

# **The German Business Panel: Insights on Corporate Taxation and Accounting during the Covid-19 Pandemic \***

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## **Abstract**

We introduce the German Business Panel (GBP), a novel large-scale survey of German firms. The GBP periodically surveys executives and key decision-makers in a representative sample of German firms, taking stock of their perceptions, views, and expectations. A particular focus of the survey is on the role of accounting and tax regulation for companies. We present findings from the first wave of the GBP which was in the field over the summer 2020 and addressed the consequences of the Covid-19 pandemic for companies in Germany. Relying on more than 10,000 complete responses, we disentangle how the economic impact of Covid-19 hits industries with varying intensity. We also document that state aid was insufficient for the hardest-hit firms. As a consequence, firms systematically took additional measures like cost-cutting or reducing cash outflows. The state interventions did not lead to managers expecting a substantial increase in future tax rates. We conclude by providing an outlook on how researchers can access and use the survey data for their own research questions.

JEL classification: C81, D22, D25, D80, D84, H00, H12, H32, H20, H24, H25, M40, R38

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## **1. Introduction**

How do firms form expectations and how do they perceive government regulation of accounting and taxation? What are their financial and regulatory constraints? In which ways do taxes, financial reporting and the design of internal reporting systems affect decision-making within firms? How do firms evaluate investment opportunities? The relevance of those questions increases in times of crisis. To address them, we need better data. Although many data sources are publicly available, existing company data have several shortcomings. Commercial databases and government-provided datasets are limited in terms of coverage and scope. For the most part, they contain only quantitative data from publicly disclosed financial statements or information provided in tax filings while they do not cover managers' rationales and attitudes behind these numbers. Therefore, such data do not include important economic variables such as expectations, risk perception, or uncertainty. Available data also hardly allow any inferences about the internal processes behind decisions within firms. An additional shortcoming of most commercially available datasets is their focus on publicly listed firms. As a result, we know little about the economic behavior of private firms which are often small in size but represent the largest share of companies in most economies around the world (Angelini & Generale 2008, Poschke 2018).

Against this background, we introduce the German Business Panel (GBP): a recurring, broad-based survey of executives and firm owners. The survey features biannual questionnaires addressing important research questions that are difficult to examine using existing data. The inclusion of randomized survey experiments allows researchers to exogenously vary elements of the survey instruments, thereby providing attractive opportunities to identify causal relationships. The survey focuses on unique aspects of accounting and taxation, which is an important blind spot in many existing large-scale survey panels. The collected data are made available in the spirit of

the open research data concept and the FAIR principles to stimulate research in business economics, especially in areas for which empirical evidence is hard to collect.<sup>1</sup> For example, the survey includes questions regarding tax rate uncertainty, expectations about future tax rates, tax planning processes within firms, expected costs and benefits of mandatory disclosure, interactions between internal and external financial reporting, and company characteristics such as cost structure or investment plans.

The recurring nature of the GBP offers the opportunity to study these questions over time and to identify trends while controlling for unobserved firm-specific effects. The panel design is one of the distinguishing features compared to previous one-shot survey studies in accounting and taxation such as Graham et al. (2010; 2011; 2014; 2017), or Robinson et al. (2010). A distinctive methodological feature is the implementation as a rolling panel, which allows to combine the advantages of a rolling cross-section design and of a panel data framework.

To illustrate the new panel and introduce the data, we present the results of the first wave of the survey. The first wave was in the field between July and October 2020. The questions of this first wave focused on the implications of the Covid-19 pandemic for firms, particularly in the context of taxation and accounting matters. We have randomly drawn our sample from the Bureau van Dijk Orbis dataset. More than 10,000 firms participated. Benchmarked against the target population in the business register of the German Federal Statistical Office (AFiD-Panel Unternehmensregister, URS), the final sample overrepresents firms with revenues larger than 1 million Euros (43 percent in GBP vs. 12 percent in the population) and more than nine employees (43 percent in GBP vs. 11 percent in the population) substantially. This is due to overrepresentation of companies subject to mandatory disclosure in company registers (e.g., underrepresentation of

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<sup>1</sup> FAIR is short for “findable, accessible, interoperable, reusable”, see Wilkinson et al. (2016).

sole proprietors). To account for this sampling issue, the GBP data include sampling weights consistent with marginal distributions of the target population of firms in the business register of the German Federal Statistical Office. The data granularly discern more than 500 industries.<sup>2</sup> The set of participating firms is representative for the type of firms that will be included in future waves of the GBP. We received responses mainly from owners or CEOs (70 percent of respondents) and heads of accounting, tax, and marketing departments (about 7 percent) from firms of all sizes and industries.<sup>3</sup>

We use the generated information to break down the impact of the Covid-19 crisis by industries and find strong disparities depending on the type of market the firm operates in. Profits and revenues of providers of personal or mobility-related services like airlines or travel agencies have been depressed by more than 70% compared to the level of January 31, 2020 before the pandemic spread to Germany. Profits for other types of services, for instance those of lawyers, tax advisors, and accountants have, on the contrary, surged. At the same time, travel and contact restrictions did not affect profits in the construction sector. We show that firms used government aid (immediate assistance program and interim transfers, short-time work, deferral of tax payments) most frequently to reduce liquidity needs. The results further suggest that the assistance targeted at small companies, self-employed businesses and freelancers effectively ensured firm survival. Finally, we document that firms which were forced to take further actions in addition to government support and firms which were not eligible for these programs were careful not to lose

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<sup>2</sup> The covered industries include, among others, retail, communication, manufacturing, service professions, construction, health, hospitality, entertainment and recreation, real estate, insurance, transportation, education, energy, agriculture. Industries are defined according to the so-called *Klassifikation der Wirtschaftszweige* (WZ 2008).

<sup>3</sup> We collect and store the data subject to very strict data protection measures. For example, we use a specially secured room equipped with surveillance cameras. Still, more than 20 percent of respondents did not provide any information about their position within the company, which underscores that data protection is particularly important to the respondents.

employees. They took the following managerial steps to cope with the crisis most frequently: i) reduction of bonus payments and future wage increases, ii) reduction of payouts to shareholders, iii) price increases, iv) consumption of internal reserves (i.e., reduction of retained earnings). These results could not have been observed with available archival or administrative data sources.

Besides direct financial aid, tax regulation played a key role in governments' response to the crisis. A temporary cut in the Value Added Tax (VAT) rate was one major change in German tax regulation. The policy aimed to stimulate private consumption through lower prices. The GBP data shed light on adjustments to final consumer prices during the period with the temporary tax cut. While many companies indicate some price change, the results suggest that the average price adjustment across all firms was relatively low. However, we find large heterogeneities across industries and observe that firms in some heavily affected industries even increase prices (presumably due to Corona-induced price pressure). We also investigate expectations about future tax changes and find that firms mostly do not expect large tax increases over the next two years.

In addition to providing unique insights into firms' coping with the Covid-19 crisis, the paper illustrates the usefulness of the GBP for empirical research in the context of accounting and taxation. The objective of our work is to provide a description of the data and to outline how interested researchers can use the survey database for their purposes. We also highlight how researchers can contribute novel questions or experiments to future waves of the survey.

The paper proceeds as follows. Section 2 provides an overview of the GBP. Section 3 presents results of the Covid-19 related first wave of the GBP. Section 4 provides an outlook on the prospective steps of the panel (including data provision to the research community, linkage with other data sources and the possibility for researchers to submit own questions to the survey). Section 5 concludes.

