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Corporate debt in Germany in the course of the COVID-19 pandemic: An evaluation based on the AnaCredit dataset

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Technical Paper

Corporate debt in Germany in the course of the COVID-19 pandemic: An evaluation based on the AnaCredit dataset

07/2021

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Non-technical summary

This technical paper describes various metrics that can be used to analyse the bank loan debt of German non-financial corporations based on the AnaCredit data set. This data source provides detailed and up-to-date information on the corporate sector's bank loan indebtedness at the individual company level and thus enables granular analyses.

The metrics are used to trace the development of debt in the course of the coronavirus pandemic and to highlight the advantages of the granular data set. According to the analysis, the bank loan debt of German non-financial corporations increased during the pandemic. For the aggregate of the companies, however, this increase was on average not extraordinarily strong. Moreover, debt rose from a relatively low level and the companies took out loans on comparatively favourable financing terms. This suggests that the solvency of the corporate sector has not deteriorated significantly.

A disaggregated analysis, however, shows that bank loan debt has risen quite strongly in the sectors hit particularly hard by the containment measures. Although bank loan debt before the coronavirus pandemic was low by historical standards, it now stands at a comparatively high level after the large increase in 2020. However, the average interest rate on the loan portfolio has also fallen in these sectors. Taken by itself, this should make it easier for companies to service their loans. The economic sectors particularly affected make up a rather small share of the portfolio of German banks' loans to German non-financial corporations.

Nichttechnische Zusammenfassung

Das vorliegende Technical Paper beschreibt verschiedene Metriken, anhand derer die Bankkreditverschuldung deutscher nichtfinanzieller Unternehmen auf Basis des AnaCredit-Datensatzes analysiert werden kann. Diese Datenquelle stellt auf Einzelunternehmensebene detaillierte und zeitnahe Informationen zur Bankkreditverschuldung des Unternehmenssektors bereit und erlaubt hierdurch granulare Auswertungen.

Die Metriken werden angewandt, um die Entwicklung der Verschuldung im Verlauf der Corona-Pandemie nachzuzeichnen und die Vorzüge des granularen Datensatzes herauszustellen. Demnach ist die Bankkreditverschuldung der deutschen nichtfinanziellen Unternehmen während der Corona-Pandemie gestiegen. Für die Gesamtheit der Unternehmen war dieser Anstieg im Durchschnitt jedoch nicht außergewöhnlich stark. Er ging zudem von einem relativ niedrigen Ausgangsniveau aus und die Unternehmen nahmen Kredite zu vergleichsweise günstigen Finanzierungskonditionen auf. Dies legt die Schlussfolgerung nahe, dass sich die Solvenz des Unternehmenssektors nicht maßgeblich verschlechtert hat.

Eine disaggregierte Betrachtung zeigt jedoch, dass die Bankkreditverschuldung in den besonders von den Eindämmungsmaßnahmen betroffenen Branchen sehr deutlich gestiegen ist: Wenngleich auch hier die Bankkreditverschuldung vor Corona nach historischen Maßstäben niedrig war, liegt sie nach dem starken Anstieg im Jahr 2020 nun auf einem vergleichsweise hohen Niveau. Allerdings ist auch in diesen Branchen der durchschnittliche Zins im Kreditbestand gesunken. Dies dürfte es den Unternehmen für sich genommen erleichtern, ihre Kredite zu bedienen. Die besonders betroffenen Wirtschaftsbereiche machen einen eher geringen Anteil am Kreditportfolio der deutschen Banken gegenüber deutschen nichtfinanziellen Unternehmen aus.

Corporate debt in Germany in the course of the COVID-19 pandemic: An evaluation based on the AnaCredit dataset¹

Benedikt Kolb²

Frieder Mokinski³

Robert Unger⁴

We analyse developments in the bank loan debt of German non-financial corporations during the COVID-19 pandemic based on the AnaCredit dataset. This data source provides detailed and timely firm-level information on the corporate sector's bank loan debt and thus enables granular analyses. Using data sources available for longer periods of time, we assess the developments in a historical context. We find that, although the bank loan debt of German non-financial corporations has risen significantly on average since the outbreak of the COVID-19 pandemic, the increase was not extraordinarily strong by historical standards. However, a disaggregated analysis shows that, in the sectors hit particularly hard by the containment measures, bank loan debt has risen very strongly and to a historical degree.

¹ We would like to thank Felix Geiger, Stephan Kohns, Esteban Prieto, Felix Thierfelder, Benjamin Weigert and Andreas Worms for their helpful comments. Our thanks also go to our colleagues from Directorate General Statistics, especially the AnaCredit section, for the many helpful discussions. The views expressed in technical papers represent the authors' personal opinions and do not necessarily reflect those of the Deutsche Bundesbank or the Eurosystem.

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1 Introduction

This technical paper describes various metrics that can be used to analyse the indebtedness of German non-financial corporations over the course of the COVID-19 pandemic. Its purpose is to document and validate the results that were published in abbreviated form in the Bundesbank’s Financial Stability Review 2021 (Bundesbank, 2021a). Our analysis is limited to corporate debt in the form of bank loans, and thus only covers part of the overall indebtedness. The reason for this narrow focus is our chosen data source – the analysis is based on AnaCredit, a dataset on individual bank loans, harmonised across the euro area and dating back almost three years. In contrast to more highly aggregated, broader-based sources of data on indebtedness, the granularity of this dataset allows us to perform highly differentiated analyses. For example, AnaCredit data allow us to investigate whether debt dynamics in sectors that were hit particularly hard by the pandemic differ from those in the rest of the corporate landscape. In addition, owing to their short publication lag, AnaCredit data lead corporate annual financial statements, for instance. One limitation of the AnaCredit dataset is its short history. In order to put the developments observed during the COVID-19 pandemic into context, we therefore make comparisons with various other data sources which go back further and from which similar metrics for indebtedness can be calculated. Ultimately, we note that this analysis does not allow a conclusive assessment of the trajectory of corporate solvency. This would require the usage of new borrowing and developments in corporate earnings projections to be taken into account, besides other sources of debt.

2 Metrics and data sources

In section 2.1 below, we first describe the metrics we use to analyse corporate debt. Our data sources are explained in the following sections. Section 2.2 explores AnaCredit, our main data source. Sections 2.3 to 2.5 present further data sources, which we use to frame the results from AnaCredit in a historical context and evaluate their reliability.

2.1 Metrics

First, we calculate our debt metrics individually for each borrower and point in time, which then allows us to calculate statistics on the distribution over a cross-section of borrowers. In doing so, we observe the development of the mean value, the total or percentiles in the cross-section of borrowers over time. Using the mean value and the total, we capture developments for the “average” company or in the aggregate. We use percentiles to investigate the respective distribution tails, such as the development of relatively highly leveraged companies or of companies with a high interest burden.

