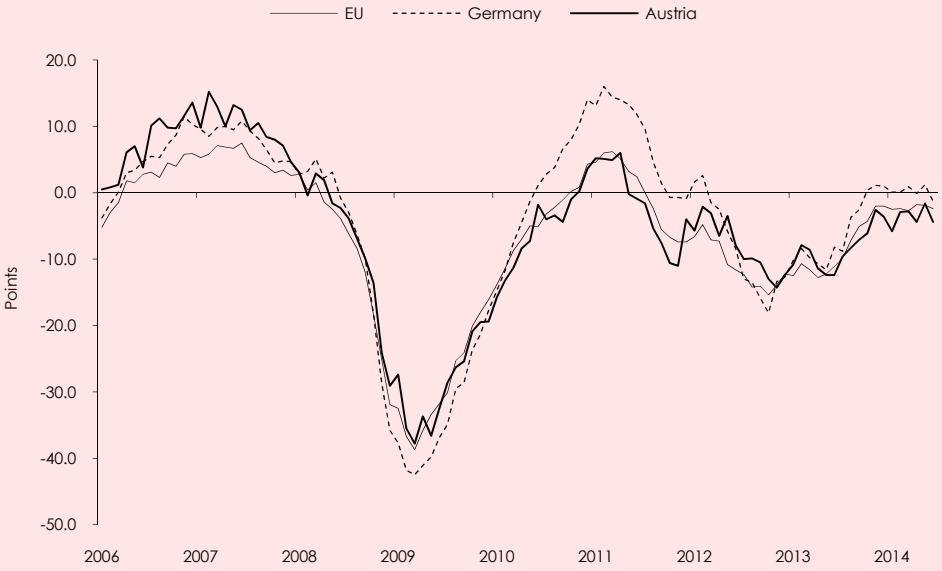
Figure 1: Assessment of the economic situation of companies in manufacturing

Balance of positive and negative assessments as a percentage of total responses



Source: WIFO Business Cycle Survey.

Figure 2: Industrial confidence indicator for the EU, Germany and Austria



Source: Joint Harmonised EU Programme of Business and Consumer Surveys.

The costs of manufacturers were developing equally moderate. As a result of the lagging worldwide economic situation in 2013, industrial commodity prices dropped significantly for a second time (–5.8 percent in 2013, –8.9 percent in 2012). The interest rate for companies was lower in 2013 at 2.2 percent than in 2012 (2.4 percent), which was reflected in a slight increase in the credit volume (*Scheiblecker et al.*, 2014). The real-effective exchange rate index rose by 2.7 percent compared to the year before, and unit labour costs increased by 1.9 percent. This mixed picture of a reduction of energy and loan financing costs on the one hand and a rise in unit labour costs and exchange rates on the other most likely contributed to the stable development of returns in manufacturing (Table 1).

Data and definitions

The cash-flow ratio is an indicator of a company's capacity to *finance investment, pay off debt and taxes or distribute profits* out of its sales revenue. It mirrors the *self-financing capacity* of a company. The comparison of firms' equity capitalisation is of similar interest. The latter is of importance beyond the pure liability element, above all with a view to its effect on confidence with clients and suppliers regarding a company's future liquidity, as well as its autonomy in carrying out high-risk financial operations.

The *cash flow* of a company corresponds to the surplus of revenues over expenditure generated within a period through its own business operations. In contrast to *external financing* (via equity capital, debt capital or subsidies) or financing via asset transformation (asset sales, depletion of inventories, etc.), it is another form of internal financing. *Self-financing in the broader sense* consists of three components: *retained earnings* (self-financing in the narrow sense), the "earned" *counter value of depreciation and of financial reserves* for potential liabilities vis-à-vis third parties (*Schäfer,* 1998).

The cash-flow-to-sales ratio is measured by the share of cash flow in sales revenues. For this purpose, cash flow is defined as follows:

Result from ordinary business operations

\+ normal depreciation of fixed assets

\+ depreciation of financial assets and securities of current assets

[± allocation to or liquidation of reserves]

[± allocation to or liquidation of social capital]

= Cash flow

The balance sheet database of the Austrian Institute for SME Research

The data basis is the balance sheet database of the Austrian Institute for SME Research, which consists of a pool of over 100,000 annual financial statements of Austrian firms. The industry classification mainly follows ÖNACE 2008. This statistical classification offers the advantages of a high degree of detail, as well as the possibility of international comparison. Through the analysis of balance- (asset and capital structure) and return-and-loss-sheets (performance, costs and results structure), it is possible to compute a number of performance indicators.