## 2. The German Business Panel

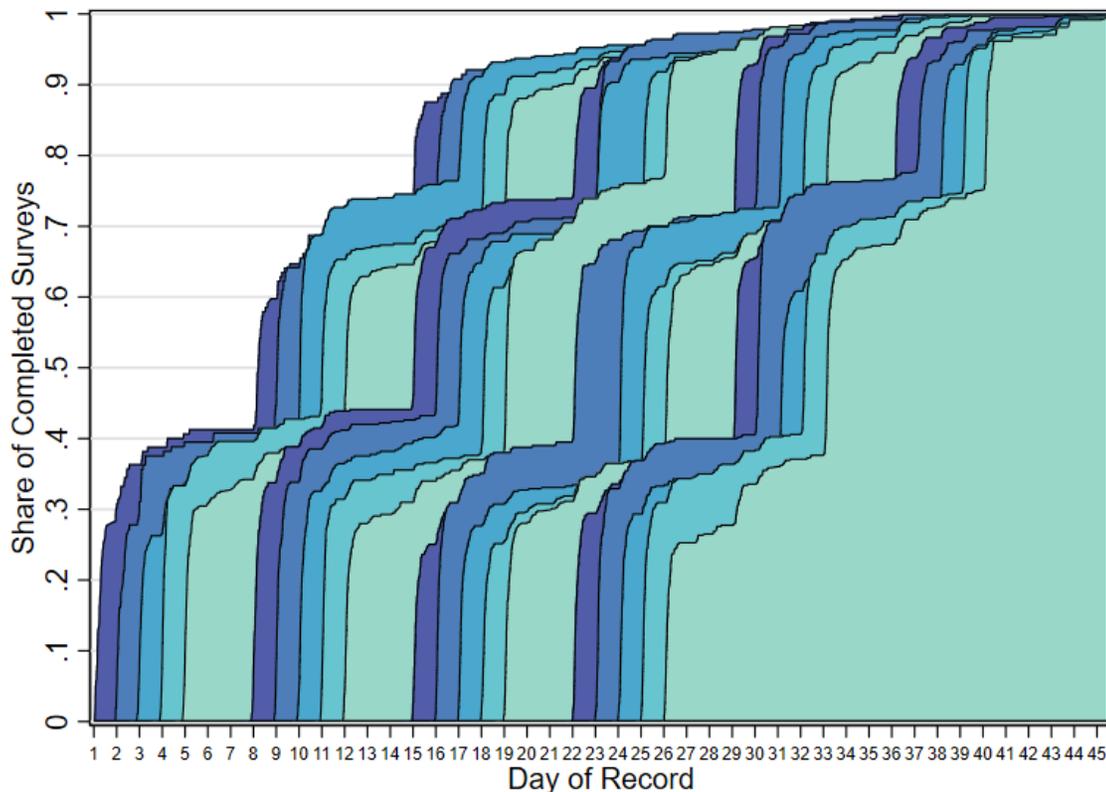
### 2.1. *The Sampling Frame*

The core sample of the GBP is randomly drawn from company data included in Bureau van Dijk Orbis which covers both private and public firms. We invited most participants via email and combined the resulting sample with other survey modes. The sample is conditioned on firms operating in Germany and having filed an email address to the register through which a computer assisted web interview (CAWI) can be initiated. We add a randomly drawn sample of firms without available e-mail addresses. We initiate computer assisted telephone interviews (CATI) for these firms. To increase the sample size of the empirical analysis, the core sample is combined with convenience samples recruited from existing networks and contact persons.

### 2.2. *The Rolling Cross-section Design*

A unique feature of the dataset is its rolling cross-section design. In combination with the currently ongoing second wave and future waves, this design is being extended to a fully-fledged rolling panel. Figure 1 shows the principle behind the rolling cross-section design. We grouped firms randomly into 20 groups assigned to 20 field days. Each day (except on weekends) we sent invitations to participate in the survey to one of the groups. We sent the first reminder after seven days and the second one after 14 days. In Figure 1, we indicate the day of record along the horizontal axis and show the share of completed surveys for each day and each daily set of invitations on the vertical axis. One third of firms reacts immediately to our invitation emails (often at 7 am). However, the reminders also play an important role as each of them increases the share of completed surveys again by roughly another 1/3.

**Fig. 1: Rolling Cross-Section Design**

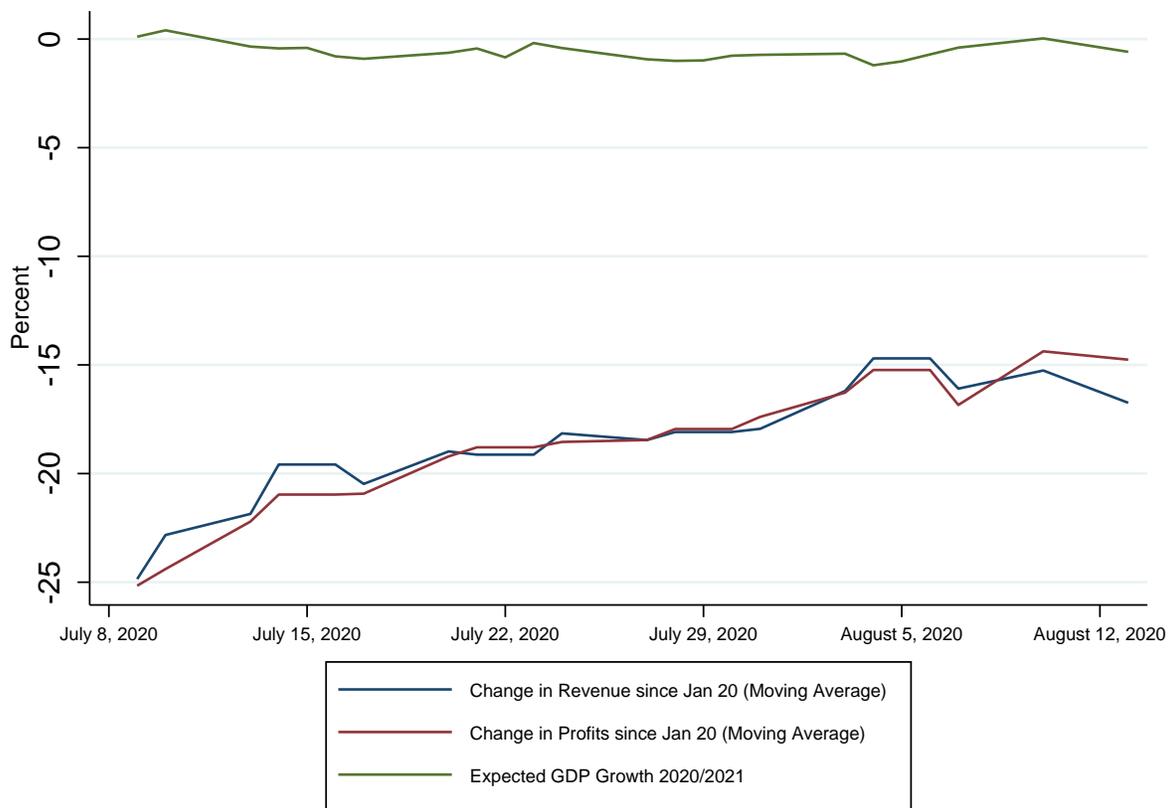


*Source:* German Business Panel (GBP), wave 1, July-October 2020. *Notes:* The figure plots cumulative distributions of the time of record by day of invitation. No invitations have been sent on weekends. Seven (fourteen) days after initial invitation the first (second) reminder has been sent. We started sending invitations on June 6, 2020 and sent the last set of invitation on July 31, 2020. The last reminder has been sent on August 14, 2020. We sent a thank you message on October 23, 2020.

