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Firm growth in times of crisis

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JEL Classification: D22, E24, E32, L25

Keywords: Firm Growth, employment, great recession, COVID-19, Young firms

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Firm growth in times of crisis

Jozef Konings[1] and Aigerim Yergabulova[2]

April 17, 2021

Abstract

We use the full population of Belgian firms to examine the unequal impact of Covid-19 on firm growth. In doing so, we compare whether the response of firms to Covid-19 is different from the Great Recession of 2008. We find a significant decline in net employment growth during the first and second quarter of 2020, with an average loss of 4 and 19 percent in aggregate employment, respectively. We show that the aggregate picture masks significant heterogeneity among firms and that the Covid-19 crisis is different than the Great Recession. While small and medium-sized firms performed relatively well during the 2008 crisis, during the 2020 pandemic crisis they were hit harder compared to large firms. We find that the difference stems from the industry-specific effects of the shocks and the nature of the crises. However, we show that what really matters is firm age, which is even more relevant than firm size. Young firms contribute disproportionately to aggregate job creation an destruction and they respond more to major shocks. Policy should therefore target young firms rather than small firms to weather the crisis.

Keywords: Firm growth, Employment, Great Recession, Covid-19, young firms

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1. Introduction

How do economic crises affect firms? Does it hurt small firms more than large ones, young more than old ones, and what are the aggregate implications? While these are straightforward questions, little is known about the cyclical responses by heterogeneous firms and how this matters for aggregate outcomes. Gertler and Gilchrist (1994) and Sharpe (1994) use firm size as a proxy for financial vulnerability and show that small firms destroy more jobs in recessions than large firms. In contrast, Moscarini and Postel-Vinay (2012) document that employment in large firms is more closely linked to business cycles than in small firms. However, these papers ignore the role of start-ups and the age of the firms, which turns out to be an important characteristic determining firm growth, irrespective of size, as documented for the U.S. by Haltiwanger et al. (2013).

This paper studies how the Covid-19 shock has had an impact on firms of different size and age in Belgium using quarterly administrative data from the social security registry. In doing so, we compare whether the response of firms to Covid-19 is different from the Great Recession of 2008. We find a significant decline in net employment growth, with a loss of 4 and 19 percent in aggregate employment in the first and second quarter of 2020, respectively. We show that the channel through which aggregate employment is affected in the pandemic crisis is different from the Great Recession. During the Great Recession, small and medium-sized firms performed better compared to large firms. In contrast, large firms did much better than small ones during the Covid-19 crisis. We find that the difference stems from the industry-specific effects of the shocks. In particular, the manufacturing sector containing, on average larger firms, was hit harder during the Great Recession whereas the services sector, comprised primarily of small firms, has been disproportionately affected by the pandemic crisis. These findings reflect the underlying nature of the recessions. The Great Recession was a result of disruptions in credit markets that started in the housing sector and resulted in lower demand for tradable goods, produced in manufacturing. On the other hand, the Covid-19 pandemic is entirely an exogenous shock that required containment measures, precautionary behavior, and ultimately in lock-down of a number of sectors, mainly in the non-tradable service sectors, such as restaurants, bars, hair-dressers, and leisure. Finally, we show that the vulnerability to shocks by young firms is persistent across both the Great Recession and the pandemic crisis suggesting that firm age, unlike firm size, is a key channel through which business cycles propagate consistent with the results corroborated by Pugsley and Sahin (2019).

This paper adds to the existing literature in several ways. First, our results contribute to a growing number of studies analyzing the detrimental impact of Covid-19 on firms and jobs (Apedo-Amah, 2020; Bartik et al. 2020; Cajner et al. 2020; Dai et al. 2020; Kahn et al. 2020). While most of these papers are based on survey data (Buffington et al. 2020; Bloom et al. 2021; Fairlie, 2020), we use comprehensive firm-level data covering the full population of private firms in a small open European economy, which covers the first two quarters of 2020, when the Covid-19 crisis erupted in full. Although the pandemic crisis has yet to finish, we document the heterogeneous responses of firm growth and tease out the aggregate implications.