Adjusted cash flow

The definition of earning power used in the following is the "adjusted cash flow". Here, the cash flow derived from the accounts is placed in relation to operational effectiveness. The cash flow is calculated as the sum of ordinary operations and depreciations. The figure is "adjusted" by taking into account a "calculatory entrepreneurial salary", which makes it possible to compare figures across legal forms. In contrast to incorporated companies, business partnerships and individual enterprises do not enter a deductible salary for the participation of the entrepreneur as an expenditure. For business partnerships and individual enterprises, the minimum salary of managers exercising comparable functions is used as proxy for a calculatory entrepreneurial salary. Operational effectiveness is calculated as the "adjusted" turnover defined as turnover less sales deductions, which have been adjusted to take into account capitalised self-produced assets and inventory changes.

For the calculation of the median, the arithmetic mean and the standard deviation, the weighted and unweighted cash-flow ratios are used. The weighting is based on implicit weights: the companies examined are viewed as one company, and the various balance sheets are consolidated into an industry-level balance sheet, from which the figures to be analysed are calculated. As a result, larger firms have a higher weight than smaller firms, due to their absolute balance sheet value.

The profitability of manufacturing is embedded in this cyclical picture. As there are no early indicators for its development and cyclical data only become available after a delay, a "projection" of the cash-flow ratio is generated for 2013. The projection is based on accounting data from the financial statement database of the Austrian Institute for SME Research.

Table 1: Development of cost in manufacturing

	Industrial commodity prices, euro basis		Unit labour costs		Interest rate for company loans	Real-effective exchange rate index	
	1990 = 100	Percentage changes from previous year	2000 = 100	Percentage changes from previous year	In percent	First quarter 1999 = 100	Percentage changes from previous year
2002	94.1	– 7.6	100.2	+ 0.8	5.2	94.5	+ 0.5
2003	91.3	– 2.9	102.1	+ 1.9	4.2	97.8	+ 3.4
2004	103.8	+ 13.6	99.8	– 2.3	3.7	98.7	+ 0.9
2005	118.8	+ 14.5	98.1	– 1.7	3.5	97.4	– 1.3
2006	155.7	+ 31.1	94.8	– 3.3	4.1	96.7	– 0.7
2007	165.0	+ 5.9	92.6	– 2.3	5.1	97.2	+ 0.5
2008	160.9	– 2.5	97.6	+ 5.4	5.5	97.3	+ 0.1
2009	126.3	– 21.5	108.0	+ 10.7	2.8	97.8	+ 0.5
2010	194.0	+ 53.5	100.5	– 6.9	2.4	94.9	– 3.0
2011	210.9	+ 8.7	97.5	– 3.0	2.9	95.5	+ 0.6
2012	192.2	– 8.9	100.4	+ 3.0	2.4	94.0	– 1.6
2013	181.1	– 5.8	102.3	+ 1.9	2.2	95.8	+ 2.0

Source: WIFO, OeNB, HWWA.

1. Projection of the cash-flow-to-sales ratio at the industry level

Estimates for the year 2013 show a slight decline of the average cash-flow-to-sales ratio in Austrian manufacturing to 9.0 percent (9.2 percent in 2012).

An analysis of the earning power of manufacturing is published each year in the WIFO monthly reports. In the present report, indicators from the balance sheet database of the Austrian Institute for SME Research are used for the first time to calculate the cash-flow ratio. This enhances the data quality compared to the hitherto used approximative values on earning power at the industry level, which were calculated using the BACH database (*Friesenbichler,* 2009). Furthermore, the industry classifications have also been adjusted, so that data on the cash-flow-to-sales ratio are now available in the EU classification at the two-digit level (NACE Rev. 2). A comparison of the results with those from previous reports is not possible due to these statistical changes.

Due to the shift from NACE Rev 1.1. to NACE Rev. 2, the projection is based on relatively short time series, as the figures used are only available from the year 2000. In the data set, the industries of tobacco processing (NACE 12), coke and mineral oil processing (NACE 19) and other vehicle manufacturing (NACE 30) are not available, so that only 21 of the 24 industries could be considered in the econometric estimates. The econometric estimate for the year 2013 is based on data from the 2000 to 2012 period.

Table 2: Estimated coefficients for the projection of the cash-flow-to-sales ratio

	$\log \pi_{i,t-1}$	$I_{i,t}$	$I_{i,t}^2$	$\log SD(\pi_{i,t-1})$
Coefficient	0.312	0.14	– 0.03	0.16
z-value	7.45***	1.85*	– 0.92	2.72***

Source: WIFO calculations. π . . . cash-flow ratio, I . . . economic indicator, SD . . . standard deviation, I . . . industry, t . . . period, * . . . significant at a 10 percent level, *** . . . significant at a 1 percent level. Number of observations: 231.