The main advantage of the rolling cross-section design is that it allows researchers to track variables over time at a high frequency. This is particularly relevant for the identification of relevant events, short-term trends, and recurring patterns, providing timely information for policy making. Figure 2 illustrates this feature. We show the day of records on the horizontal axis and the seven-day moving averages of key variables on the vertical axis. These exemplary variables are changes of revenues and profits (in percent) since January 2020. For comparison, we show the daily arithmetic averages of expected GDP growth for 2020/21. While there is little variation over time in the latter variable, the changes in companies' revenues and profits clearly track the

economic recovery over the course of summer 2020 (with changes in revenues and profits increasing from about -25 to -15 percent).

**Fig. 2: Time-Series Variation in the Rolling Cross-Section Design**



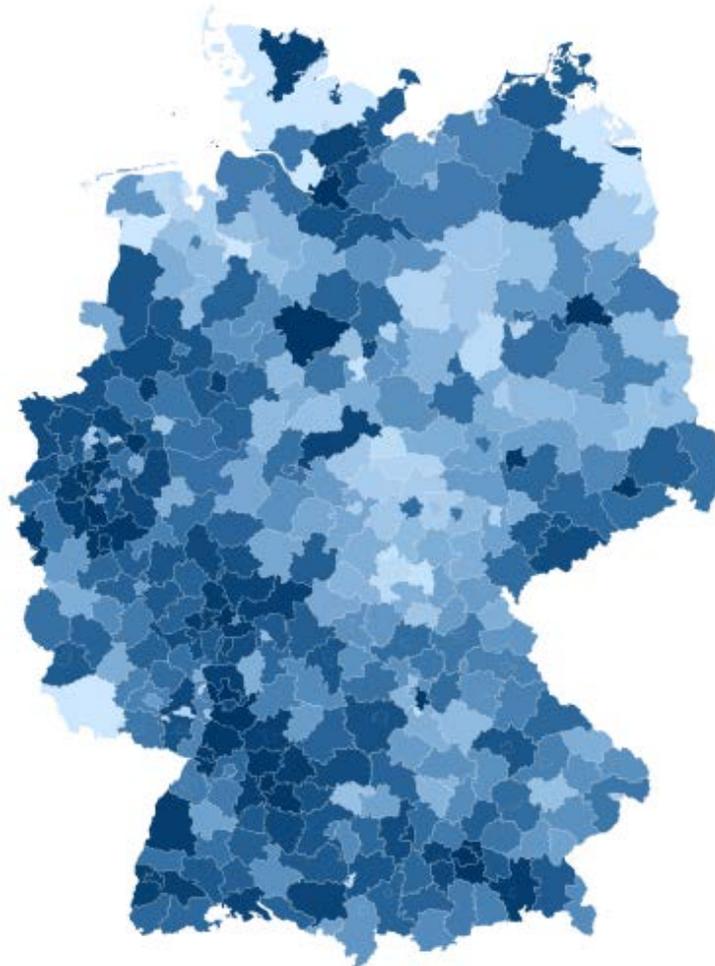
*Source:* German Business Panel (GBP), wave 1, July-October 2020. *Notes:* The figure plots the seven-day moving averages of the average changes of revenues and profits since January 2020 and average expected GDP growth from 2020 to 2021 by day of record. All figures are unweighted. This is based on the survey question “To what extent were the following key figures affected by the Corona crisis? Please indicate by what percentage the key figures have changed compared to 31.01.2020.” and on “What do you expect: By what percentage will the gross domestic product (GDP) change in the years 2020 and 2021 compared to the respective previous year?”.

### 2.3. The Spatial Scope of the Dataset

The GBP sample covers companies from all regions of Germany. Figure 3 presents the spatial distribution of respondents by county. Naturally, in areas with lower population density (e.g., federal state of Brandenburg), the number of companies is small, while the number of companies

is relatively large in metropolitan regions with above-average GDP like Hamburg, Frankfurt, Stuttgart, Cologne or Munich.

**Fig. 3: Spatial Distribution of GBP Participants**



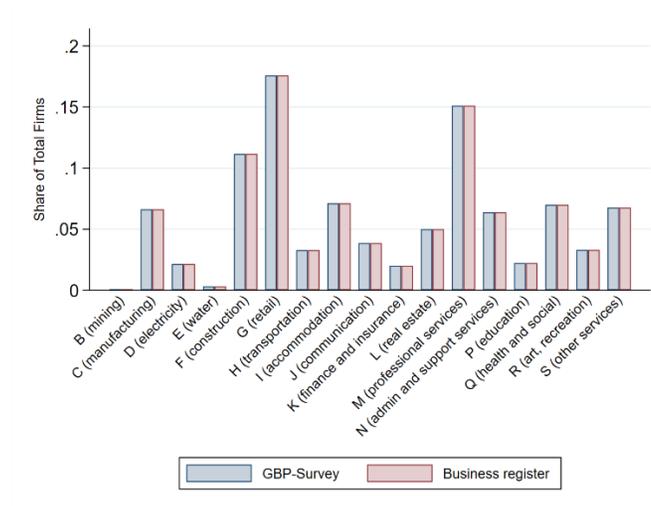
*Source:* German Business Panel (GBP), wave 1, July-October 2020. *Notes:* The map shows the unweighted number of participants by county (Kreis) in which the business is located.

## 2.4. Firm and Respondent Characteristics

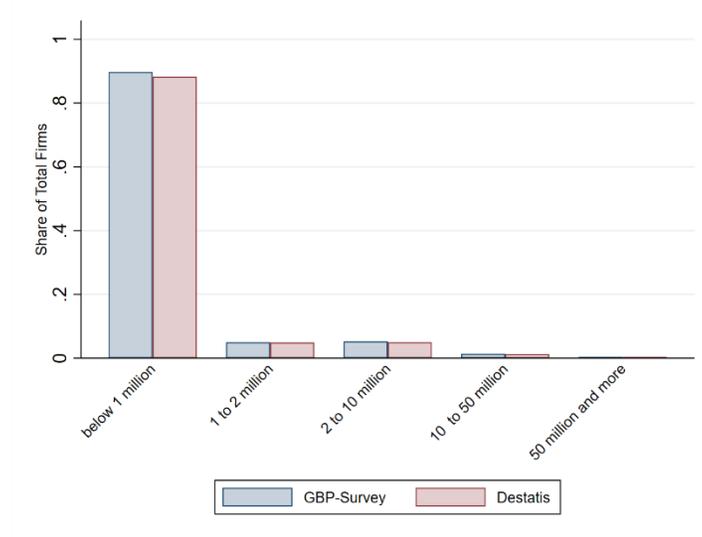
In order to provide high quality data, the German Business Panel aims to be representative of the universe of companies located in Germany and to record responses from a key decision-maker within the company. Figure 4 shows that the marginal distribution of the business register provided by the Federal Statistical Office is well matched with the sampling weights provided with the dataset. These weights are obtained using the raking method (Kolenikov, 2014) and the multiple imputation by chained equations algorithms (MICE, Royston, 2011). The figure shows weights calibrated using industry, revenues, employees, and legal form as targets.