We calculate the **nominal stock of bank loans** of borrower i in period t as:

$$\text{Nominal stock of bank loans}_{it} = \sum_j \text{Outstanding credit volume}_{ijt},$$

thus arriving at the total of all outstanding bank loans j of borrower i in the respective period t . The nominal stock of bank loans measures the debt level of an enterprise in euro. Aggregated across the firms in a sector or the economy as a whole, this indicator provides information on how absolute levels of debt in the form of bank loans have developed and how exposed the banks are to each borrower group.

The **bank debt ratio** (BDR) of borrower i in period t is calculated as:

$$BDR_{it} = \frac{\text{Nominal stock of bank loans}_{it}}{\text{Total assets}_{it}}$$

The bank debt ratio measures how indebted a firm is in terms of bank loans. Normalising it using total assets allows debt to be compared across firms. Here, it should be noted that whether or not new lending expands the corporate balance sheet makes a difference to the development of the bank debt ratio. This can be easily illustrated using two examples. *Example 1*: If new loans are used exclusively to cover losses – such as those arising from higher running costs – the corporate balance sheet would not be expanded compared to the previous period. Instead, the equity capital is reduced by the amount of the loan and the bank debt ratio rises significantly. *Example 2*: If new loans are used to create a liquidity buffer (which, however, is not used for the time being), there is an increase in both the nominal stock of loans and the total assets because the liquidity buffer, as a newly created asset, expands the assets side and thus the balance sheet. The increase in the bank debt ratio is therefore smaller than in example 1. Another point to note is that, owing to data limitations regarding corporate balance sheets, our analysis can only depict gross debt and not net debt. In example 2, for instance, although the enterprise's gross debt rises, its net debt remains the same, and the newly created liquidity buffer could even have a risk-mitigating effect for the firm.

We use the following formula to calculate the **interest rate on the stock of loans** of borrower i in period t :

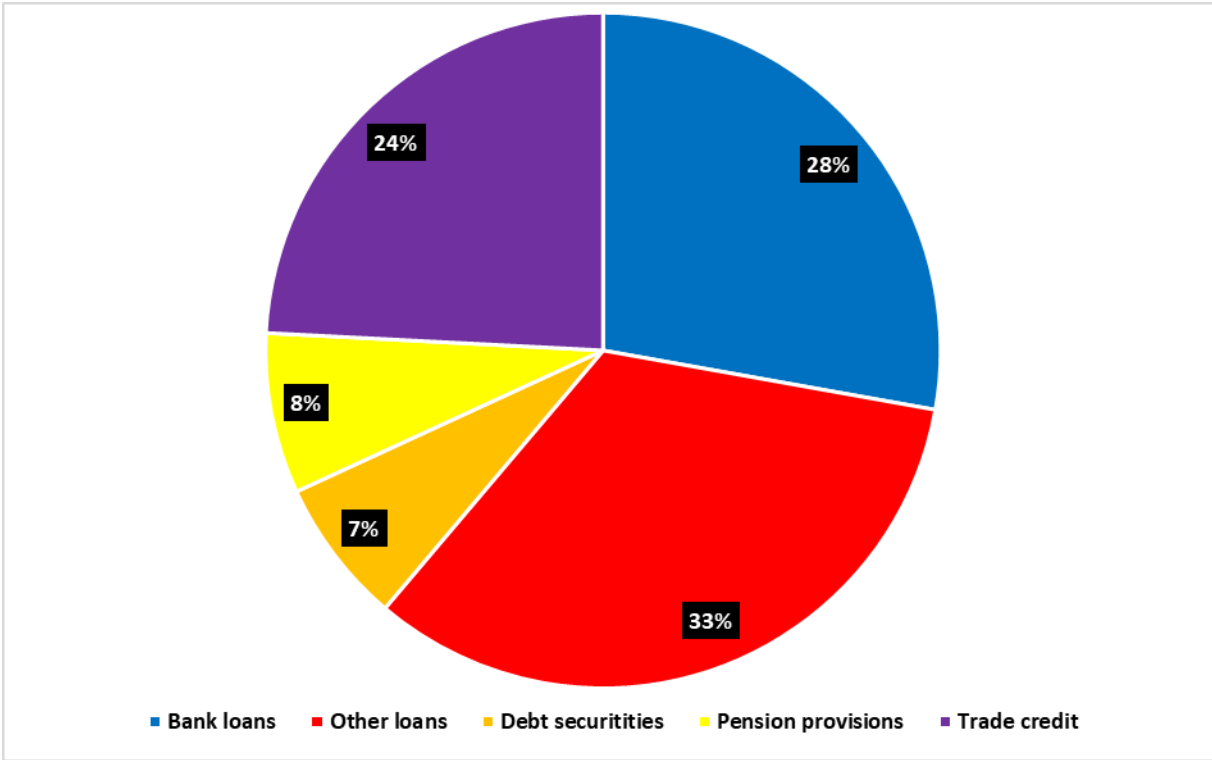
$$\begin{aligned} & \text{Interest rate on the stock of loans}_{it} \\ &= \frac{\sum_j \text{Outstanding credit volume}_{ijt} \cdot \text{Annualised interest rate}_{ijt}}{\text{Nominal stock of bank loans}_{it}}, \end{aligned}$$

where the numerator represents total interest payments across all outstanding bank loans j of borrower i in the respective period t . Normalised using the nominal stock of a firm's bank loans, this therefore constitutes the volume-weighted average interest rate on all the outstanding bank loans of a firm. The interest rate on the stock of loans therefore measures a firm's interest burden. However, this is only part of the burden associated with bank loans. In addition to this, borrowers are usually obliged to make contractually agreed redemption payments.

One key limitation of the analyses presented here is that they only relate to developments in debt arising from bank loans. Figure 1 shows the composition of the corporate debt of Germany's aggregated non-financial corporate sector. Although it indicates that bank loans play an important role in the overall indebtedness of non-financial corporations, with a share of 28% at the end of 2020, loans from non-banks (other credit, 33%), particularly from other

enterprises, and trade credits (24%) are also key sources of funding. Pension provisions (8%) and debt securities (7%) are somewhat less significant.

Figure 1: German non-financial corporations' debt broken down by instrument



Sources: Deutsche Bundesbank (financial accounts), authors' calculations.