The aggregated cash-flow ratio recovered only weakly after the outbreak of the financial crisis in 2008 (9.7 percent in 2007, 8.7 percent in 2008). A long-term average of 9.6 percent was achieved in 2010, but in the subsequent years the ratio again dropped to a level just above the crisis year of 2008. In 2011 and 2012, it was below the long-term average of 9.2 percent. For 2013 the estimate of the dynamic panel-econometric model (see the box "A panel-econometric model for cash-flow projection") predicted a below-average cash-flow ratio of 9.0 percent. The small change compared to the previous year reflects the poor dynamics of cyclical development in the year 2013.

A panel-econometric model for cash-flow projection

A panel-econometric approach is used for the projection of the cash-flow ratio at the industry level. Despite rather short time series, the pooling of sectoral data allows a reliable econometric estimate to be made for the cash-flow ratio. The specification follows the industrial economics literature and assumes that the cash profitability, and thereby also the self-financing power of companies, exhibit differences which are persistent over time (*Mueller,* 1990, *Aiginger – Pfaffermayr,* 1997, *Peneder – Pfaffermayr,* 2003). As industries in manufacturing are also characterised by entry barriers and sunk investments, the equalisation of earning power across industries will be slow. Unfortunately, industry-specific structural data that explain the cash-flow ratio are not available. The econometric model also includes the cash-flow ratio lagged by one period in order to account for the partial adjustment to external shocks.

The central explanatory variable is a synthetic business cycle indicator at the industry level (I_{it}, I_{it-1}) on the basis of companies' subjective assessment of business conditions, as provided by the WIFO Business Cycle Survey. Industrial commodity prices, R_t, were also included. The synthetic cyclical indicator is derived from the annual averages of the balance between optimistic and pessimistic responses (as percent of all responses) with regard to current order books (AB), the business outlook for the next six months (GL) and the development of prices (PR) using the following formula (*Oppenländer,* 1996):

$$I = [(AB + 2)(GL + 2)(PR + 2)]^{1/3} - 2 ,$$

with the individual indicators included as percentage values in the estimate. The series of these balances of responses are closely correlated with the trend of the cash-flow-to-sales ratio and with the growth of manufacturing. However, they also mirror non-observed structural differences and different developments in production costs between industries. For projection purposes, this indicator should exhibit a sufficient lead time. The correction of values by 2 ensures that the value of the term in square brackets is always positive.

In algebraic terms, the econometric forecasting model is specified as follows:

$$\log \pi_{it} = \beta_1 \log \pi_{it-1} + \beta_2 I_{it} + \beta_2 I_{it-1} + \beta_0 + \sum_{j=1}^{22} \gamma_j S_j + \varepsilon_{it} ,$$

$$\varepsilon_{it} \sim N(0, \sigma^2).$$

In addition to the lagged cash-flow ratio π_{it-1} and the synthetic business cycle indicator I_{it} as well as its squared term I_{it}^2, the lagged standard deviation of the cash-flow-to-sales ratio $SD(\pi_{it-1})$ and fixed industry effects S_j are included in the forecasting model.

The estimate of the dynamic panel model uses the *Kiviet* (1995) approach. The projection of the average cash-flow ratio for the entire manufacturing sector is obtained as the weighted average of the industry-specific projections, with the turnover shares of the individual industries used as weights. The weights are assumed as deterministic and continued for the year 2013 using the growth rates of industrial production between 2012 and 2013.

The estimation results for the period from 2000 to 2012 are presented in Table 2. All explanatory variables, with the exception of the squared business cycle indicator, but including fixed industry effects, are significant. The significant parameter of the cash-flow ratio (which has been deferred by one period) implies that exogeneous effects on the development of returns can have a delayed effect over several periods, even though the persistence of the cash-flow-ratio is relatively small. In general, the estimated model exhibits sufficient quality (Figure 3), although the R^2 of 0.7 should not be overrated – it is largely determined by fixed industry effects.