Second, we are the first to compare the heterogeneous impact of the Great Recession and the Covid-19 crisis on firm growth. We show that small and medium-sized Belgian firms have been more resilient to the 2008 crisis than in the US (Fort et al.,2013). The fact that small firms did relatively better has also been documented for other EU economies (Bartz and Winkler 2016; Huber et al. 2017; Mina and Santoleri, 2021). In contrast, during the pandemic crisis, we find that small firms did relatively worse, in

line with the recent findings for the U.S. (Bartik et al. 2020; Cajner et al. 2020; Bloom et al. 2021). Cajner et al. (2020) report that during the first few months after the pandemic shock hit the US economy, small firms with less than 50 workers were hit the most with a 25 percent decline in employment over the first quarter of 2020. These results are broadly in line with the previous studies which state that small firms are more responsive to business cycles as they tend to be more adversely affected by credit constraints (Sharpe, 1994; Gertler and Gilchrist, 1995). This contrasts the view of Moscarini and Postel-Vinay (2012) who document that large firms have a disproportionate response to business cycles relative to small firms due to a poaching effect.

Finally, this study is related to the growing literature that takes into account the age dimension of the firms. Haltiwanger et al. (2013) show that young firms, in particular, tend to have a different growth pattern than old firms. They are typically small due to their lack of reputation in product and credit markets, constraining them to scale up. Hence they are often characterized by an "up or out" dynamic with high job creation and job destruction rates. Fort et al. (2013) find that small and young firms are more sensitive to cyclical conditions than mature firms and provide evidence that shocks in house prices and restricted access to credit due to home equity financing by small and young firms might explain these results. Based on the analysis of 18 OECD economies, Criscuolo et al. (2014) show that young firms were hit more than older ones by the Great Recession, even though their contribution to overall net employment growth was positive during the crisis. Our results suggest that young firms contribute disproportionately to overall job creation and job destruction and are more responsive to crisis years.

The next section describes the data. Section 3 takes different slices of the data to document the impact of the crises on jobs. We decompose the aggregate employment effect into its micro-economic drivers. In section 4 we estimate a firm growth model in which we analyze the firm size, age, and the impact of major shocks in a more systematic way. To this end, we compare the financial crisis shock of 2008-2009 with the Covid-19 shock. We conclude in section 5.

2. Data and definitions

We make use of the National Social Security Office (NSSO) database – a register of Belgian employers. This database covers all firms subject to social security according to Belgian law.[3] Belgian social security system applies to any employee who performs services in Belgian territory for an employer established in Belgium, but also for employers abroad who have a place of business in Belgium where the employee is dependent. Employers file quarterly declarations that include information on wages and employees. This information is then used to calculate the social contributions and social rights built up by the employees.

Data is at the firm level, meaning that we do not observe multiple plants that belong to the same firm.[4] However, when a firm has multiple plants in most of the cases these plants would be set up as

[3] Exceptions include students and employees in a period of complete inactivities, such as those in career break. Although individual entrepreneurs are not included in this dataset since the self-employed report to a different social security body, INASTI, the NSSO database covers employees working for individual entrepreneurs.

[4] Hence, a 'firm' refers to a collection of one or several plants (establishments) under a common legal entity. Although this is not entirely comparable with studies that use establishment or plant-level data, we expect the impact to be

incorporated entities with a separate VAT number and would therefore be considered as a separate firm in our data set. We do not make a distinction between organic employment growth and growth due to 'mergers and acquisitions' because we have no information on the latter. The dataset includes 70 consecutive quarters, from 2003q1 to 2020q2. Thus we cover, the first half of 2020 and analyze the immediate effect of the pandemic on jobs. According to the data from the National Bank of Belgium, Belgium counted 4,873,000 employees in the second quarter of 2020, whereas our data count 3,950,000 employees during the same period. Hence, this dataset covers more than 80 percent of all employment in Belgium.[5]

Employment is measured in full-time equivalents (FTE) and reflects the volume of work performed by a full-time employee during a full quarter. An employee may have a volume of work less than one full-time equivalent as a result of part-time work, incomplete employment, or periods of absence such as illness or temporary unemployment. This means that employees absent due to illness or temporary unemployment are not counted in the FTE measure. Hence, full-time equivalent measures precise changes in the amount of time worked and is more preferred to the average number of workers.

