The COVID-19 Pandemic and Entrepreneurship in Germany

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Abstract

The COVID-19 pandemic severely affected not only incumbent firms, but also the emergence of start-ups. This paper investigates and analyzes the pandemic's effect on new business formation, as well as business exits and insolvencies, in Germany. We find that the overall level of business registrations slightly decreased during the first year of the pandemic, but that the effect is specific to certain industries. Innovative manufacturing industries and technology-oriented services experienced an increase in the numbers of start-ups. High subsidies and a temporary suspension of important criteria obliging firms to declare insolvency weakened market selection resulting in fewer exits in 2020. The relaxation of insolvency regulations may lead to considerable numbers of 'zombie' firms. Generally, the pandemic re-enforced ongoing structural change, but also exerted specific effects that may be temporary in nature.

Keywords: COVID-19; entrepreneurship; new business formation; hi-tech sectors; Germany

Citation: Fritsch M., Greve M., Wyrwich M. (2021) The COVID-19 Pandemic and Entrepreneurship in Germany. *Foresight and STI Governance*, 15(4), 42–51. DOI: 10.17323/2500-2597.2021.4.42.51

Introduction

The COVID-19 pandemic began early in 2020. A year and a half later, with the implementation of the vaccination program, the pandemic appears to be slowly resolving itself. That being said, the economic consequences of the pandemic are much more severe than those of the Great Financial Crisis that occurred in 2008-2009 [OECD 2021]. The effects and consequences of the pandemic are, however, highly dependent upon national and regional economic conditions, particularly on the national policy response [*Bailey et al.,* 2020]. Hence, international comparisons may lead to important insights.

Since entrepreneurs represent one of the most vulnerable groups of the labor force heavily affected by the COVID-19 crisis, there has been pronounced scholarly attention toward small businesses and entrepreneurship since the beginning of the pandemic. The emerging literature encompasses studies on the impact of government support for firms and particularly SMEs as a response to the outbreak of the pandemic [*Gourinchas et al.,* 2021; *Core, De Marco,* 2021; *Belghitar et al.,* 2021; *Demary,* 2021; *Holtemöller et al.,* 2020; *Dörr et al.,* 2021a], changing innovation patterns [*Birkholz et al.,* 2021], as well as the impact of the crisis on the mental health and well-being of entrepreneurs [*Torrès et al.,* 2021].

This paper adds to the existing literature by documenting the evolution of new business formation and reporting on available evidence for exits and insolvencies in Germany over the course of the COVID-19 pandemic. We draw on data from various publicly available sources such as Business Registration Statistics and Bureau van Dijk.[1] The empirical evidence suggests a general amplification of ongoing structural change, and some distinct effects that may be temporary in nature. Although it is still unknown whether the pandemic will cause a global recession, it is obvious that the massive increase in public expenditures as a response to its outbreak constitutes a heavy burden that will continue to shape public policy. It is also likely that the pandemic will impact a variety of economic activities in the coming years.

Germany's Policy Reactions to the Pandemic

After the outbreak of the SARS-CoV-2 virus in China in late 2019, the disease spread rapidly around the globe, reaching Europe by late January 2020. The German government responded with a series of country-wide containment measures based on infection rates. Germany's first policy intervention banned mass events, effective on March 8, 2020. This intervention was followed by the closing of schools and child-care facilities, effective on March 16. The first national lockdown began on March 22, and continued until May 3. While this initial lockdown was phased out early in the summer of 2020, two subsequent waves of surging infection led to another period of lockdowns of varying intensity beginning in November 2020 (Figure 1).

The curve in Figure 1 depicts daily new confirmed cases of COVID-19 in Germany between January 27, 2020, when the first case in Germany was officially registered, and May 13, 2021, the latest available date at the time of writing this article. The curve shows the moving seven-day average and thus represents smoothed statistics. Three shaded time periods reflect lockdown or lockdown-like measures of varying intensity. The first lockdown was effective between March 22, 2020, and May 3, 2020. The so-called "light lockdown" was officially enacted on November 2 at the federal level and was prolonged several times. On December 13, 2020, January 5, and 19, 2021, the lockdown measures were tightened and remained effective until April 18, 2021. The end of the second shaded period marks the end of the shutdown of retail shops. As of April 23, 2021, a so-called "Federal Emergence Break" policy became effective and encompasses a variety of lockdown-like policy measures that are supposed to be applied locally at a county level depending upon the recent trends in COVID-19 cases.