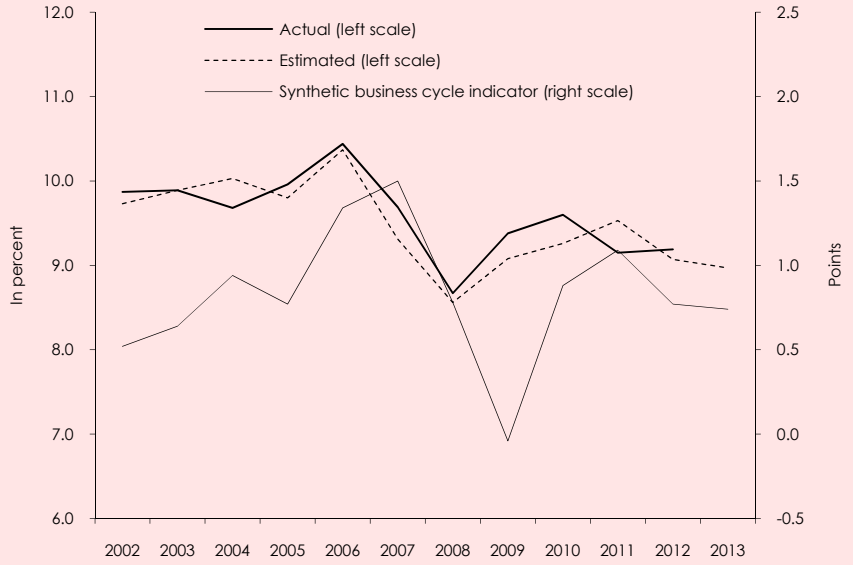
Compared to 2008, by 2012 the rate of return mainly recovered in the manufacture of textiles (NACE 13), in the manufacture of wood, weaving, basket and cork products (without furniture; NACE 16) and the manufacture of pharmaceuticals (NACE 21), while it worsened in the manufacture of leather and related products (NACE 15), the manufacture and processing of basic metals (NACE 24) and in the repair and installation of machinery and equipment (NACE 33; Table 3).

Table 3: The cash-flow ratio in Austria by industry

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013[1]
	Cash flow as a percentage of sales													
Manufacture of food and feed products	5.6	6.4	7.2	7.0	6.4	7.1	7.0	6.9	6.0	7.0	7.2	5.2	5.7	5.9
Manufacture of beverages	12.7	11.9	10.8	14.2	14.5	12.5	11.1	11.8	10.4	12.7	13.4	11.1	10.2	10.3
Manufacture of textiles	8.3	7.4	8.2	8.0	7.8	9.9	8.3	6.2	0.3	3.5	6.7	5.5	4.6	6.2
Manufacture of apparel	5.9	4.3	5.5	3.8	5.6	2.1	5.3	6.3	6.0	5.5	8.2	6.2	5.6	5.9
Manufacture of leather and related products	4.6	3.8	1.9	3.8	10.1	8.5	8.3	9.1	9.0	10.3	13.6	11.3	6.4	7.3
Manufacture of wood, weaving, basket and cork products (without furniture)	7.3	5.4	6.1	6.1	7.1	8.6	7.8	7.4	3.3	4.5	7.9	6.4	5.4	5.4
Manufacture of paper, cardboard and related products	14.9	18.2	15.4	14.4	12.4	11.3	10.3	11.9	9.0	13.6	9.5	9.6	10.1	10.6
Printing and reproduction of recorded media	11.5	10.7	9.3	8.6	9.6	7.7	8.2	8.5	8.4	8.1	9.8	9.2	7.8	7.9
Manufacture of chemical products	15.9	11.8	11.8	9.8	11.2	10.4	12.8	10.6	10.5	12.0	12.1	11.8	11.5	10.5
Manufacture of pharmaceuticals	16.1	12.8	31.5	16.7	18.7	12.3	15.0	9.9	6.4	10.9	8.2	12.2	17.2	12.5
Manufacture of rubber and plastics	9.5	7.5	8.1	8.3	7.4	8.8	8.8	8.6	7.9	8.6	8.6	8.7	8.2	7.4
Manufacture of glass and glassware, ceramics, processing of rocks and soils	11.4	10.6	9.9	10.9	10.0	10.7	11.9	12.6	10.5	9.4	9.9	10.3	11.0	10.8
Manufacture and processing of basic metals	9.0	9.6	8.3	8.2	8.3	10.2	10.4	10.6	10.8	11.0	10.0	9.0	8.3	8.8
Manufacture of fabricated metal products	10.9	9.7	8.3	8.9	8.4	9.4	10.5	9.0	10.4	9.5	10.2	9.3	9.8	9.3
Manufacture of computer, electronic and optical products	13.6	12.7	10.2	12.6	12.6	12.1	10.9	10.3	8.9	9.1	9.9	11.2	11.9	10.5
Manufacture of electrical equipment	8.7	7.1	7.2	10.7	9.3	10.3	11.9	8.1	9.3	9.1	10.1	7.4	9.4	8.8
Manufacture of machinery	9.4	8.7	8.5	8.3	8.4	9.3	10.8	10.1	10.1	9.5	10.5	10.3	9.2	9.3
Manufacture of motor vehicles, trailers and semi-trailers	8.6	8.8	9.4	9.2	10.1	11.1	11.5	11.4	5.6	6.6	7.3	8.5	7.6	8.5
Manufacture of furniture	5.6	6.0	5.8	7.5	5.4	5.5	6.0	5.7	5.6	5.5	5.3	5.7	5.5	5.4
Other manufacturing	6.4	13.0	16.4	14.9	13.6	14.1	13.8	8.1	6.8	6.4	10.5	9.2	8.8	9.6
Repair and installation of machinery and equipment	10.1	4.8	5.0	6.8	8.7	5.8	7.1	7.5	7.9	7.5	8.3	6.3	6.2	6.4
Manufacture of goods total														
Industries considered in the projection	10.3	9.6	9.9	9.9	9.7	10.0	10.4	9.7	8.7	9.4	9.6	9.2	9.2	9.0
All industries	9.5	11.0	9.4	9.9	9.6	9.6	10.5	10.6	8.8	8.6	9.7	8.7	8.8	8.7