2.2 AnaCredit⁵

AnaCredit is our chief data source. It contains loan-level data with detailed information on loan characteristics and parties. These loan-level data enable almost any granular analysis one could wish to carry out, such as evaluating debts by the sectoral affiliation of the borrower or by loan maturity. Another feature of the AnaCredit data is their comparatively short publication lag of just a little over one month. These data have been collected and harmonised across the euro area for nearly three years. Nevertheless, the AnaCredit data have certain limitations for the purposes of our analyses of corporate debt:

- First, as AnaCredit focuses on bank loans, it only covers one area of corporate debt (see above). It also does not fully capture bank loans to non-financial corporations due to reporting thresholds. Firms whose total loans, as reported by the lender, are under €25,000 are not recorded. Analyses covering very small firms are therefore likely to be significantly skewed – potentially towards more highly leveraged enterprises, as these slip under the reporting threshold less often. In addition, natural persons are not included as debtors.

⁵ See Deutsche Bundesbank (2021b), pp. 303 ff.

- Second, not all debtors are uniquely identified in AnaCredit. This leads to two challenges when interpreting the data set: (1) Some of a debtor’s loans will not be assigned to that debtor in the data set. This means the debt of certain debtors could be underreported. (2) The identified debtors might be systematically different from those not yet identified. This would make our analyses less representative of the overall population.
- Third, the Financial Statement Data Pool for debtors contained in AnaCredit is not of uniformly high quality (e.g. some balance sheet data are flawed) and also has a different publication lag than the AnaCredit data. In practice, the bank debt ratio is calculated using total assets derived from the most recently reported annual financial statements as at the reporting date. For example: in the reporting period of May 2021, loans were reported which existed or were newly issued in May 2021. Conversely, the reported total assets are typically based on the 2019 fiscal year, or on 2020 at best. Solely based on the AnaCredit data, it is not possible to calculate the bank debt ratio as described above as $BDR_{it} = \frac{\text{Nominal stock of loans}_{it}}{\text{Total assets}_{it}}$, as the current total assets in t are usually unknown. Instead we calculate $BDR_{it}^{AnaCredit} = \frac{\text{Nominal stock of loans}_{it}}{\text{Total assets}_{it^*}}$, where $t^* < t$ is the temporal reference to the most recent known annual financial statements as at the reporting date. Both this temporal incongruence and the missing data can lead to statistical issues which might manifest themselves in the form of unrealistically high bank debt ratios. In our analyses, we therefore restrict the bank debt ratio to between 0% and 100%. In this manner, we filter out unrealistic observations and obtain metrics which are, as far as possible, not skewed.

2.3 Monthly balance sheet statistics⁶

The monthly balance sheet statistics are derived from a complete survey of German banks (monetary financial institutions, or MFIs). Since January 1999 they have captured assets and liabilities of domestic MFIs based on their books at the end of the month. These data are only available as aggregate data and are used to validate our “nominal stock of bank loans” metric and place it in a historical context.

2.4 MFI interest rate statistics⁷

The MFI interest rate statistics are derived from a monthly representative sample survey of banks. They capture interest rates and credit volumes for new and existing business with the private non-financial sector. MFI interest rate statistics have been collected and harmonised across the euro area since January 2003. Around 230 German monetary financial institutions participate in the survey (as at November 2019). Using statistical procedures, their reports are extrapolated to the overall population of German MFIs. In the analysis presented here, we use

⁶ See Deutsche Bundesbank (2021b), pp. 35 ff.

⁷ See Deutsche Bundesbank (2021b) pp. 445 ff.

the MFI interest rate statistics to evaluate the reliability of the “interest on the stock of loans” metric and put its developments into a historical context.⁸

2.5 JANIKA⁹

The JANIKA data set collects the annual financial statements of German non-financial corporations. It contains data stretching back to 1997. Nevertheless, it is worth noting that the sample of annual financial statements in the first few years was quite small. This is why our analyses only begin with the year 2003. The individual JANIKA data record is representative of different market segments to different extents. High-revenue firms, for example, receive better coverage than small, low-revenue firms. Different economic sectors are also represented to differing extents in the data set.¹⁰ However, the main problem posed by the JANIKA data set, and thus a major factor in our use of the AnaCredit data in this analysis, is its huge publication lag. In August 2021, annual financial statements for 2020 were almost exclusively available for larger firms only. For around 70% of the aggregate corporate total assets, data were available for the 2019 fiscal year at best. Nonetheless, JANIKA can be used to review the quality of the AnaCredit data for overlapping periods for the purposes of our “bank debt ratio” metric and to put the developments during the COVID-19 pandemic in a historical context.

3 Development of bank loan debt during the COVID-19 pandemic

The following section presents the results of our analyses. The analysis took place at two levels of aggregation: one for all non-financial corporations and one for only those sectors hit particularly hard by the COVID-19 pandemic. Due to the relatively short data history, an economic classification of observed developments based solely on the AnaCredit data set is not possible. For this reason, we make comparisons with the aforementioned data sources, which allow for the calculation of similar metrics over a longer period.

3.1 Developments for all non-financial corporations

First, we will examine the debt developments for all non-financial corporations in the AnaCredit data set. Figure 2 displays the three metrics described above.

The mean value of the **bank debt ratio** rose from 20.0% in December 2019 to 20.5% in December 2020 (+0.5 percentage points (pp)). The increase for highly leveraged firms in the 80th percentile was more pronounced (38.6% to 40.1% / +1.5 pp). To contextualise the 0.5 pp

⁸ The aggregate interest rate naturally includes loans by German banks to firms in other euro area countries. As their volume is small, however, this indicator might be a good approximation of the average interest costs for German non-financial corporations.

⁹ See Deutsche Bundesbank (2021c).