**Fig. 4: Distribution of Firm Characteristics in the GBP vs. Target Population**

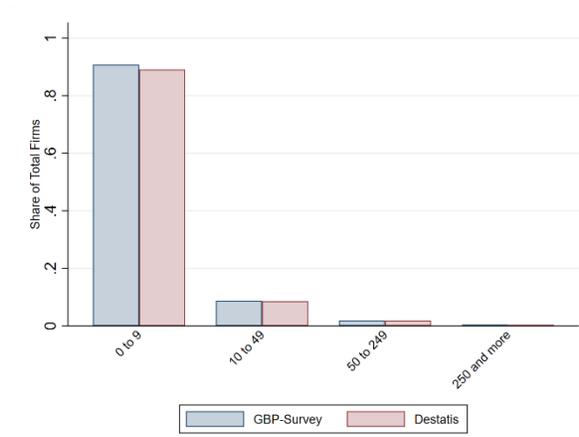
*Panel A: Raking Weights by Industries*



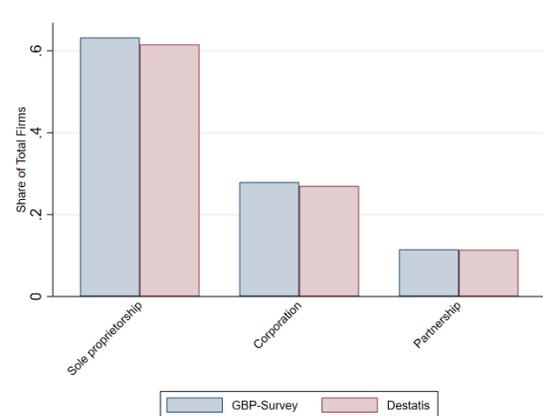
*Panel B: Raking Weights by Revenues*



*Panel C: Raking Weights by Employees*



*Panel D: Raking Weights by Legal Form*



*Source:* German Business Panel (GBP), wave 1, July-October 2020. *Notes:* The figures show the share of firms in each category of industry (Panel A), revenue class (Panel B), employment size class (Panel C), and legal form (Panel D) for the 2018 Business Register (AFiD-Panel Unternehmensregister, URS) and the GBP survey respondents. The shares of the GBP survey are weighted using the raking algorithm based on MICE imputations.

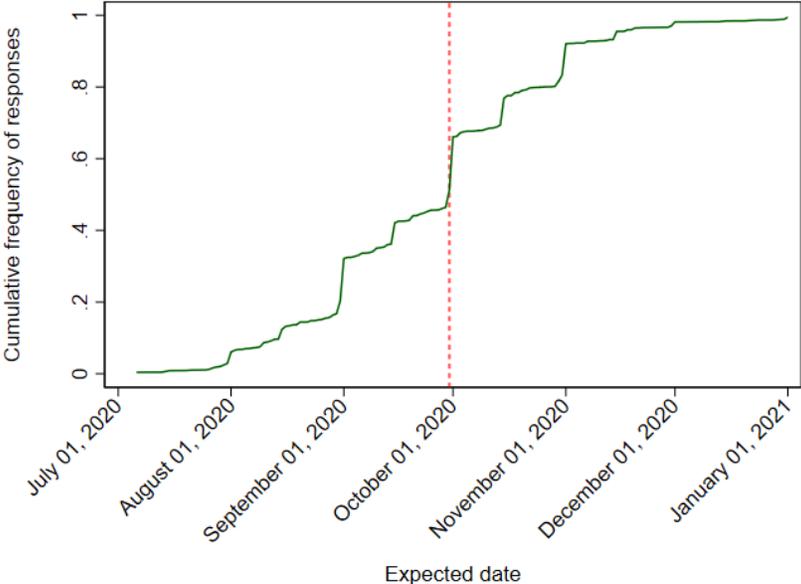
The GBP also includes questions on characteristics of the survey respondents. These responses shed light on the respondents' status and function in the company as well as their familiarity with the decision-making process in their companies. The responses show that the majority of respondents are owner-managers and CEOs. A smaller share works in the finance, accounting, tax, or marketing department. Another small group indicates other departments, often also in a leading position. The high number of respondents who do not wish to specify their position (22.4 %) shows the importance of data protection. A similar picture emerges when asking for their function in the firm. Most respondents indicate to be owners and top-level executives, few are department heads, or have other functions like serving on the board. Again, many respondents refuse to specify their position (21.9 %). The distribution of the respondents' highest qualification shows that a master's degree is most common (36.7 %), followed by having served an apprenticeship and holding a master of craft's degree (22.9%). The shares of respondents with a doctoral, a bachelor's degree, or some other degree are all around 5%. Only few never obtained any degree. Our sample includes 80% male and 20% female participants. This distribution reflects almost exactly the gender share in the German Commercial Register, see Bürgel (2010).

Using questions on future events shows that the precision of collective forecasts of this group of managers is remarkably reliable. Evidence from the initial data indicates that their ex-ante expectations relate well to ex-post outcomes. One example is the prediction accuracy for the beginning of the second wave of the pandemic in Germany (the first wave being the initial peak of infections in spring 2020). During the summer 2020, we have asked these managers on what date they expect this second wave to begin. The median response was October 1, 2020 (see Figure

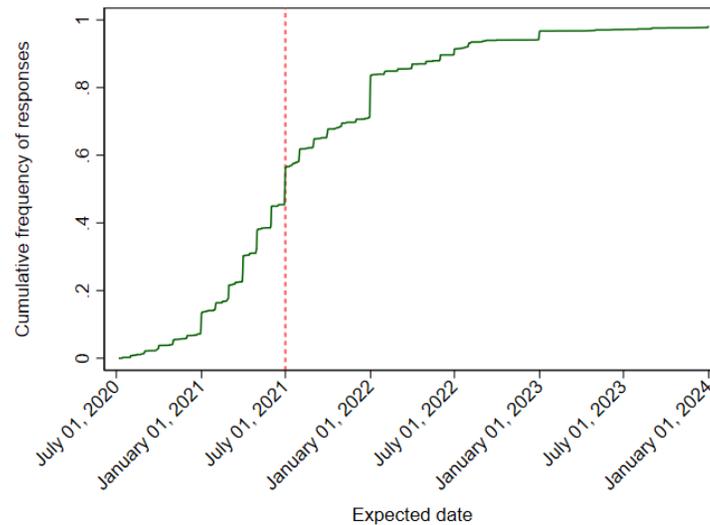
5 for the distribution of the estimates). This estimate coincides almost exactly with the actual start of the second wave (the number of reported daily infections in Germany increased from 1,092 on September 30 to 10,132 on October 31, 2020, source: Robert Koch Institut). If these estimates remain similarly reliably (with the responses reflecting the wisdom of the crowd), we can expect the restrictions of public life in Germany to remain in place until July 1, 2021. This date represents the median response when we asked managers on what date they expect public life in Germany no longer to be restricted due to the Corona crisis.

**Fig. 5: Manager Expectations about the Timing of the Crisis**

*Panel A: Start of the Second Covid-19 Wave in Germany*



### Panel B: End of Public Life Restrictions in Germany



Source: German Business Panel (GBP), wave 1, July-October 2020. Notes: Panel A shows the cumulative distribution function of the expected dates when the second wave of Covid-19 infections will begin in Germany. It is based on the survey question “Please give an estimate: On what date will the second wave begin?”. Panel B shows the cumulative distribution function of the expected dates when Covid-19 ceases to have an impact on public life. It is based on the survey question “Please give an estimate: On what date will public life in Germany no longer be restricted due to the Corona crisis?”. The dashed vertical lines indicate the median expected event dates.

### 2.5. Comparison with other Datasets

To provide further evidence on how the GBP sample compares to the universe of German companies, Table 1 shows the respondents’ perception of the Covid-19 pandemic as a source of uncertainty for businesses. We benchmark these answers to an equivalent question from another survey (Bloom et al. 2020). The distributions of the reported responses are very similar in indicating most businesses face substantial uncertainty from the pandemic (90.1 % in the GBP vs. 85.8 % in Bloom et al. 2020).

**Table 1: COVID-19 as a source of uncertainty for own business, % of respondents**

|                                | GBP COVID-19 Survey | Decision Maker Panel (July 2020) |
|--------------------------------|---------------------|----------------------------------|
| Not important                  | 2.3                 | 2.1                              |
| One of many/Somewhat important | 7.5                 | 12.1                             |
| Top two or three/Important     | 21.9                | 31.0                             |
| Largest/Very important         | 68.2                | 54.8                             |

*Source:* Own calculations based on the German Business Panel (GBP), wave 1, July-October 2020, and the Decision Maker Panel. The Table is based on 10,629 survey responses by firms in Germany. Unweighted frequencies.