Source: Data from the Austrian Institute for SME Research. – [1] Estimate.

Figure 3: Projection and actual development of the cash-flow ratio in manufacturing



Source: WIFO Business Cycle Survey, WIFO calculations.

For most industries, the projection of the cash-flow ratio for 2013 shows only small changes. It increased particularly in the manufacture of textiles (1.6 percentage points), the manufacture of leather and related products, and in the manufacture of vehicles, trailers and semi-trailers (+0.9 percentage points, respectively). A decline took place in the manufacture of pharmaceuticals (–4.7 percentage points), the

manufacture of chemical products (–1.0 percentage points) and the manufacture of rubber and plastics (–0.8 percentage points)[1]. The divergent profitability development of the individual industries enters the estimate via the synthetic business cycle indicator containing information from companies. The heterogeneous effects of a change in business conditions can only be depicted to a limited extent.

2. Selected industry characteristics as determining factors of the cash-flow ratio

In addition to the non-linear influence of overall cyclical developments (measured by the synthetic business cycle indicator), the development of the cash-flow ratio is determined by the size of the company, industry heterogeneity and sunk costs. Descriptive statistics deliver weighted and unweighted measures of the distribution of the cash-flow ratio at the industry level. This picture is expanded to include distribution moments, and sunk costs are included via the proxy "mobility barriers".

Table 4 shows the unweighted and weighted cash-flow ratio as it was used for the projection. The weighting is by company turnover, whereas in the unweighted figures each company has the same weight, independently of size. The arithmetic mean of the weighted sample lies significantly above that of the unweighted sample. Larger companies therefore on average have a higher cash-flow ratio than smaller companies. A comparison of the medians confirms this result. Other sources also point towards this connection between the amount of the cash-flow ratio and the size of the company (*Austrian Institute for SME Research,* 2012, *BMWFJ,* 2012, p. 46). Furthermore, the standard deviation of the unweighted ratios is significantly above that of the weighted ratios, and the profit rate of smaller companies is significantly more heterogeneous than that of larger companies. This image persists when the value for 2010 – a possible outlier – is not considered in the calculation of the standard deviation.

On average, large companies display a higher cash-flow ratio than smaller companies. The return rates of smaller companies are more heterogeneous. Business cycle developments have an effect on the average and median values of the cash-flow-to-sales ratio, but not on its variation.

Table 4: Weighted and unweighted cash-flow ratio at the industry level

		Weighted with turnover			Unweighted		
	Number of companies	Mean	Median	Standard deviation	Mean	Median	Standard deviation
2000	2,132	9.5	9.1	10.7	8.9	7.5	11.7
2001	2,733	11.0	9.8	9.6	8.0	6.7	12.2
2002	3,931	9.4	8.5	8.6	8.5	7.2	12.2
2003	4,463	9.9	9.2	8.1	8.5	7.3	11.0
2004	4,882	9.6	9.1	8.4	8.4	7.3	15.6
2005	5,422	9.6	9.2	8.4	8.5	7.1	11.7
2006	6,505	10.5	9.2	8.4	8.9	7.5	13.9
2007	7,651	10.6	8.9	9.1	9.2	7.5	12.7
2008	8,608	8.8	7.5	8.7	8.6	7.0	12.3
2009	8,829	8.6	7.7	8.6	7.5	6.4	13.5
2010	8,848	9.7	8.4	9.4	8.7	7.0	36.9*
2011	8,631	8.7	8.1	8.3	8.4	6.9	11.5
2012	7,438	8.8	7.8	8.2	8.0	6.7	16.0
Mean value		9.6	8.7	8.8	8.5	7.1	12.9
Standard deviation		0.77	0.71	0.75	0.44	0.33	1.60

Source: Austrian Institute for SME Research. * . . . Outlier.