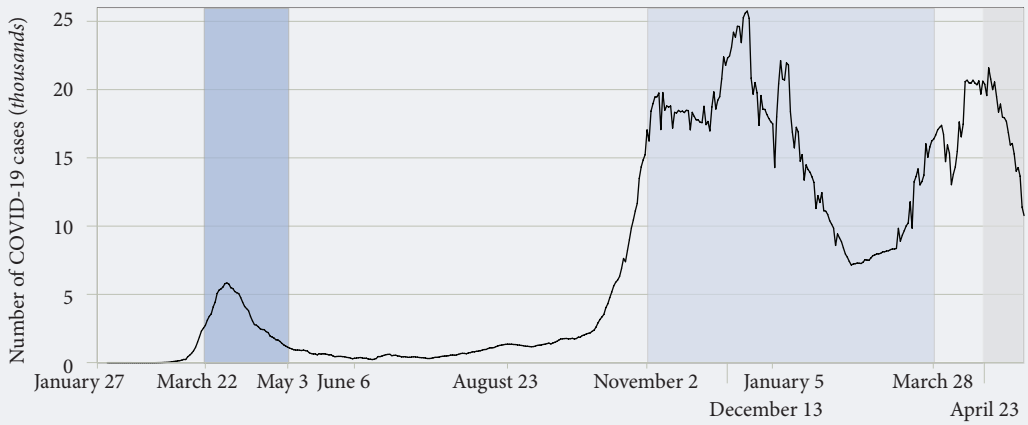
In the early stages of the pandemic, German firms reported reduced expectations and high levels of uncertainty [*Buchheim et al.,* 2020]. The hospitality, transportation, and entertainment industries were negatively affected by public containment measures. A growing number of employees began to work primarily from home. It is estimated that the German GDP declined by about 5% in 2020, but forecasts expect growth rates above 3% in 2021 and 2022 [*Wollmershäuser et al.,* 2021].

In an attempt to minimize the negative economic impact of lockdowns and avoid a recession, the German government introduced multiple measures to support incumbent firms. Massive public subsidies and a temporary[2] relaxation of the rules dealing with the obligation to file for insolvency (*COVID-19 Insolvenzaussetzungsgesetz;* COVID-19 Insolvency Suspension Act) enacted at the end of March 2020, were all designed to help businesses survive. These policy measures contributed to forestalling a surge of insolvencies, as well as maintaining unemployment figures at an acceptable level. One of these measures was an emergency aid package called *Soforthilfe* (instant aid). Around 50 billion euros were allocated to solo self-employed individuals, as well as micro businesses with no more than 10 employees. The aid could cover operating costs up to 15,000 euros and

[1] All reported empirical evidence is subject to data availability at the time of writing this paper at the end of May and early June 2021.

[2] The obligation to file for insolvency was generally suspended until end of September 2020. For certain businesses, e.g., firms that applied for state aid that was not delivered, this regulation was extended until end of April 2021.

Figure 1. **The Course of the COVID-19 Pandemic and Lockdown Periods in Germany**



Source: John Hopkins University CSSE COVID-19 Data. https://ourworldindata.org/coronavirus, accessed17.05.2021.

applications for the emergency aid packages were accepted between the end of March and the end of May 2020. Another measure was *Kurzarbeit* (short-time work scheme). This program supplemented employees' earnings that were temporarily reduced by shortened work schedules. This measure was intended to support businesses by allowing them to retain their employees during the crisis.

What Should One Expect?

Governmental responses to a pandemic such as the COVID-19 can have a variety of effects. There are obvious impacts caused by publicly ordered lockdowns, or people behaving more cautiously. For example, more adults began working at home and students were forced to learn in virtual classrooms, both of these trends increased the amount of time people spent online. As a consequence, some businesses were no longer viable, while other business experienced a boom. These pronounced sectoral and regional differences[3] will also impact start-up trends and the exit of incumbent firms.