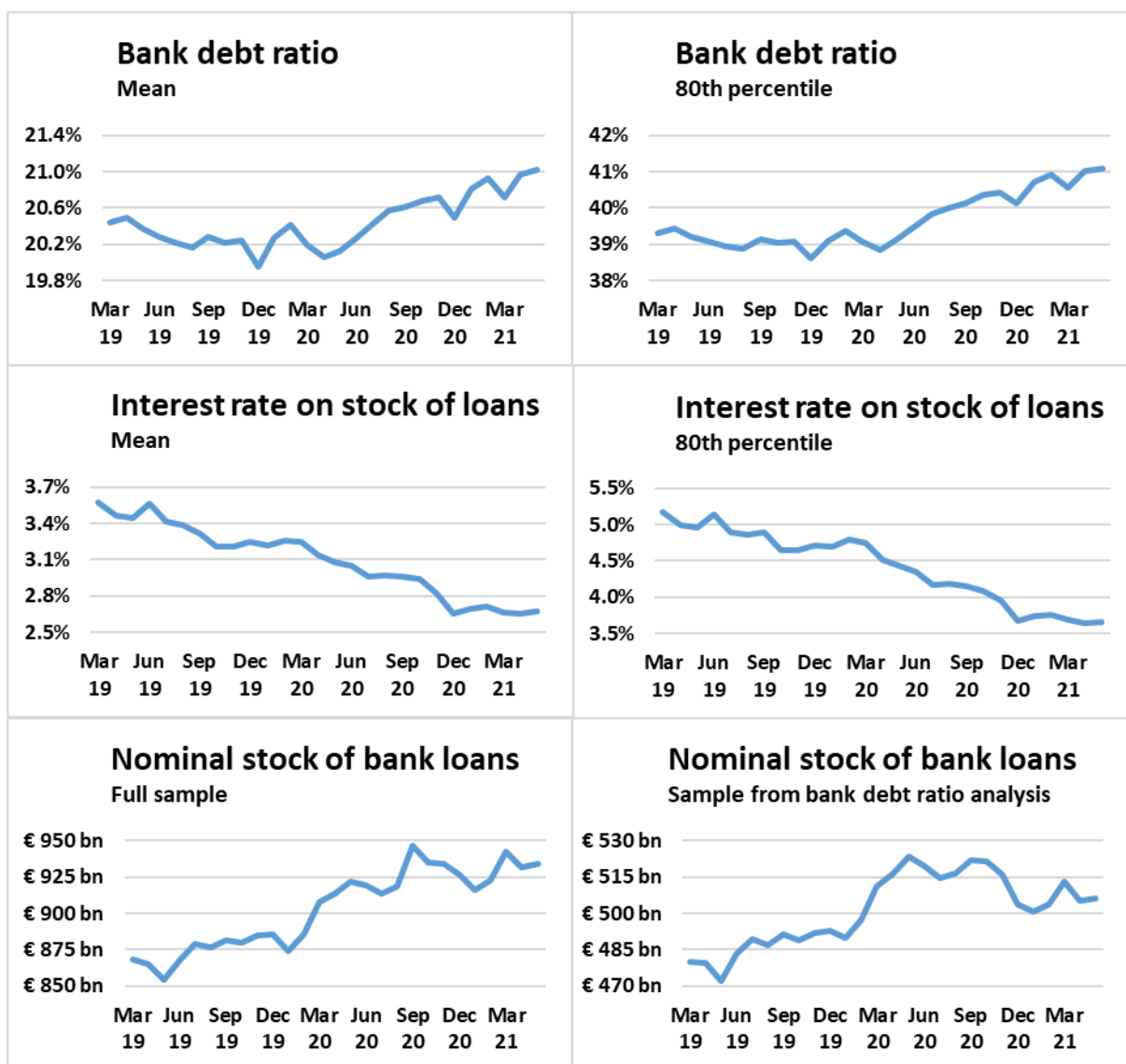
¹⁰ For the reporting year 2018, for example, 78% of the total revenue of firms with over €50 million in revenue (measured in terms of the figures from the Federal Statistical Office's business register) were represented in the individual JANIKA records, whereas for firms with less than €2 million in revenue that number was 2%. The recorded revenue share for the manufacturing sector is 70%, but the share for the hospitality sector is only 15%. See Deutsche Bundesbank (2021d).

rise in the bank debt ratio in AnaCredit between December 2019 and December 2020, we examine historical changes in the yearly JANIKA data set (see **Figure**). This reveals that the observed increase is comparable to the one seen in 2007, which was marked by significant borrowing, but is noticeably smaller than in 2009 (+0.9 pp) when the global financial crisis spilled over into the German economy. It is also evident that the increase is starting from a historically low level. In **Figure 3**, we also see that the JANIKA and AnaCredit data deliver similar numbers for the bank debt ratio, with the change in the indicator from the end of 2018 to the end of 2019 being similar in both sets of statistics. Both sets also feature similar levels.

The **interest rate on German non-financial corporations' stock of loans**¹¹ drops during the period under review in terms of both its mean value and the 80th percentile. This indicates that German non-financial corporations have generally been borrowing at lower interest rates than their legacy holdings. Nevertheless, a trend towards ever-lower interest rates in the stock of loans was already present prior to the coronavirus pandemic; in this case, the change in the lending rate series in AnaCredit can be put into a historical context using the MFI interest rate statistics. As shown in the left panel of **Figure 4**, the shape of both series is very similar at the start of 2019, with both taking on a downward trend. This is also visible in the very high correlation coefficient of 97%. Despite this, the interest rates in the AnaCredit data sets fall somewhat further and from a higher level.

¹¹ This covers only those firms where the average legacy interest rate lies between -5% and 20% in every period (assumption: otherwise, there exist inaccurate interest rate reports).

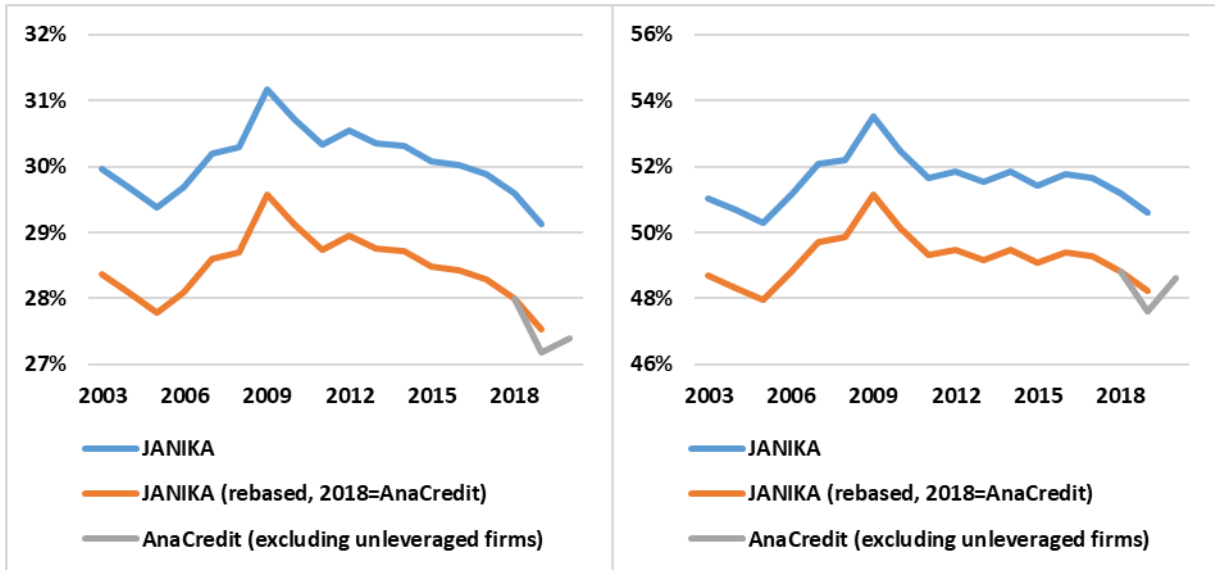
Figure 2: Borrowing metrics for German non-financial corporations



Sources: Deutsche Bundesbank (AnaCredit) and authors' calculations.