In the next step, the weighted standard deviation of the delayed cash-flow ratio is included in the estimation in order to consider additional information. As the regression between the cash-flow ratio and the synthetic business cycle indicator shows, cyclical developments have a particularly strong effect on the arithmetic mean, as well as the median of the cash-flow ratio (Table 5).

[1] The estimation results for the individual industries should be interpreted with greater caution than the aggregated estimate.

Table 5: Connection between diverse economic indicators and the cash-flow-to-sales ratio

	Cash-flow-to-sales ratio					
	Weighted with turnover			Unweighted		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation
I_{it}	1.09*	1.04*	– 0.61	1.06**	1.10***	0.55
	(0.63)	*(0.61)*	*(0.49)*	*(0.43)*	*(0.32)*	*(2.90)*
I_{it}^2	– 0.19	– 0.23	0.36	– 0.32	– 0.33*	– 0.22
	(0.34)	*(0.33)*	*(0.27)*	*(0.23)*	*(0.17)*	*(1.57)*
I_{it-1}	– 0.37	– 0.60**	– 0.06	– 0.34	– 0.24	– 2.59*
	(0.31)	*(0.30)*	*(0.24)*	*(0.21)*	*(0.16)*	*(1.44)*
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	273	273	273	273	273	273
R^2	0.57	0.58	0.37	0.61	0.73	0.10

Source: WIFO calculations. There is a association between the business cycle indicator and the cash-flow-to-sales ratio, in particular with respect to the mean and the median. The association with the standard deviation is low (clearly declining R^2). As the coefficients show, the partial correlation in well-specified regressions is of similar dimensions for the unweighted sample and the weighted sample. Further moments of distribution (skewness and kurtosis) yielded no significant result. Thus, the business cycle mainly influences the situational parameter of distribution and has the greatest influence on the mean and the median of the distribution. * . . . significant at a 10 percent level, ** . . . significant at a 5 percent level, *** . . . significant at a 1 percent level.

Statistically significant results with satisfactory explanatory power $\left(R^2\right)$ can only be achieved for the arithmetic mean and the median. Here, it is less important whether weighted or unweighted figures are used. However, the explained variance, measured by R^2, is higher for the regression results with unweighted figures. The economic indicator to explain the standard deviation of cash flow has much lower explanatory value. An examination of the skewness and kurtosis yielded no significant result. Cyclical developments therefore primarily influence the location parameter of the cash-flow distribution, and have a much lower effect on the variance and skewness of the distribution.

Up to now, industry-specific factors were only considered as dummy variables ("fixed effects") in the forecasting model. A possible extension of the model involves the consideration of sunk costs. Together with cyclical fluctuations, these influence the return rate of companies. As *Lambson – Jensen* (1995) and *Gschwandtner – Lambson* (2006) show, over time the rate of return of companies in industries with higher sunk costs shows greater variability than in industries with lower sunk costs. Sunk costs therefore impede short-term capacity adjustments in cycles, resulting in greater shifts in the rate of return.

Sunk costs are typically proxied by indicators for capital stock, however they can also result from investments in company-specific human capital. Employees with company-specific knowledge secure core competencies and tend to be kept in the firm during cycles, in contrast with employees with little company-specific or industry-specific knowledge. An approximative value for specific knowledge or sunk costs at the industry level are mobility barriers, which can be quantified by excess labour turnover (*Hölzl,* 2014). Industries with high mobility barriers show low excess labour turnover, and vice versa. Low excess turnover – as an indicator for high sunk costs – therefore means higher cyclical dependency of the rate of return.

The present results confirm this hypothesis. The influence of the cycle therefore depends on the level of mobility barriers. The effect of the business cycle indicator on the weighted and unweighted mean of the rate of return in dependency on the mobility barrier is shown in Figure 4. Lower values for excess labour turnover correspond with higher mobility barriers and vice versa. According to this estimation, cyclical development, measured using a synthetic business cycle indicator, has a

strong effect on the cash-flow ratio in industries with high mobility barriers. The effect of cyclical fluctuations is much lower in industries with low mobility barriers, and statistically not different from zero.