Another interesting comparison is based on a question eliciting risk aversion on an 11-point Likert scale. The same instrument is available for the subset of sole proprietors in the Socio-Economic Panel. The comparison of this group's risk-aversion to the GBP respondents in Table 2 reveals that the two groups exhibit very similar distributions in the degree of risk-aversion. Compared to the general population of Germany, both groups are less frequently risk averse and more frequently risk loving (Wagner et al., 2007, Goebel et al., 2018).

**Table 2: Risk aversion in the GBP and in the SOEP**

|                                     | GBP COVID-19 Survey | SOEP (2016) |
|-------------------------------------|---------------------|-------------|
| Extremely risk averse               | 3.2                 | 2.2         |
| Most risk averse                    | 3.5                 | 2.6         |
| Very much risk averse               | 9.7                 | 7.0         |
| Very risk averse                    | 12.6                | 10.0        |
| Risk averse                         | 8.3                 | 8.4         |
| Neither risk averse nor risk loving | 20.7                | 19.3        |
| Risk loving                         | 11.7                | 12.7        |
| Very risk loving                    | 14.3                | 17.0        |
| Very much risk loving               | 11.1                | 14.1        |
| Most risk loving                    | 2.5                 | 4.0         |
| Extremely risk loving               | 2.6                 | 2.7         |

*Source:* Own calculations based on the German Business Panel (GBP), wave 1, July-October 2020, and the Socio-Economic Panel (SOEP), version 32, 2016, <http://doi.org/10.5684/soep.v32>. The table is based on survey responses of 10,680 firms in the GBP and 14,573 firms in the SOEP. Unweighted frequencies.

### 3. Survey Results: Implications of the Covid-19 pandemic for firms

This chapter presents some key findings from the first wave of the GBP. The first survey wave was in the field between July and October 2020 (i.e., after the first peak of the pandemic in Spring 2020) and focused on the implications of the Covid-19 pandemic for firms. This chapter serves two purposes. First, the findings of the first wave are relevant and of interest in themselves because they address the important question of how firms were affected by the pandemic and they shed light on the efficacy of government measures to support firms. Second, the first wave is illustrative for future waves of the GBP and shows which type of questions can be addressed with our firm survey. In what follows, we therefore particularly focus on the analysis of survey questions that are illustrative of the potential of our survey approach. The following analyses are based on approximately 12,000 unweighted firm responses.

#### 3.1. *Crisis Effects on Performance Indicators and Perceptions of Economic Consequences and Government Support during the Crisis*

We start off with a descriptive overview of some selected variables. Table 3 depicts how key firm indicators were impacted in the course of the pandemic. In particular, the table shows how the respective firm indicator changed relative to the pre-pandemic situation in January 2020 (in percent). The firms in our sample reported to have had a substantial drop in monthly revenue (-17.8%), profits (-17.8%) and available liquidity (-8.3%). Outstanding bills (+4.0%) and liabilities (+6.3%) increased significantly in the course of the pandemic. We also observe that accruals went down (-3.8%) and confirm that access to production inputs was hampered (-0.6%). Overall, these results confirm the notion that the spring 2020 peak of the pandemic has had a very strong adverse effect on firms and provide a nuanced real-time picture of the crisis impact on firms.

**Table 3: Key Performance and Accounting Indicators of Survey Participants**

|                   | Obs    | Mean  | Std. Dev. | Min  | Max |
|-------------------|--------|-------|-----------|------|-----|
| Monthly revenue   | 11,981 | -17.8 | 44.4      | -100 | 100 |
| Employees         | 11,783 | 1.7   | 31.8      | -100 | 100 |
| Liquidity         | 11,509 | -8.3  | 40.6      | -100 | 100 |
| Liabilities       | 11,219 | 6.3   | 30.7      | -100 | 100 |
| Outstanding bills | 11,139 | 4.0   | 32.7      | -100 | 100 |
| Profits           | 11,297 | -17.8 | 44.9      | -100 | 100 |
| Accruals          | 10,284 | -3.8  | 34.7      | -100 | 100 |
| Access to inputs  | 8,953  | -0.6  | 29.4      | -100 | 100 |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The Table is based on 11,981 survey responses by firms in Germany. The following survey question is used in this Table: “To what extent were the following key figures impacted by the Corona crisis? Please indicate by what percentage the key figures have changed compared to 31.01.2020.” The table reports unweighted summary statistics for the respective indicator.

We also surveyed if firms cancelled or postponed investments due to the pandemic. Our findings, summarized in Table 4, clearly indicate that the pandemic had a very adverse effect on investment plans. In particular, the firms in our sample reported on average that 21.8% of investments which they had planned prior to the pandemic are postponed. 14.1% of planned investments are even cancelled due to the pandemic. Overall, this suggests that more than one third of all investment plans that existed pre-pandemic were adversely affected by Covid-19. These results illustrate the capability of surveys to measure important variables, that are not included in archival data, on a real time basis.

**Table 4: Investment Plans of Companies during the Covid-19 Crisis**

|                                      | Obs   | Mean | Std. Dev. | Min | Max |
|--------------------------------------|-------|------|-----------|-----|-----|
| Share of investments to be postponed | 9,504 | 21.8 | 32.2      | 0   | 100 |
| Share of investments to be cancelled | 9,419 | 14.1 | 27.3      | 0   | 100 |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The following survey questions are used in this Table: “Have you had investment plans prior to the Corona crisis which you now postpone or cancel because of the Corona situation?”. The table reports unweighted summary statistics for postponed and cancelled investments respectively.

The previous results suggest a strong impact of the pandemic on firms. What are the resulting implications for the probability that a firm survives the pandemic without bankruptcy? To shed light on this question, we asked firms to estimate which fraction of firms in their industry will survive the pandemic. We deliberately did not ask for survival probability of the own firm to avoid potential biases in the answers (e.g., due to over-confidence), and instead asked about firms in their own industry. Table 5 reports that firms in our survey sample estimate that 1/5 of all firms in their industry will not survive the Corona crisis. A natural next question then is how much larger this fraction would have been in the absence of government actions to support firms and consumption. To shed light on this, we asked firms if they believe that they would have survived the Corona crisis if they had not benefitted from any form of governmental aid. We find that 43% of all firms report that they would not have survived without government support. Overall, these numbers again underline the significant impact of the crisis, and they provide evidence that adverse effects on the economy would have been even worse if the government had not intervened with massive support programs (see section 3.4 below for more on this).

**Table 5: Descriptive Statistics for the Survival Estimates**

|                                 | Obs   | Mean | Std. Dev. | Min | Max |
|---------------------------------|-------|------|-----------|-----|-----|
| Survival with state aid         | 7,277 | 56.6 | 49.6      | 0   | 100 |
| Expected survival rate industry | 9,719 | 79.4 | 18.7      | 0   | 100 |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The following survey questions are used in this Table: “Would your company have survived the corona crisis without taking up any governmental measures?”; and “Please give an estimate: What fraction of companies in your industry will survive the Corona crisis until 31st December 2020?”. The table reports unweighted summary statistics for the respective question.

Considering the important role of government measures in the context of the crisis, we also surveyed if firms evaluate government interventions to be justified. This question is subtler than it seems on first glance: on the one hand, the economy was stabilized by government interventions,

but, on the other hand, some firms might believe that government action was too comprehensive, resulting in a situation where market mechanisms are annulled and firms that had made losses even before the crisis were artificially kept alive by the government. The results, reported in Table 6, clearly suggest that surveyed firms find the government interventions justified; almost 85% of survey respondents indicated that they evaluate the government interventions to be “justified” (44.4%) or even “absolutely justified” (40.5%). This question again illustrates the value of surveys: archival data do not include such types of questions although they provide evidence that satisfaction with government interventions is high. This satisfaction, in turn, contributes to better compliance with the imposed pandemic-related restrictions.