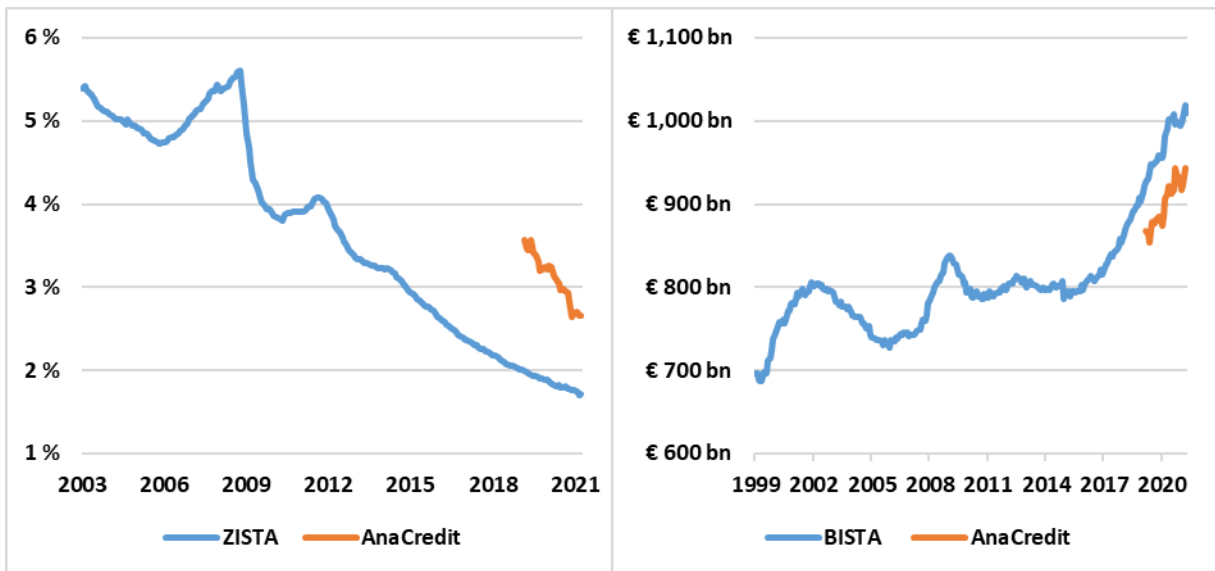
The **nominal stock of bank loans** – which we calculate as the sum of all German banks' outstanding credit claims on German non-financial corporations according to AnaCredit – increased from €886 billion in December 2019 to €926 billion in December 2020 (+4.6%). In order to put this increase in a historical context, we observe the distribution of the annual growth rate of German banks' credit claims according to the monthly balance sheet statistics (BISTA) for the period 1999 to 2020. On the one hand, this indicates that this rise of 4.6% roughly corresponds to the 80th percentile of the BISTA series and is therefore strong but not unusual by historical standards. On the other hand, it should be noted that similarly strong increases in the past were only observed before the dotcom bubble and the global financial crisis, following each of which lending declined noticeably. The right panel of Figure 4 shows the BISTA series used along with the AnaCredit series. Both series indicate a high degree of co-movement, which is also reflected by a high correlation coefficient of 94%.

Figure 3: Mean (left) and 80th percentile (right) of the bank debt ratio of German non-financial corporations*



Sources: Deutsche Bundesbank (AnaCredit, JANIKA) and authors' calculations. * "JANIKA (rebased, 2018 = AnaCredit)" is the JANIKA series that was shifted downwards by the difference between the "JANIKA" and "AnaCredit (excluding unleveraged firms)" series at the data point in 2018. The bank debt ratio in JANIKA calculated as the quotient of the annual financial statement items "bank liabilities" and "total assets". All "0" values in JANIKA are interpreted as "missing" – the analysis is thus limited to leveraged firms. For this reason, unleveraged firms were also removed from the AnaCredit sample in the interest of comparability.

Figure 4: Interest rate on the stock of loans (left) and nominal stock of bank loans (right) of German non-financial corporations



Sources: Deutsche Bundesbank (AnaCredit, BISTA, MFI interest rate statistics) and authors' calculations.

3.2 Dynamics in sectors hit particularly hard by the pandemic

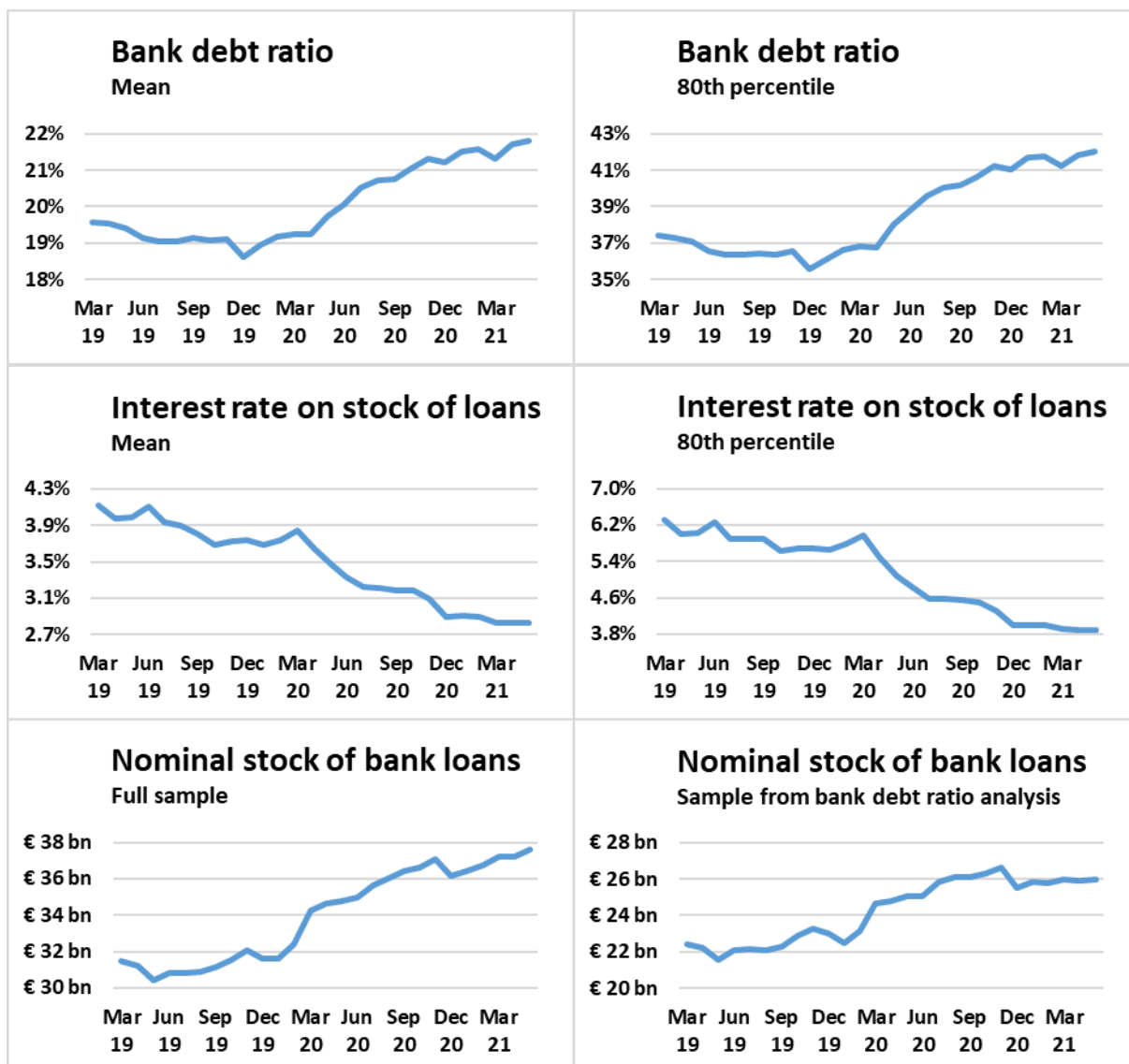
Below, we will examine the dynamics of the bank loan debt of sectors hit particularly hard by the pandemic and the containment measures.¹² Figure 5 shows the corresponding metrics.