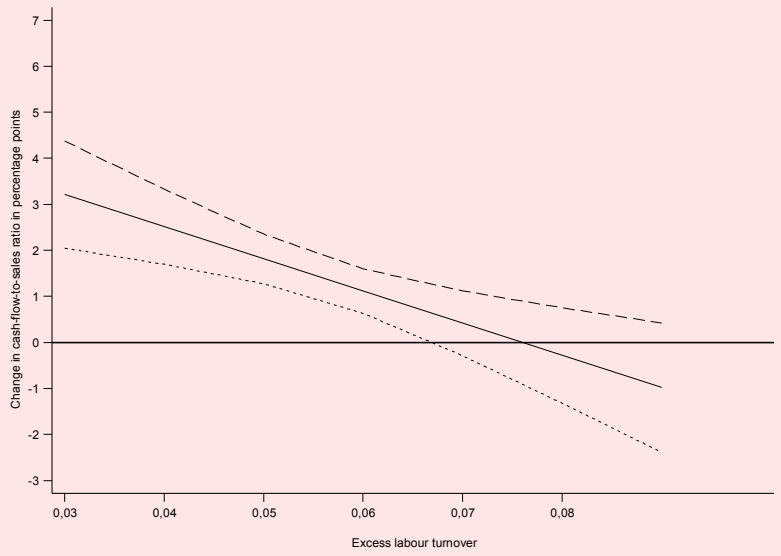
While cyclical developments affect the level of the cash-flow-to-sales ratio in all industries, their impact is higher in industries with high mobility barriers. This can, for example, be measured by the capital intensity or labour hoarding.

Cyclical development has a greater influence on profitability in industries with higher sunk costs. When mobility barriers are low, the business cycle barely has an influence on the cash-flow-to-sales ratio.

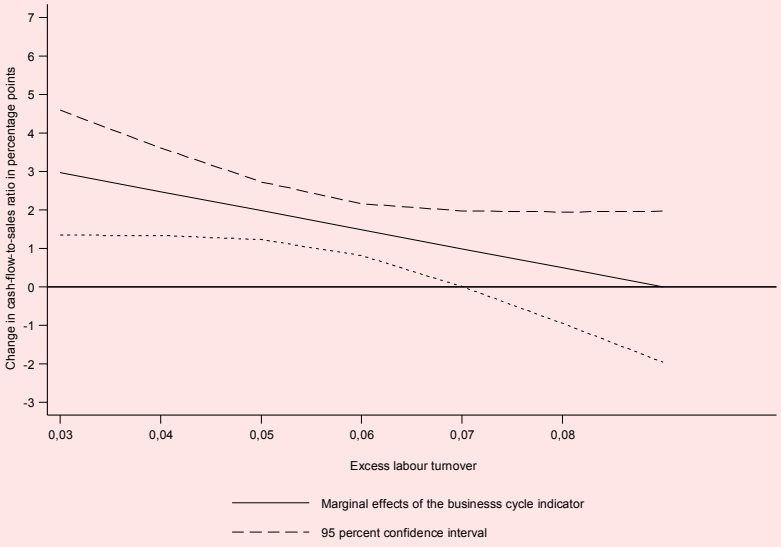
Figure 4: Marginal effect of the business cycle indicator on the cash-flow ratio in dependence on sunk costs

Dependent variables: synthetic business cycle indicator

Unweighted cash-flow ratio



Weighted cash-flow ratio



Source: WIFO calculations, Austrian Institute for SME Research, WIFO Business Cycle Survey. In industries with low excess labour turnover (higher sunk costs) the cash-flow ratio vacillates more than in industries with higher excess labour turnover (lower sunk costs).

3. Appendix: The equity ratio in international comparison

The equity capital ratio as a measure of financial independence is calculated as the share of equity capital in the balance sheet total. Equity capital includes both balance sheet equity capital and untaxed reserves. The balance sheet total consists of

fixed assets, current assets and deferred items. The equity capital ratio is – much more so than the cash-flow ratio – a structural indicator. It is determined by company and industry-specific capital intensity and risks. In an international comparison, the non-neutrality of financing types also plays a role. For example, if bank financing is cheaper than the equity financing due to the tax deductibility of interest payments, this will have an effect on the financial structure of companies.

Alternative estimation models

Distribution moments

The projection values are based on the weighted cash-flow ratio. In addition, the model uses information on distribution moments, whose consideration requires an adjustment of the regression equation. The equation is now as follows:

$$M(\pi)_{it} = \beta_1 I_{it} + \beta_2 I_{it}^2 + \beta_3 I_{it-1} + \beta_0 + \sum_{j=1}^{22} \gamma_j S_j + \varepsilon_{it},$$

$M(\pi)_{it}$ . . . statistical measure of distribution (mean, median or standard deviation) at the industry level. The business cycle indicator at the industry level enters the estimation equation also as squared $\left(I_{it}^2\right)$ and lagged $\left(I_{it-1}\right)$ terms.