Given the changing framework conditions, an increase of market exits in industries that could hardly operate during a lockdown could be expected,[4] the impact upon new business formation, however, is unclear. The emergence of new business opportunities in fields such as digital services, and/or the prospect of becoming unemployed may fuel entries, but increased uncertainty could also have a dampening effect. Start-ups induced by unemployment might result in small-scale and replicative businesses, but new entries in technology and innovative manufacturing industries could be more ambitious [*Konon et al.,* 2018; *Ebersberger, Kuckertz,* 2021].

For an overview of the early research and potential effects of the COVID-19 pandemic on entrepreneurship see [*Kuckertz, Brändle,* 2021]. *Dinlersoz et al.,* [2021] find pronounced differences between the emergence of new businesses during the COVID-19 pandemic and the Great Financial Crisis of 2008-2009. Their analysis suggests that the Great Financial Crisis should not be viewed as an analogous event.[5] Based on administrative data for applications of Employer Identification Numbers in the US, the authors identify a sharp decline of new business formation activity in the first few weeks of the pandemic followed by a pronounced rebound. According to their data, business applications reached a 'normal' level about 18 weeks after the onset of the pandemic and began to increase in the subsequent weeks. Many of the new businesses will be small, often being only the owner with no additional employees (solo self-employment) [*Dinlersoz et al.,* 2021].

The report by [*Djankov, Zhang,* 2021] demonstrated pronounced differences in the level of new business formation during the first three quarters of 2020 across countries. While there were significant increases in the number of start-ups in the US, Turkey, Chile, and the UK, other countries experienced a decline in new business formation.[6] The authors provide some empirical evidence supporting their conjecture that differences in the legal requirements for starting a firm is the primary factor that explains these cross-country variations. Apparently, the lower the require-

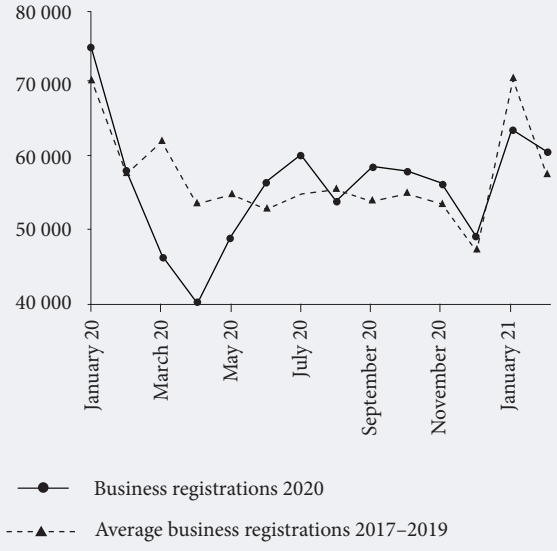
[3] For expected regional impacts of the pandemic see [*Bailey et al.,* 2020].

[4] E.g., retail shops, hospitality, tourism, transportation, personal services, as well as activities related to live events such as performing artists and the organization of exhibitions.

[5] See [*Klapper, Love,* 2011] for the US, and [*Hundt, Sternberg,* 2014] for Germany.

[6] For Germany, there is estimate of a 4% reduction of new business applications during the first three quarters of 2020 [*Djankov, Zhang,* 2021].

Figure 2. **Number of Business Registrations in Germany during the First Year of the Pandemic Compared to the 2017-2019 Average**



Source: German Statistical Office.

ments, the higher the number of start-ups during the pandemic.

Another effect of the COVID-19 pandemic could be the impact of public spending to support firms and employees. Overall, the immediate fiscal impulse in Germany amounted to nearly 40% of 2019 GDP, representing a particularly strong fiscal response in comparison to other countries.[7] The increased public debt may force governments to reduce subsidies in the coming years. Uncertainty about such future consequences can shape behavior today and may result in a reduction in the level of new business formation in the future.