With a rise of 2.6 percentage points, the mean of the distribution of the **bank debt ratio** for these firms increased significantly more strongly between December 2019 and December 2020 than in the corporate sector overall (+0.5 percentage point). This growth also appears unusual in a historical context. For instance, the greatest increases recorded in JANIKA for these sectors from 2003 to 2019 are only roughly half as large (see Figure 6). While debt was at a relatively low level before the coronavirus pandemic by historical standards, it jumped during the pandemic to a level the sectors last recorded almost 20 years ago. At 5.5 percentage points, the increase observed in the 80th percentile is even greater still. Figure 7 presents this development broken down by the “divisions” of the NACE Rev. 2 Statistical classification of economic activities. Thus, the particularly hard hit sectors are listed individually here. This shows that the greatest increase was seen in accommodation, food and beverage service activities, travel, and the arts and cultural activities.

Despite the clear rise in indebtedness, the mean and the 80th percentile of the **interest rate on the stock of loans** decreased even for the group of particularly hard hit enterprises. Furthermore, German banks are now clearly more exposed to the particularly hard hit sectors than before the outbreak of the coronavirus pandemic, with the **nominal stock of bank loans** being roughly 14.4% higher in December 2020 than in the same month of the previous year (corporate sector as a whole: +4.6%). However, loans to these sectors represent only a moderate share of German banks’ total loan portfolio. According to AnaCredit, these loans accounted for 4.3% of the aggregate credit claims on all non-financial corporations in Germany in May 2021.

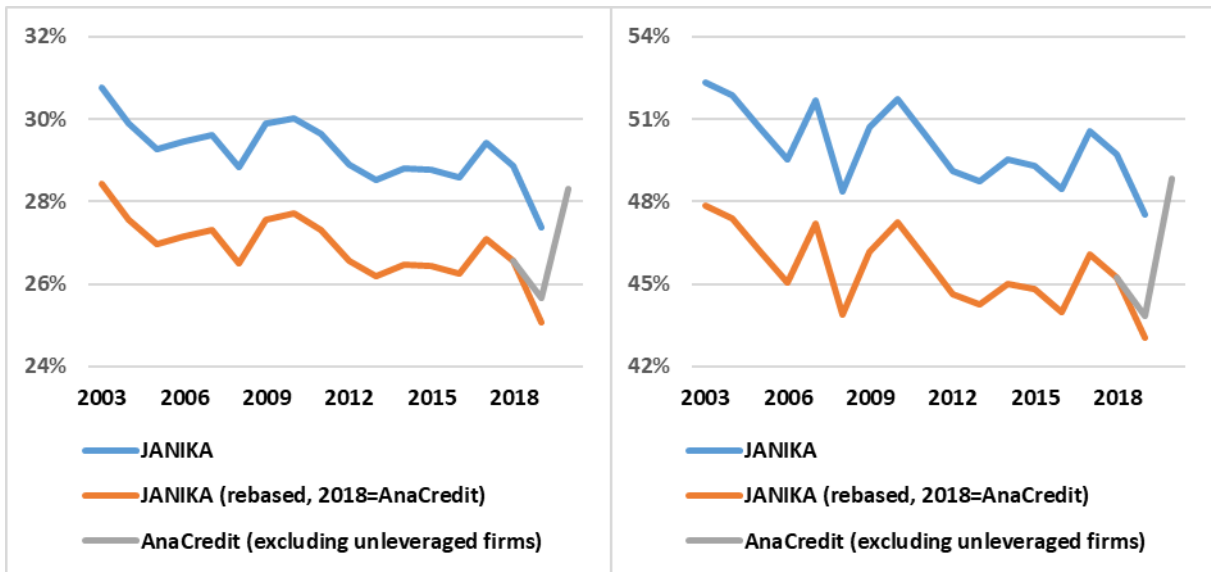
¹² We understand the following sectors to be particularly hard hit by the pandemic: “retail trade (except of motor vehicles and motorcycles)” (NACE code 47), “air transport” (51), “accommodation” (55), “food and beverage service activities” (56), “travel agency, tour operator and other reservation service and related activities” (79), “creative, arts and entertainment activities” (90), “sports activities and amusement and recreation activities” (93) and “other personal service activities” (96). To this end, we use the sectoral classification in AnaCredit according to the most up-to-date data available for each enterprise.