Mobility barriers

In addition to moments of distribution, the question of the extent to which sunk costs influence the rate of return as industry characteristics is addressed. Following *Hölzl* (2014), the indicator "excess labour turnover" is used for mobility barriers. This indicator ($\ddot{U}$) is defined as:

$$\ddot{U} = \frac{JC + JD - |JC - JD|}{0{,}5 \times \left(E_t + E_{t-1}\right)},$$

JC . . . job creation at the company level, JD . . . job destruction at the company level. The enumerator shows the extent to which labour turnover at the company level exceeds the rate of change in employment at the industry level. In the denominator, this value is weighted at the industry level with the mean value of the employment figures. The indicator measures the barrier for short-term capacity adjustment in the business cycle. Industries with high sunk costs or mobility barriers show low excess labour turnover, and vice versa.

The regression analysis, which takes mobility barriers into account, is carried out with interaction variables. The regression model is noted as follows:

$$\pi_{it} = \beta_1 I_{it} + \beta_2 \ddot{U}_{it} + \beta_3 I_{it} \times \ddot{U}_{it} + \varepsilon_{it}.$$

Table 6: International comparison of the weighted equity capital ratio in manufacturing

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	In percent												
Austria	38.4	37.7	35.7	35.4	36.7	37.0	38.6	37.1	35.4	36.9	37.1	37.9	37.3
Belgium	37.0	37.3	36.7	38.5	37.2	40.5	43.1	45.4	44.8	48.0	47.3	49.0	50.6
Czech Republic	.	.	.	.	.	.	49.5	51.0	49.6	51.3	50.8	49.5	51.6
Germany	28.5	29.3	30.7	30.5	30.6	30.1	29.9	30.9	29.7	29.9	31.7	32.0	31.6
Estonia	42.1	41.8	41.1	41.2	40.6	38.9	38.2	37.4	39.1	38.2	41.1	41.6	41.6
France	34.8	32.5	32.6	33.6	35.0	37.3	37.0	35.9	33.3	34.3	36.4	36.0	36.4
Italy	.	28.5	28.7	29.1	30.0	30.5	30.4	30.0	32.4	33.7	33.6	33.3	34.2
The Netherlands	.	.	.	.	.	.	.	.	.	51.1	43.6	44.6	46.3
Poland	.	.	.	.	.	.	49.7	50.4	46.7	49.8	49.9	48.7	51.0
Portugal	42.2	42.5	42.9	44.4	44.0	44.6	44.8	37.4	36.7	36.0	35.6	34.5	34.5
Average	37.2	35.7	35.5	36.1	36.3	37.0	40.1	39.5	38.6	40.9	40.7	40.7	41.5

Source: BACH database (Bank for Accounts of Companies Harmonized).

The data basis for the calculation of the equity capital ratio is the BACH database (Bank for Accounts of Companies Harmonized). Since 1987, this has been generated by the European Commission (DG ECFIN) in collaboration with the European Committee of Central Balance Sheet Offices, in order to make comparisons between EU

countries possible. Aggregated annual financial statements are currently available for 9 countries: Austria, Belgium, Spain, France, Germany, Italy, the Netherlands, Portugal and Poland. The data contains information on 87 industries, based on NACE rev. 2 (2-digit), of which 24 are in the manufacturing sector. In addition, the data are split into 3 size classes (companies with an annual turnover of below € 10 million, of € 10 to € 50 million and over € 50 million. Table 6 shows the weighted equity capital ratio in international comparison, while Table 7 shows the median of the equity capital ratios.

Table 7: International comparison of the equity capital ratio in manufacturing

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	In percent (median)												
Austria	25.8	21.8	22.4	22.5	22.4	24.2	25.3	27.1	27.1	28.6	28.9	29.1	29.1
Belgium	31.5	32.0	32.4	33.3	33.9	34.5	35.3	35.9	36.5	37.2	37.6	37.3	37.6
Germany	17.3	18.6	21.2	23.2	24.7	25.7	26.4	27.0	28.8	31.3	31.7	32.0	33.7
Estonia	28.9	29.4	28.9	28.8	28.5	28.1	27.8	28.8	29.8	29.9	30.7	32.0	33.6
France	30.6	31.8	33.4	34.3	34.9	35.6	35.9	36.4	37.5	40.3	40.9	40.6	40.6
Italy	.	22.4	22.5	22.3	22.6	22.8	21.9	21.7	27.0	28.4	27.5	26.7	28.0
The Netherlands	.	.	.	.	.	.	.	.	.	30.5	30.9	33.9	34.8
Poland	.	.	.	.	.	.	48.2	50.3	50.5	52.7	51.4	50.7	51.8
Portugal	31.1	32.1	32.4	33.6	35.0	34.9	35.4	23.5	23.8	24.7	24.9	25.4	25.8

Source: BACH database (Bank for Accounts of Companies Harmonized).

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