**Table 6: Managerial Perceptions of the Government Aid Programs**

|                                   | Share of respondents |
|-----------------------------------|----------------------|
| Absolutely unjustified            | 1.8                  |
| Unjustified                       | 3.6                  |
| Neither justified nor unjustified | 9.7                  |
| Justified                         | 44.4                 |
| Absolutely justified              | 40.5                 |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The Table is based on 1,236 survey responses by firms in Germany which were not subject to an information treatment preceding this question. The following survey question is used in this Table: “Do you think it is justified for the government to intervene with this stimulus package at the taxpayer’s expense?”. The table depicts the unweighted share of firms which chose the respective reply category.

### 3.2. Which Companies Were Hit Hardest?

The GBP data track the changes in profits and revenues during the calendar year 2020 (compared to 2019) and, thus, provides evidence on the impact of the crisis. Table 7 reports these results by industry. We list industry averages for the change in profits and revenues of the ten most heavily affected industries and add information on the five industries which experienced the least severe impact. The results show that non-surprisingly those industries are hit hardest where the

business model relies on (a) the mobility of people (e.g., airline or train carriers, hotels, travel agencies) or (b) the gathering of fairly large groups of people (e.g., restaurants, entertainment, sport events, trade fairs). The revenues of these companies have been depressed by up to 74.5% (for the organizers of fairs, exhibitions, and congresses) relative to the period before the pandemic spread to Germany.

Other industries benefit from the consequences of the pandemic. On average, retail sales revenues (both within stores and direct sales) increase, especially for food, beverage and tobacco products (+5.2%). Revenues of the construction industry (both underground engineering and building installation) are also surging, pointing to potential benefits from government investments in infrastructure that were intended to foster growth.

**Table 7: The Impact of the COVID-19 Crisis by 3-digit Industry**

| Industry                                                                     | Change in Revenue | Change in Profits | Survival of Industry |
|------------------------------------------------------------------------------|-------------------|-------------------|----------------------|
| <i>Industries with the most negative impact on revenues:</i>                 |                   |                   |                      |
| Fair, exhibition and congress organizers                                     | -74.5%            | -63.8%            | 53.3%                |
| Travel agencies and tour operators                                           | -69.4%            | -66.7%            | 58.4%                |
| Catering services                                                            | -61.0%            | -64.0%            | 62.8%                |
| Provision of other services relating to entertainment and recreation         | -59.4%            | -60.6%            | 63.4%                |
| Leasing of machines, equipment and other movable assets                      | -58.1%            | -52.2%            | 71.7%                |
| Other passenger land transport                                               | -54.8%            | -56.0%            | 68.2%                |
| Hotels and other provisions of lodging                                       | -52.8%            | -54.8%            | 67.0%                |
| Beverage serving activities                                                  | -51.3%            | -45.1%            | 58.9%                |
| Creative, arts and entertainment activities                                  | -47.9%            | -48.5%            | 65.8%                |
| Provision of sports activities                                               | -42.1%            | -34.0%            | 77.2%                |
| <i>Industries with the most positive impact on revenues:</i>                 |                   |                   |                      |
| Building installation                                                        | 3.6%              | 2.2%              | 86.9%                |
| Retail sale not in stores, stalls or markets                                 | 4.6%              | 1.0%              | 80.0%                |
| Audit and tax services                                                       | 4.8%              | 5.5%              | 94.0%                |
| Retail sale of food, beverages and tobacco products (via stalls and markets) | 5.2%              | 0.5%              | 79.8%                |
| Other underground engineering                                                | 6.0%              | 3.8%              | 89.0%                |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The Table is based on 8,645 survey responses by firms in Germany. The following survey questions are used in this Table: “To what extent were the following key figures impacted by the Corona crisis? Please indicate by what percentage the key figures have changed compared to 31.01.2020.” and “Please give an estimate: What fraction of companies in your industry will survive the Corona crisis until 31st December 2020?”. The table depicts the unweighted averages.

Further cross-sectional analyses also reveal within-industry differences. Retail is an example for an industry that is heterogeneously exposed to the restrictions imposed by the government during the crisis. Some retail stores were allowed to remain open (especially large grocery stores and drugstores) and experience an increase in profits over the entire year, whereas other specialized stores had to close and experience an average drop in their profits by 14.5%. We also observe substantial within-industry differences by firm size, with small firms (5 employees or less) and sole proprietors being hit hardest (-21.8% in average profit). Larger firms (20 employees or more) report an average decrease in profits by 10.5% only.

### *3.3. How Did Companies React?*

In the next step, we examine the role of government support and how it relates to managerial strategies to cope with the impact of the crisis. Overall, 67% of the respondents indicate that they have benefitted from government aid in some form. Most of these firms used the Immediate Assistance (Soforthilfe) program by the German government (33%), the subsidies for short-time work (30%), and the deferral of tax payments (19%). While most companies that received funds from the Immediate Assistance program indicate that they would not have survived without the state aid (79%), this figure is much smaller for companies using the subsidies for short-time work or deferral of tax payments (59% and 42%).

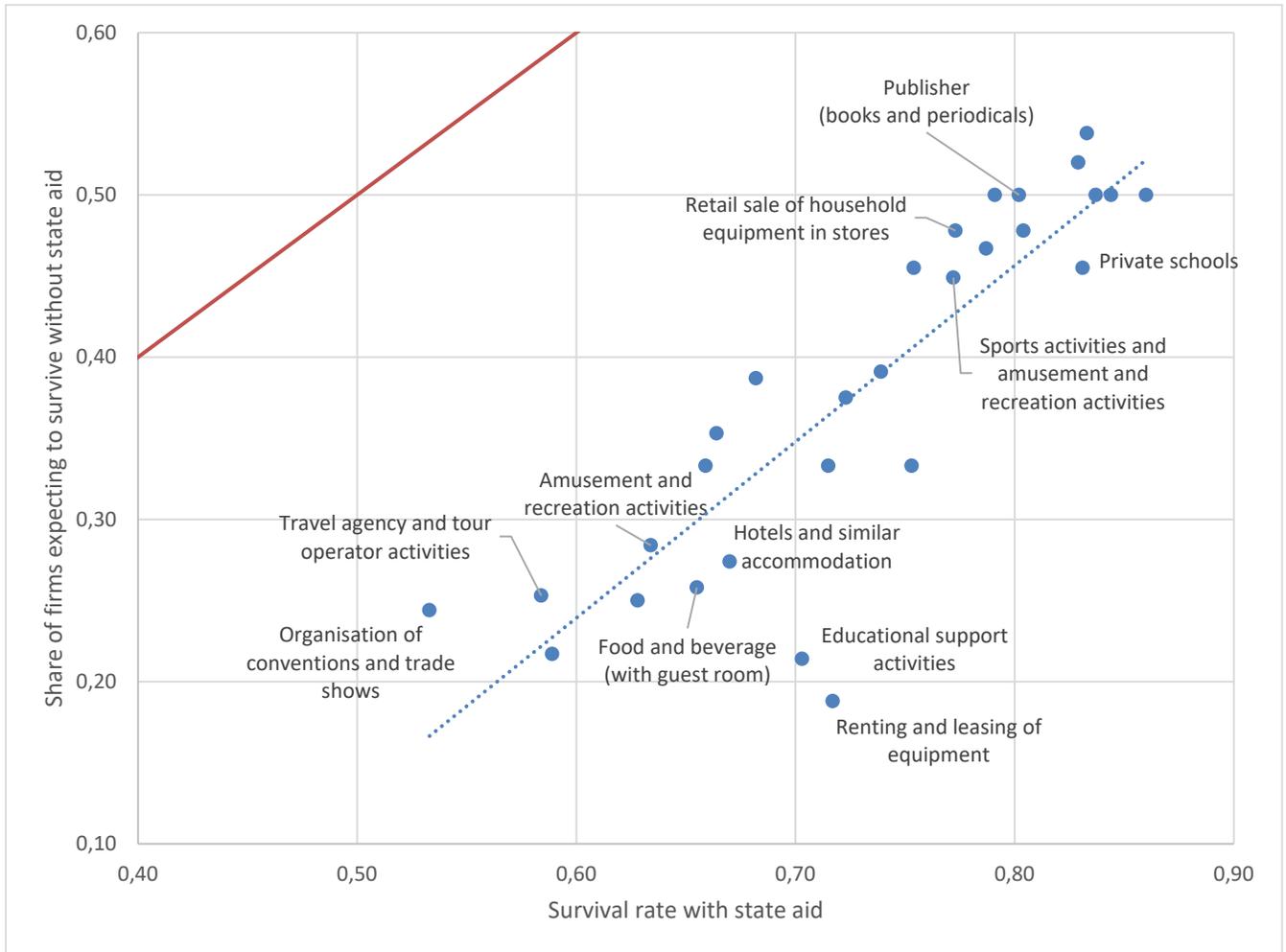
The data shows that companies were forced to take other measures in addition to the government support. While government support was helpful, it was thus not sufficient for many companies to survive the crisis. Most frequently, companies reduced future wage increases or