Figure 5: Debt metrics of German non-financial corporations for sectors hit particularly hard by the pandemic*



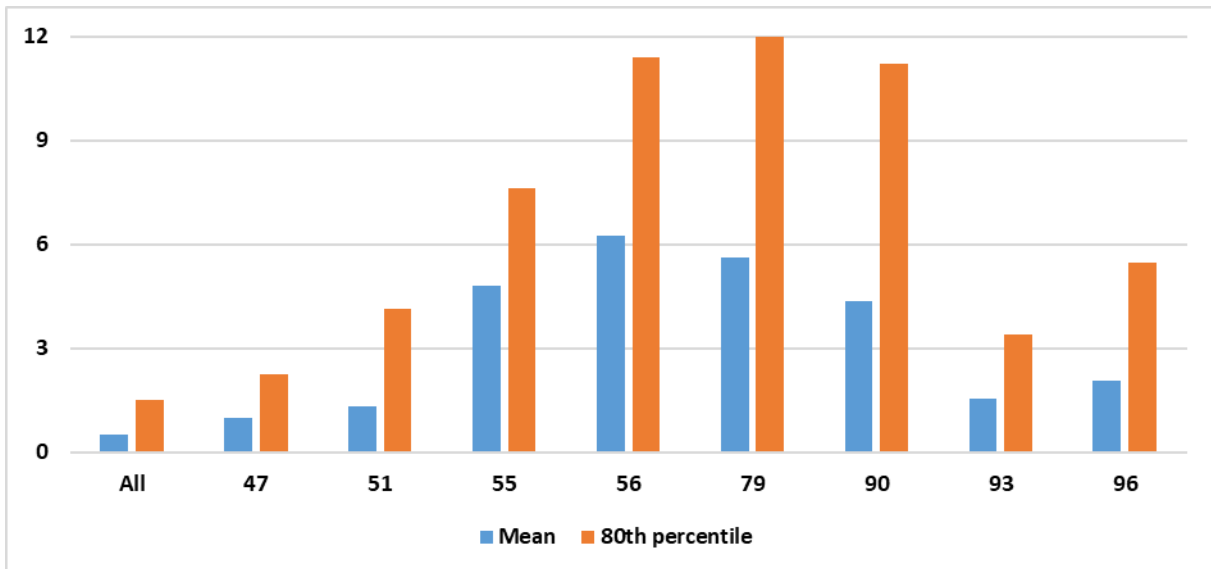
Sources: Deutsche Bundesbank (AnaCredit) and authors' calculations. * See footnote 12 for details on the definition of particularly hard hit sectors.

Figure 6: Mean (left) and 80th percentile (right) of the bank debt ratio of particularly hard hit sectors*



Sources: Deutsche Bundesbank (AnaCredit, JANIKA) and authors' calculations. * For technical details, see the notes to Figure 3 and footnote 12.

Figure 7: Change in the bank debt ratio between December 2019 and December 2020 according to the NACE Rev. 2 divisions (percentage points)*



Sources: Deutsche Bundesbank (AnaCredit) and authors' calculations. * 47: "retail trade (except of motor vehicles and motorcycles)", 51: "air transport", 55: "accommodation", 56: "food and beverage service activities", 79: "travel agency, tour operator reservation service and related activities", 90: "creative, arts and entertainment activities", 93: "sports activities and amusement and recreation activities", 96: "other personal service activities".

4 Summary

In this technical paper we investigate whether the bank loan debt of German non-financial corporations has risen in the wake of the coronavirus crisis. To this end, we use the AnaCredit dataset, which is based on microdata and can be used to carry out very granular analyses. The analyses reveal that even though the bank loan debt rose across the board in the corporate landscape, this growth was not exceptionally large from a historical perspective. In addition, firms were able to borrow at comparatively favourable conditions. By contrast, the rise in indebtedness in sectors hit particularly hard by the coronavirus pandemic was very significant by historical standards. However, these firms were also able to obtain funding at more favourable interest rates. German banks' exposures to particularly hard hit sectors only account for a minor share of the total portfolio of loans to non-financial corporations.

5 References

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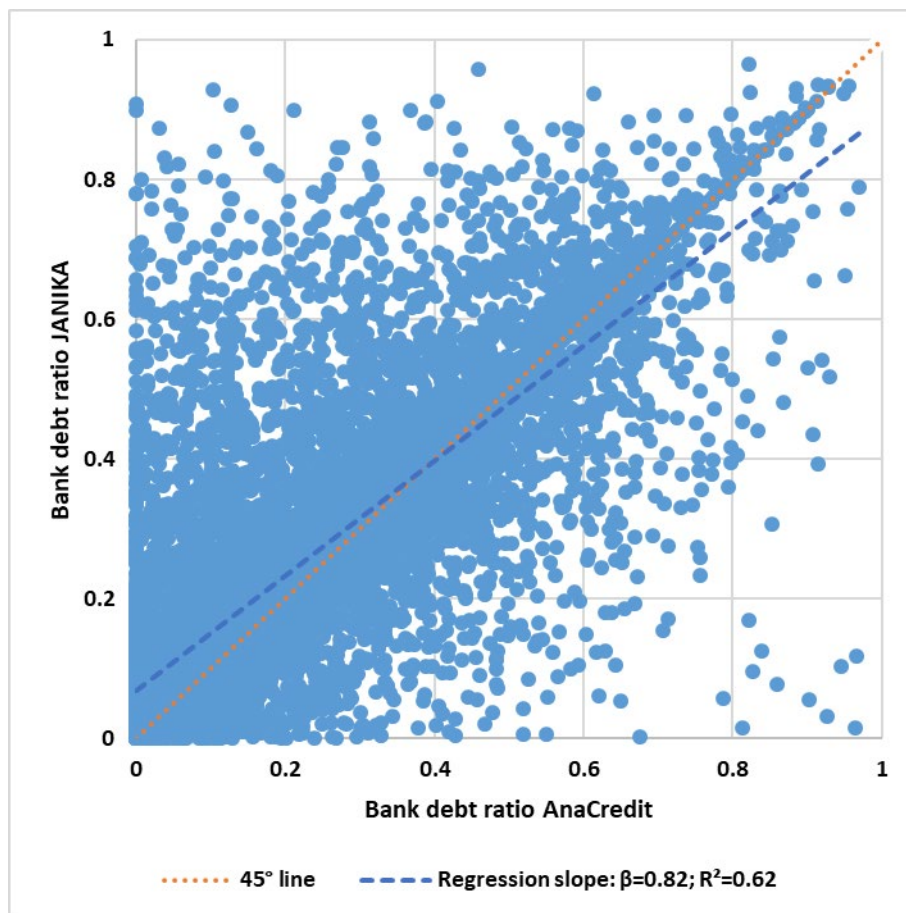
Deutsche Bundesbank (2021c), [Financial statement statistics \(ratios – provisional data\)](#), May 2021, Statistical Series

Deutsche Bundesbank (2021d), [Financial statement statistics \(ratios\)](#), May 2021, Statistical Series

6 Appendix

This appendix presents further comparisons with sources of reference data. Specifically, we compare firm-level data points for December 2019 from the AnaCredit data with the JANIKA annual financial statement data for the end of 2019. Thus, only firms that were captured in both sets of statistics at the same reporting reference date are considered. In doing so, we want to derive a further assessment of how reliable the AnaCredit data are with regard to debt dynamics. Since the JANIKA data have a publication lag of at least a year, whereas the AnaCredit data are already available after a few weeks, this comparison can also be interpreted as how well the AnaCredit data “forecast” the values of the annual financial statement statistics.