New Business Formation during the Pandemic

The most recent data on start-ups in Germany come from the Business Registration Statistics (*Gewerbeanzeigenstatistik*). This database counts the notifications of new businesses recorded in the Business Register in a timely manner, with monthly updates and the inclusion of solo entrepreneurs.[8] Individuals starting a for-profit business are required to register with the municipal trade office.

Figure 2 shows the number of business registrations per month in Germany during the first year of the pandemic, from January 2020 to January 2021 as well as the average number of monthly business registrations in the years 2017-2019 as a comparison. The graph clearly shows a sharp decline in the number of business registrations that coincides with the outbreak of the pandemic in Germany and the first lockdown that began mid-March 2020. Figure 2 also shows a dramatic recovery of start-up activity after the initial decrease.[9]

There are a number of possible reasons behind the increase in new business formation. For example, individuals who lost their jobs may have opted for self-employment, either out of necessity, or because of a perceived opportunity in response to the changing environment. The 10.2% increase in the number of sideline start-ups in 2020 compared to the previous year.[10] (Statistical Office 2021) indicates that some individuals who received *Kurzarbeit* (short-time work scheme) compensation began experimenting with moonlighting schemes. These speculations require more research to determine the true causes behind the fluctuations of new business formation in Germany during the first year of the pandemic.

Unfortunately, the business registration data do not distinguish between industries. To detect sector-specific patterns of start-up activities during the first year of the pandemic, we use the Orbis database provided by the Bureau van Dijk. We use the reported date of incorporation and allocate firms into sectors using NACE Rev. 2 4-digit system. Although the Orbis database tends to underrepresent small firms due to survivorship bias, the fact that our analysis relies on 2020 data obviates this issue. It can also be assumed that the Orbis data represent the real firm population sufficiently well for identifying structural changes in new business formation (see [*Kalemli-Ozcan et al.*, 2015], for a detailed review).

Figure 3 shows new businesses in innovative (high-tech and technologically advanced) manufacturing and technology-oriented services from January to December 2020. Again, we use the average number of start-ups in the respective sectors in the years 2017-2019 as a benchmark. The figure clearly indicates increasing numbers of start-ups in innovative manufacturing industries and in technology-orient-

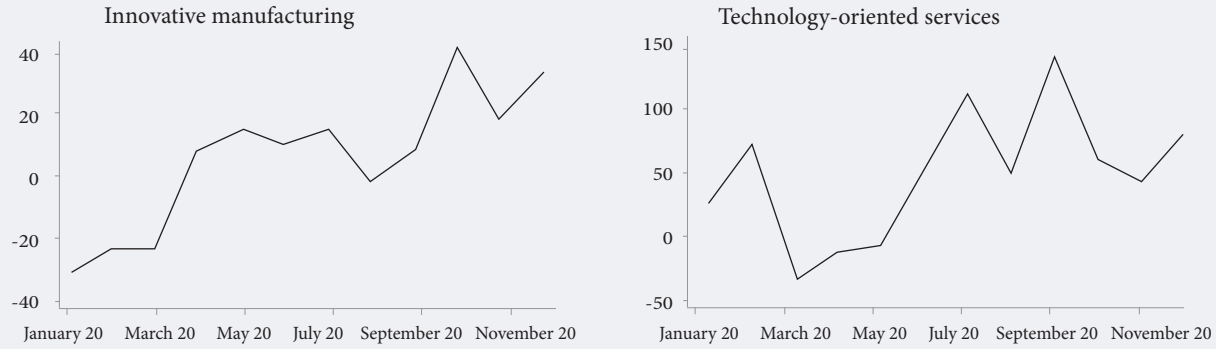
[7] For a detailed overview of the discretionary fiscal measures see https://www.bruegel.org/publications/datasets/covid-national-dataset, accessed on 16.06.2021.

[8] Disadvantages of the database are a lack of information on business characteristics, the fact that notifications are often made but no business is founded and start-ups in the liberal professions are not required to register.

[9] Other fluctuations of the numbers of business registrations in 2020 that can be observed roughly correspond to the regular seasonal dynamics of past years.

[10] https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/02/PD21_062_52311.html, accessed 16.06.2021.