bonus payments (32%) and increased prices (25%). 18% of the companies reduced their actual payouts to shareholders. 13% reduced their staff. Strikingly, the ratio of companies that reduced employment is particularly low (6%) among those which did not receive any government support. These companies rather cut future wages and increase prices.

#### *3.4. Was the Government Support Effective?*

In order to evaluate the effectiveness of state aid we employ the German Business data to contrast the survival rate a manager would expect for his or her industry with the expected likelihood of companies from that industry to survive the Corona crisis without any state aid. If the two expected probabilities match, state aid is redundant as it does not change a company's probability to survive. The bigger the difference between these expectations, however, the more positive is the effect of state aid on a company's likelihood to survive.

**Fig. 6: The Efficacy of Government Support by Industries**



Source: German Business Panel (GBP), wave 1, July-October 2020. Notes: The figure shows survival probability without government support by industry and overall survival probability by industry. The former is based on the survey question “Would your company have survived the corona crisis without taking up any governmental measures?”, the latter on the survey question “What is your estimate: How many percent of companies in your sector will survive the corona crisis until 31.12.2020?”. For industries where government support has not been effective, the solid 45-degree line and the data points intersect. The figure shows industries with lowest survival probabilities.

The above chart illustrates the effectiveness of state aid for the 30 industries for which profits decreased most. The solid line on the upper left is the 45-degree line at which survival rate would be the same – with and without state aid. However, the chart shows that all of the 30 industries analysed are clearly below that line. In all of these industries which were hit particularly hard by the crisis, state aid has had a beneficial effect. Across the board, state aid has increased

survivability of those 30 industries by an average of 35 percentage points. Looking at individual industries, however, there is a great deal of diversity.

On the one hand, there are travel agencies or event service providers whose likelihood to survive remains below 60 % even though it increased by 30 percentage points thanks to state aid (58%-25% for the former and 53%-24% for the latter); on the other hand, there are publishing houses or private schools whose likelihood to survive equally increased by 30 percentage points (80%-50% and 83%-46%, respectively) due to state aid but which finish with an overall survivability of more than 80 %. Hence, in particular the former group of industries is left behind and more targeted measures are called for to lift survivability to the level of other industries – if that is warranted. Additional state aid to that end could be linked to firms being prohibited to operate as the industries in the lower left of the graph tend to be directly affected by lockdown regulations.

### *3.5. Price Changes in the Course of the Temporary VAT Cut*

Tax regulation plays a central role in the context of the Covid-19 crisis. On the one hand, tax policy is one of the major policy measures to support businesses and consumers. On the other hand, high levels of debt generated by governments to mitigate the crisis may induce businesses and consumers to expect higher future tax rates. Such expectations could then have an adverse effect on investment plans and consumption. Wave 1 of the GBP includes survey questions to shed light on such considerations.

One very important action to mitigate the economic impact of the Corona pandemic in Germany was a temporary reduction in the Value Added Tax (VAT) for the time period between July 01 and December 31, 2020. The regular VAT rate was reduced from 19% to 16% and the

reduced rate was reduced from 7% to 5%. A stated objective of this tax policy was to boost private consumption via lower consumption prices. It is therefore an important empirical question to investigate if the policy reduced final consumption prices.

Two recent studies show that gasoline stations and supermarkets have passed through the tax cut almost fully to consumers (Montag et al. 2020, Fuest et al. 2021). However, gasoline stations and supermarkets are special retail sectors, which were not heavily hit by the pandemic and for which we do not expect that consumers bring forward consumption that was initially planned for 2021. It therefore remains unclear if the results for these studies can be extrapolated to other industries and retail sectors.

While we have administrative price data on gasoline stations and supermarkets, there rarely exist good data for consumption prices for most other industries and retail sectors. Data that are available in real time are even rarer. The GBP therefore asked firms over the summer of 2020 whether they had any plans to change final consumption prices for the relevant period between July and December 2020, and, if yes, by how much they change consumption prices. Consumption prices of course change for many reasons and it is not certain that any stated adjustments in consumption prices are fully due to the VAT reduction. Our results yet shed light on the question of whether consumption prices went down during the relevant period.

Our data show that 24.6% of all firms in our sample indicated that they have implemented, or plan to implement, adjustments to consumption prices in the period between July and December 2020. Among those indicating such an adjustment, the average price adjustment was 1.6 pp. Taken together, these findings imply that the overall price adjustment (across all firms) was relatively low and that consumption prices were quite stable during this time period.

However, we observe large heterogeneities across industries. Table 8 shows the share of firms within selected industries which indicated that they were to change consumption prices, along with the average price adjustment among price changers. More than one third of all firms in the Accommodation (41%) and Food/Beverage (35%) sectors indicated plans to reduce prices. While the average price change among these firms is zero in Accommodation, we observe that price changing firms in Food/Beverage increase prices by 6.5pp. The latter result suggests that firms in Food/Beverage passed on pandemic induced cost pressure to consumers, which was potentially possible because demand increased over the summer. The first result is an indication of within-industry heterogeneity where some firms in Accommodation increased prices and others did not (for an average of zero).

The share of price changing firms is very high in retail: 42% of firms said they would change consumption prices. Among these, the average change was a price reduction by 2.5pp, suggesting that the VAT decrease was passed through to consumers. However, we also observe average price increases in some sectors. For example, about a quarter of firms in the Art and Travel sector indicated price changes, and the overall increase among them was about 5pp. Interestingly, we see a lot of price increasing firms in Legal and Accounting Services; this increase could potentially reflect the increase in demand because many government support measures require the assistance of an accounting service.

**Table 8: Changes of Final Consumption Prices (between July and December 2020) in Selected Industries**

| Industry                      | Share of Firms | Average Price Change |
|-------------------------------|----------------|----------------------|
| Retail                        | 41.8           | -2.5                 |
| Accommodation                 | 41.4           | 0.0                  |
| Food and beverage             | 34.9           | 6.5                  |
| Wholesale                     | 31.2           | -1.4                 |
| Construction                  | 28.1           | 3.9                  |
| Legal and accounting services | 27.2           | 4.0                  |
| Art and Travel                | 26.3           | 4.8                  |
| Manufacturing                 | 24.0           | 0.4                  |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The Table is based on 4,427 survey responses by firms in Germany. The following survey questions are used in this Table: “Have you already changed prices since July 1st or do you plan to change prices for your end products before December 31st, 2020?”; “By how much have you changed or are you planning to change the prices of your end products between July 1st and December 31st, 2020?”. The table depicts averages for these questions in a subset of industries.