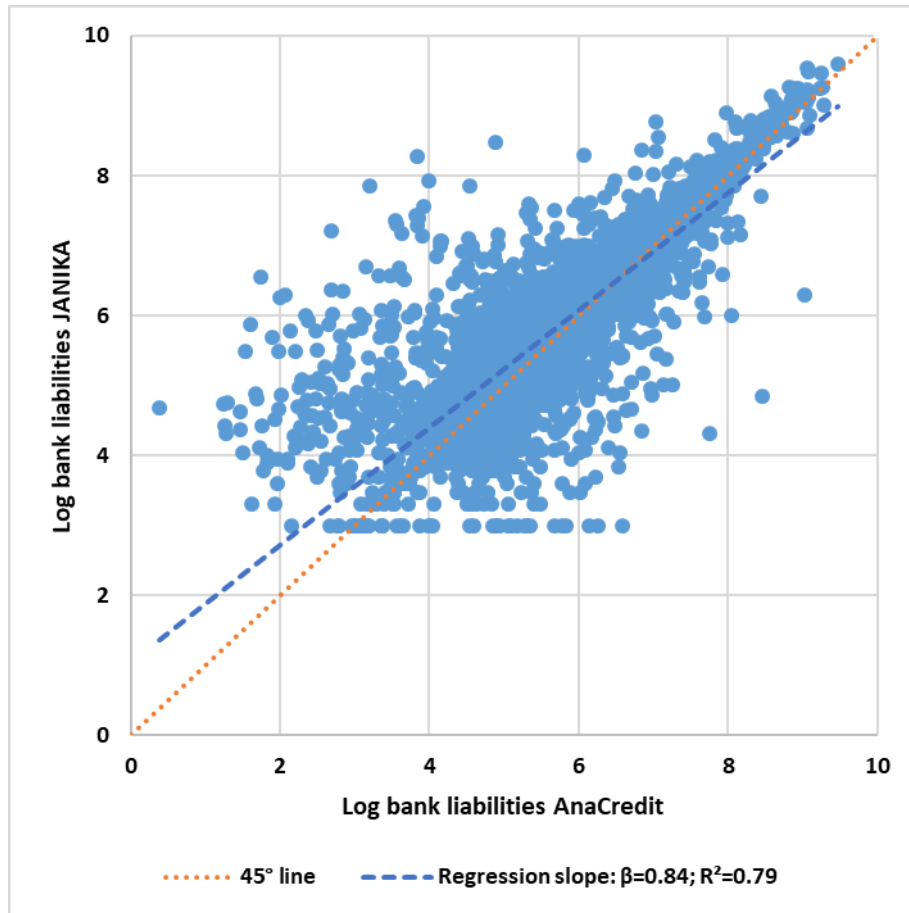
Figure 8: Relationship between the bank debt ratio in JANIKA and AnaCredit



Sources: Deutsche Bundesbank (AnaCredit, JANIKA) and authors' calculations.

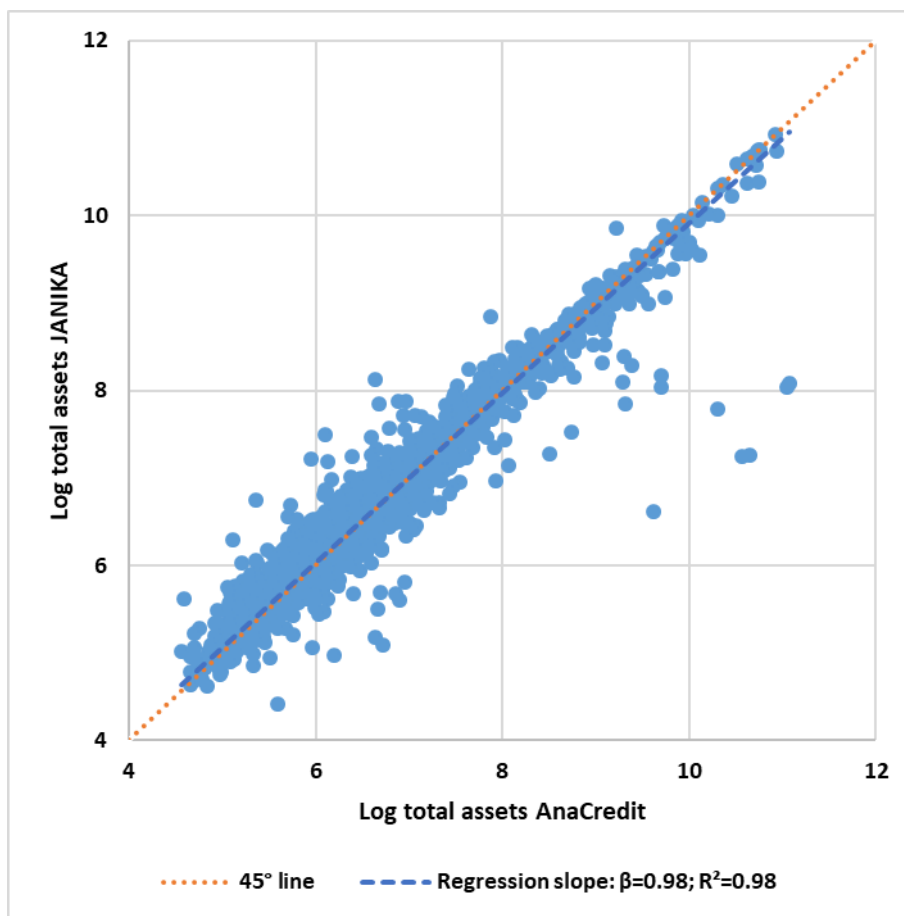
Figure 8 shows that the firm-level bank debt ratios are well aligned in many cases. The high statistical explanatory power (an R^2 of 62%) also supports this assessment. Figure 9 indicates that the degree of alignment in the numerator of the bank debt ratio (the total bank liabilities) is even greater. Figure 10 also shows a very high degree of alignment in the denominator (the firms' total assets). The regression coefficient of 0.98 means that the values shown are almost identical on average.

Figure 9: Relationship between firms' bank liabilities in JANIKA and AnaCredit*



Sources: Deutsche Bundesbank (AnaCredit, JANIKA) and authors' calculations. * Values in the common logarithm (with base 10). There is an evident cluster of values for a y-value of 3 since JANIKA only precisely identifies values in exact €1,000s.

Figure 10: Relationship between firms' total assets in JANIKA and AnaCredit*



Sources: Deutsche Bundesbank (AnaCredit, JANIKA) and authors' calculations. * Values in the common logarithm (with base 10).