Figure 3. **Number of Start-Ups in Innovative Manufacturing and Technology-Oriented Services in Germany in 2020, Compared to the 2017-2019 Average**



Note: For a list of 4-digit NACE Rev.2 industries comprising high-tech manufacturing and high-tech services, see Table 1.
Source: Bureau van Dijk, own calculations.

ed services.[11] Quite remarkably, but in line with the general increase in the service sector's share of the German economy, the surplus of start-ups in technology-oriented service industries (e.g., software and games) is substantially larger than in innovative manufacturing. Another interesting pattern emerges if we consider the new venture dynamics based on the initial situation prior to the pandemic. In the beginning of 2020, the number of innovative manufacturing start-ups was below the benchmark level, yet the pandemic seems to have triggered a boost in this type of start-up. This corresponds to an analysis by [*Konon et al.,* 2018] who find a high number of start-ups in German innovative manufacturing industries and in technology-oriented services during times of relatively high unemployment and low GDP growth.

Not surprisingly, a decrease in the number of start-ups is observed in other service sectors, such as: accommodation and food services, arts and entertainment, and recreation (see Figure 4). Other sectors (construction, wholesale and retail, repair shops, real estate services, and education) that initially experienced a significant drop in new business formation through early May 2020 (the end date of the first lockdown), experienced a sustained recovery throughout the rest of the year. This trend is probably due to an increase of online activities, such as tele-conferencing and internet shopping, caused by pandemic-related mobility restrictions.

Overall, new business formation during the first pandemic year in Germany resembles the patterns found for a number of other countries and clearly indicates ongoing structural change toward digitization [*Djankov, Zhang,* 2021]. This upward trend of new business formation in innovative and technology-oriented industries during the early stage of the pandemic indicates a pronounced structural change of the economy.

Business Deregistrations

One important indicator of the extent of an economic crisis is the number of business deregistrations. Market exits are usually associated with job losses and might carry a 'risk of contagion' along the affected value chain and have negative spillover effects in other industries, particularly the financial sector [*Müller,* 2021; *Gropp et al.,* 2020].[12] This is especially true for deregistrations caused by insolvency.

Figure 5 shows the number of business deregistration cases in Germany per month during the first year of the pandemic as compared to the 2017-2019 average. While the number of deregistrations over the 2017-2019 period decreased by about 2% each year, the number dropped by 14% in 2020 as compared to the average level of the previous years. Despite typical monthly fluctuations in the deregistration numbers, it is worth noting that the largest deviations from the averages of previous years occurred in the months of the lockdown periods (March/April 2020; November 2020 – January 2021).

There are several factors that may contribute to explaining the sharp drop in the number of business deregistrations in the first year of the pandemic.

[11] Bersch and Gottschalk [2021] confirm this trend based on the Enterprise Panel of the Centre for European Economic Research (ZEW) and Dahlke et al. [2021] identify fields of rapid-response COVID-19 innovations.

[12] It should be noted that the majority of market exits are not caused by insolvency. Most exits occur if the firm owner decides that the business is not sufficiently successful (profitable).

Table 1. **List of Industries Included in High-Tech Manufacturing and Technology-Oriented Services (NACE Rev. 2 Codes)**