Overall, these results suggest that prices were relatively stable and that firms in some heavily affected sectors even increased prices. While the latter result could, at first glance, imply that the policy objective of lower consumption prices was not achieved, note that the VAT cut might yet have supported firms: the Corona induced pressure on them might force some of them to increase consumption prices for services and goods to absorb some of the adverse economic effects. For those firms, the VAT cut could have helped that final consumption prices had to increase by less, and therefore fewer customers were lost compared to a counterfactual situation without VAT reform.

### *3.6. Which Future Tax Rates Do Companies Expect?*

An important discussion in the context of government action to mitigate the economic impact of the Corona crisis is whether and how the resulting government debt will have to be financed by future tax increases. It is widely acknowledged that expectations about future economic fundamentals and circumstances possibly affect current behavior of firms and consumers (e.g., Hall, 2010). In the current context, this could for example imply that firms which expect taxes to

go up in the future invest or hire less now because of expected higher tax burdens. Such expectations are inherently difficult to measure using conventional data sources. The first wave of the GBP asked firms whether they expect different types of taxes (and social security contributions) to increase in the short and medium run.

Table 9 summarizes the results. The survey differentiates between expectations about tax changes in the short term (next 0-12 months) and mid-term (12-24 months). Overall, we do not see that firms expect substantial tax increases over the next two years. Interestingly, firms even expect tax rates to go down in the short term (around 1 to 1.5pp decrease for corporate tax, local business tax and personal income tax). These expectations are perhaps driven by the expectation that the government uses tax policy to support economic development and to combat adverse effects of the pandemic in the short run. The effects might also be partly explained by the announced abolishment of the so-called solidarity surcharge for most taxpayers. In the medium run, firms expect mildly increasing tax rates; perhaps due to the expectation that tax financed payback of debt will slowly start in the next one to two years. Expectations regarding social security contributions are a little bit different from expectations about tax rates: firms expect increases already in the short run, and a relatively large increase of 2pp in the medium run. The rationale for these expectations might be that the social security system will be under pressure (for example, due to higher pandemic caused unemployment).

**Table 9 Expectations about Future Tax Rates**

| Type of Tax                   | Avg. Exp. Change, 0-12 months | Avg. Exp. Change, 12-24 months |
|-------------------------------|-------------------------------|--------------------------------|
| Corporate Tax                 | -1.5                          | 0.2                            |
| Local Business Tax            | -1.4                          | 0.5                            |
| Personal Income Tax           | -1.0                          | 0.7                            |
| Social Security Contributions | 0.4                           | 2.0                            |

*Source:* German Business Panel (GBP), wave 1, July-October 2020. The Table is based on 845 survey responses by firms in Germany which were not subject to an information treatment preceding this question. The following survey question is used in this Table: “What changes in the following tax rates do you expect in the short term (0-12 months) [medium term (12-24months)] based on your current tax rate?”. The table depicts averages for these questions relating to the respective type of tax rate.

## 4. Outlook

### 4.1. Data Access and Linkage with Other Data Sources

The GBP offers various possibilities for users to augment the core data with complementary information from external databases. For example, GBP provides the industry classification of all industries following the so-called Klassifikation der Wirtschaftszweige (WZ 2008) of the German Federal Statistical Office. This classification is compatible with the Statistical Classification of Economic Activities in the European Community (Nomenclature statistique des activités économiques dans la Communauté européenne (NACE) Revision 2). The NACE code allows researchers to link the GBP data with further information on industry characteristics. The GBP data are also compatible with international comparative data infrastructures. Key infrastructures are the Bureau van Dijk (BvD) or Bisnode databases. For example, the GBP includes an additional identifier, BvDID, that allows to merge data from Orbis, Amadeus, or Dafne in accordance with relevant data protection laws. Similarly, it is possible to link the data to the business register of the German Federal Statistical Office, Creditreform records, or the Mannheimer Enterprise Panel.

#### 4.2. *Future Waves and Opportunities for Panel Data Analyses*

Future survey waves of the GBP will center on various topics in the context of accounting and taxation. A particular focus will be on questions that are difficult to address with conventional data sources. For example, we are interested in the role of accounting and taxation for strategic decisions; for instance: how do managers incorporate matters of accounting and taxation when making important strategic decisions such as investments, relocations or M&A? The survey will also shed light on aspects such as expectations about regulation (e.g., future tax rates or accounting rules) and their effects, uncertainty about future regulation and future firm developments, the role of uncertainty for decisions, and perceived tax complexity. The survey will also feature questions about the organizational structure of firms and shed light on questions such as: are matters of accounting and taxation handled internally or is everything organized by an external tax advisor or accounting company? How does the organizational structure adopt to new developments and regulations in the context of accounting and taxation? We will also survey “standard” firm performance indicators in real-time, again with a focus on aspects of accounting and taxation. As the Corona focus of the first wave shows, the survey is generally very flexible and can be adjusted on short-notice to consider very recent developments.

Our objective is to develop a panel that allows conducting dynamic analyses and controlling for time invariant unobservable characteristics of firms. The data indicate that these prospects are good. About 60% of respondents that have participated in our survey so far agree with being contacted again in the future waves of the survey and 55% agree with the anonymous linking of their data to input from external data sources (e.g., the Amadeus database).

### 4.3. *Submission of Own Research Questions and Survey Experiments*

The German Business Panel includes two special sections devoted to research questions submitted by external researchers through a competitive concours, GBP-Q, and a module designed for survey experiments, GBP-X. GBP-Q offers researchers the opportunity to collect data tailored for their particular research question. These questions are compatible with the GBP core questions. Moreover, the experimental section GBP-X incorporates user-designed experimental modules. In this way, the GBP enables innovative forms of data collection.<sup>4</sup>

## 5. **Conclusions**

This paper demonstrates the possibilities for analysis and scope of the German Business Panel as an innovative survey tool to collect insights on expectations, perceptions, and internal procedures underlying managerial decision making with regard to tax and accounting issues. We developed this novel dataset as a rolling panel, combining the econometric advantages of repeated cross-sections and panel studies. We believe that it will be a useful source of information for researchers interested in the internal organization and the external reporting of firms complementing publicly available data.

We use the collected survey responses of more than 10,000 firms during the Covid-19 pandemic as a case in point to demonstrate the novelty of our methodological approach. We find that the impact on profits and revenues depends on industry and document how impacted firms recover. We provide evidence that managerial strategies differ when government aid has been taken up, and develop an indicator to assess the efficacy of government support.

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<sup>4</sup> Examples for the potential contribution of experiments embedded in company surveys are Coibion et al. (2018; 2020).

Why are many firms able to navigate through the turmoil of the crisis without government support, while others do not? Why are some firms more reluctant to lay off employees than others? What shapes the expectations towards tax policy? The precise mechanics underlying these questions are important for our understanding how firms work. A possible explanation for the first question could be that costs are more flexible for some firms. The second question could be driven by investments in firm-specific human capital. The third, may reflect that firms differ in whether they internalize the government's budget constraint. The German Business Panel provides the basis to answer these and other interesting question in future research.

Potential extensions to this work are in progress and include following up the firms to investigate how expectations, perceptions, and the choices vary over time and shed light on causal relationships. This will allow us to control for the specific nature of panel firms.

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