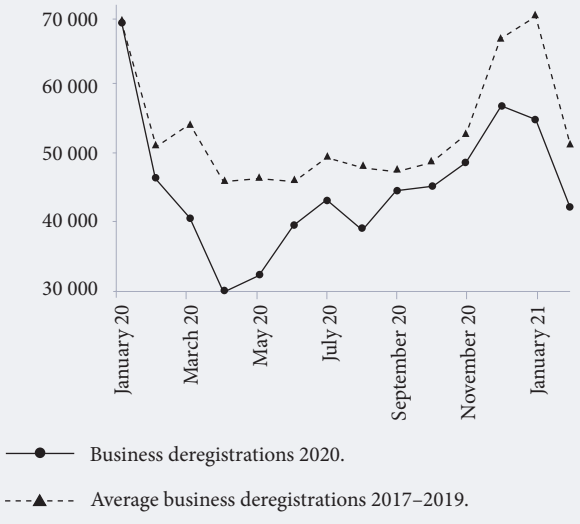
Code	Description
	Innovative Manufacturing
20.13	Manufacture of other inorganic basic chemicals
20.14	Manufacture of other organic basic chemicals
20.20	Manufacture of pesticides and other agrochemical products
20.52	Manufacture of glues
20.53	Manufacture of essential oils
20.59	Manufacture of other chemical products n.e.c.
21.10	Manufacture of basic pharmaceutical products
21.20	Manufacture of pharmaceutical preparations
22.11	Manufacture of rubber tires and tubes; retreading and rebuilding of rubber tire
22.19	Manufacture of other rubber products
23.19	Manufacture and processing of other glass, including technical glassware
25.4	Manufacture of weapons and ammunition
26.11	Manufacture of electronic components
26.12	Manufacture of loaded electronic boards
26.20	Manufacture of computers and peripheral equipment
26.30	Manufacture of communication equipment
26.40	Manufacture of consumer electronics
26.51	Manufacture of instruments and appliances for measuring, testing and navigation
26.60	Manufacture of irradiation, electromedical and electrotherapeutic equipment
26.70	Manufacture of optical instruments and photographic equipment
27.11	Manufacture of electric motors, generators and transformers
27.20	Manufacture of batteries and accumulators
27.40	Manufacture of electric lighting equipment
27.51	Manufacture of electric domestic appliances
27.90	Manufacture of other electrical equipment
28.11	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
28.12	Manufacture of fluid power equipment
28.13	Manufacture of other pumps and compressors
28.15	Manufacture of bearings, gears, gearing and driving elements
28.23	Manufacture of office machinery and equipment (except computers and peripheral equipment)
28.24	Manufacture of power-driven hand tools
28.29	Manufacture of other general-purpose machinery n.e.c.
28.30	Manufacture of agricultural and forestry machinery
28.41	Manufacture of metal forming machinery
28.49	Manufacture of other machine tools
28.93	Manufacture of machinery for food, beverage and tobacco processing
28.94	Manufacture of machinery for textile, apparel and leather production
28.95	Manufacture of machinery for paper and paperboard production
28.99	Manufacture of other special-purpose machinery n.e.c.
29.10	Manufacture of motor vehicles
29.31	Manufacture of electrical and electronic equipment for motor vehicles
29.32	Manufacture of other parts and accessories for motor vehicles
30.20	Manufacture of railway locomotives and rolling stock
30.30	Manufacture of air and spacecraft and related machinery
30.40	Manufacture of military fighting vehicles
32.50	Manufacture of medical and dental instruments and supplies
	Technology-Oriented Services
61.1	Wired telecommunications activities
61.2	Wireless telecommunications activities
61.3	Satellite telecommunications activities
62	Computer programming, consultancy and related activities
63.1	Data processing, hosting and related activities; web portals
71.1	Architectural and engineering activities and related technical consultancy
71.2	Technical testing and analysis
72.1	Research and experimental development on natural sciences and engineering

Source: Leibniz Centre for European Economic Research (ZEW).

Figure 4. **Number of Start-Ups in Germany across Industries Compared to the 2017-2019 Average**

Source: authors based on Bureau van Dijk data.

Figure 5. **Amount of Business Deregistration Cases in Germany during the First Year of the Pandemic as Compared to the 2017-19 Average**



Source: Statistics Germany.

The most likely explanation for the drop in business deregistrations is the suspension of the obligation to file for insolvency beginning in March 2020. The number of market exits caused by insolvencies (e.g., [*DeTienne et al.,* 2015]) shows a slight increase after the relaxation of the obligation to file for insolvency was rescinded in September 2020. It should be noted that in some cases, the relaxation of the rules was extended until April 2021. Other possible explanations include measures taken by the German government to support businesses and employees, and the wait-and-see attitude adopted by certain firms [*Holtemöller, Muradoglu,* 2020; *Müller,* 2021]. Positive expectations of a post-crisis rebound were supported by the fact that household savings in Germany significantly increased in 2020 [*Gropp, McShane,* 2021].

If government subsidies and temporarily relaxed insolvency regulation resulted in fewer business deregistrations in 2020, one would expect a sharp increase in deregistrations in 2021 as the subsidies and relaxations fade away. A number of economists issued warnings that the relaxed regulations may create a breeding ground for a 'zombification' of the economy [*Demary,* 2021; *Holtemöller et al.,* 2020]. Others expressed concern over the number of retained exits and insolvencies, describing the backlog as a 'time bomb' capable of destroying smaller businesses when it finally explodes [*Gourinchas et al.,* 2021]. Initial estimates of the existing insolvency gap in Germany, however, suggest that most 'zombie' firms are small enterprises that are unlikely to generate significant negative spillovers [*Dörr et al.,* 2021a, b].[13] Due to their small size, these firms are also unlikely to hamper the desirable process of 'creative destruction' by absorbing resources that are urgently needed elsewhere.

Lessons Learned

The COVID-19 pandemic continues to take a toll on every aspect of human life. Recurring lockdowns and social distancing have constrained private businesses, caused economic damage, and changed social interactions. Limiting the costs of this toll requires creativity and flexibility by policymakers and entrepreneurial responses by economic actors. Robust entrepreneurial responses offered by incumbent firms and new businesses experimenting with innovative concepts and ideas may induce new growth paths that are pivotal for economic recovery and future prosperity.

One of the pandemic's push effects is accelerated digitization, not only in the business sector, but also in the educational sector, health services, and public administration. Both public and private organizations are now experimenting with new forms of organization and new business models that may send economic development in new directions. Although some of these pandemic-induced changes may be temporary, it is likely that some will endure.

Our results indicate that the average level of new business formation in Germany has not been substantially affected by the COVID-19 pandemic. Obviously, the pandemic induced pronounced changes in the sectoral structure of newly emerging firms. In particular, we find a rising share of start-ups in innovative manufacturing and technology-oriented services. This pattern is in line with previous evidence showing that economic crises can spur innovative entrepreneurship [*Konon et al.,* 2018]. Our finding of fewer business closures compared to pre-pandemic years was probably caused by a temporary relaxation of the obligation to file for insolvency and public subsidies that helped keep firms alive.

Open Questions

Our assessment of the consequences of the COVID-19 pandemic on start-up activity and business closures in Germany provides a number of insights. Since the pandemic is still ongoing, our analysis and results are preliminary. Future studies may arrive at more nuanced conclusions about the effect of the pandemic on business dynamics and about how innovative entrepreneurship impacts structural change and economic development in times of crisis.

Because the intensity of the pandemic and the political strategies to cope with its consequences vary

[13] An insolvency gap in early 2021was estimated at about 25,000 predominantly small firms [*Dörr et al.,* 2021a].

across countries and regions, an international and regional comparison may provide additional insights. It is well known from previous research that regions with an entrepreneurial culture and tradition are more resilient to major structural crises and reveal higher growth during recovery phases [*Fritsch, Wyrwich,* 2020]. Hence, one may expect that regions with an entrepreneurial culture and tradition may also be more successful in coping with the COVID-19 pandemic [*Korsgaard et al.,* 2020].

Future research could focus on the consequences of increased digitalization and internet trade for geographic settlement structures and the development of regions. This process may also affect the geography of (innovative) start-ups. Although evidence shows that there is an increasing concentration of innovative start-ups in large cities in Germany [*Fritsch, Wyrwich,* 2021], the digitalization push may lead to a reversal of this pattern in the future. In this respect, the pandemic may also trigger development in more peripheral regions.

In the coming years, there is a need to investigate the long-term effects of the pandemic and the public policy measures on firms, entrepreneurship, and social interactions. For example, in Germany, the crisis led to a significant increase of public debt that was to a large extent due to the massive government spending on rescue measures to protect business and workplaces. In the coming years, these higher levels of public debt may translate into an increased tax burden for the private sector or in a reduction of government spending. The way governments deal with this challenge of higher debt is of critical importance. If they react with reduced spending on education and R&D, this would adversely affect the opportunities for innovative entrepreneurship to commercialize knowledge generated at universities and research centers. There can hardly be any doubt that education and R&D are of key importance for future growth that will generate higher public revenues. New ideas and better solutions will also help to deal with other challenges such as global warming or a future pandemic.

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