To account for the pandemic effect on the private sector, we exclude the public sector from our analysis and focus on NACE Rev.2 industry 1-82.[6] The final sample used for this study contains 174 thousand firms with 1.7 million employees (FTE) in 2003q1 and 192 thousand firms with 1.5 million employees (FTE) in 2020q2. Table 1 below shows the distribution of data across size and age categories for the period 2008q1 and 2020q2. The upper panel tabulates the share of firms, whereas the lower panel tabulates the share of employment. Micro firms, defined as those having less than 10 workers, make up about 86 percent of all firms while accounting for 20 percent of total employment. In turn, large firms with more than 250 workers account for only half a percent of all firms while employing around 35 percent of employment.

Table 1. Distribution of firms and employment by size and age classes

Size/Age	Young	Old	Total
Share of firms			
0-9	26.03	59.85	85.88
10-49	0.83	10.75	11.58
50-249	0.04	2.05	2.09
250+	0.00	0.45	0.45
Total	26.91	73.09	100.00
Share of employment			
0-9	4.66	15.20	19.86
10-49	1.51	22.13	23.63
50-249	0.41	20.40	20.81
250+	0.19	35.50	35.69
Total	6.77	93.23	100.00

negligible. We also correct for 'spurious' entrants to account for 'true' entry similar to Geurts and Van Biesebroeck (2016) and Karimov and Konings (2020).

[5] The difference stems from the exclusion of individual entrepreneurs and students that are not in the NSSO dataset.

[6] In addition, we exclude publicly-owned firms such as NMBS and De Lijn and firms that report 0 employment throughout the sampling period. We further exclude the employment agencies industry (NACE 78) since due to its nature, the majority of employees within this industry work for other industries.

In terms of the distribution of firms by age category, we observe that young firms that are less than 5 years old, make up 27 percent of all firms while accounting for 7 percent of all jobs in the economy. This distribution is similar to the results documented for the US economy where young firms account for 22 percent of all businesses make up 11 percent of employment (Lawless, 2014). Overall, the patterns across both size and age categories are not very different from other European economies as shown by Criscuolo et al. (2014), Lawless (2014), and Mina and Santoleri (2021).

We measure employment growth at the firm level as in Davis et al. (1996). Let growth rate of firm i at time t, denoted as g_{it}, be defined as the change in employment (n) between t and $t-4$ over the average employment:

$$g_{it} = \frac{n_{it} - n_{it-4}}{x_{it}}, \qquad (1)$$

where $x_{it} = (n_{it} + n_{it-4})/2$. This growth rate measure is more preferred than the traditional growth rate measure since it is symmetric around 0 and can accommodate entry (births) and exit (deaths) of the firms in the closed interval of $[-2, 2]$.

Formally, the gross job creation is the sum of all jobs created across all expanding and new firms, while job destruction is the sum of all jobs destroyed by exiting and contracting firms. Aggregate job creation and job destruction rates are size-weighted sums of all firm-level growth rates[7]:

$$pos_t = \sum_{i \in I_t} \left(\frac{x_{it}}{X_t}\right) g_{it} \text{ if } g_{it} > 0, \text{ and} \qquad (2)$$

$$neg_t = \sum_{i \in I_t} \left(\frac{x_{it}}{X_t}\right) |g_{it}| \text{ if } g_{it} < 0, \qquad (3)$$

where pos_t and neg_t are job creation and job destruction rates, respectively. I_t is the set of all firms in the economy at time t.

Hence, equations (2) and (3) measure the job creation and job destruction rates in terms of the size-weighted growth rate distributions. The sum of the two terms ($pos_t + neg_t$) is the gross job reallocation rate ($gross_t$), and likewise, the difference ($pos_t - neg_t$) is the net employment growth rate (net_t). Substituting equations (2) and (3) into the latter (net_t) yields the size-weighted sum of firm growth rates:

$$net_t = \sum_{i \in I_t} \left(\frac{x_{it}}{X_t}\right) g_{it}. \qquad (4)$$

Unless stated otherwise, the net employment growth refers to the percentage growth vs. the average size over the period rather than the standard growth rate that expresses the percentage growth vs. the previous employment size. It is also important to note that since we are dealing with quarterly data there are seasonal variations in employment that may be an industry norm. If quarter-on-quarter metrics vary drastically between quarters (e.g. 2015q4 vs. 2015q3), this might be seasonal. Hence, we compare year-over-year metrics, i.e. comparing one quarter to the same quarter of a previous year. This helps us to analyze major fluctuations for abnormal spikes or drops and identify long-term trends.

[7] Size is defined as the average employment in periods *t* and *t-4*.

3. Results

3.1. Aggregate picture

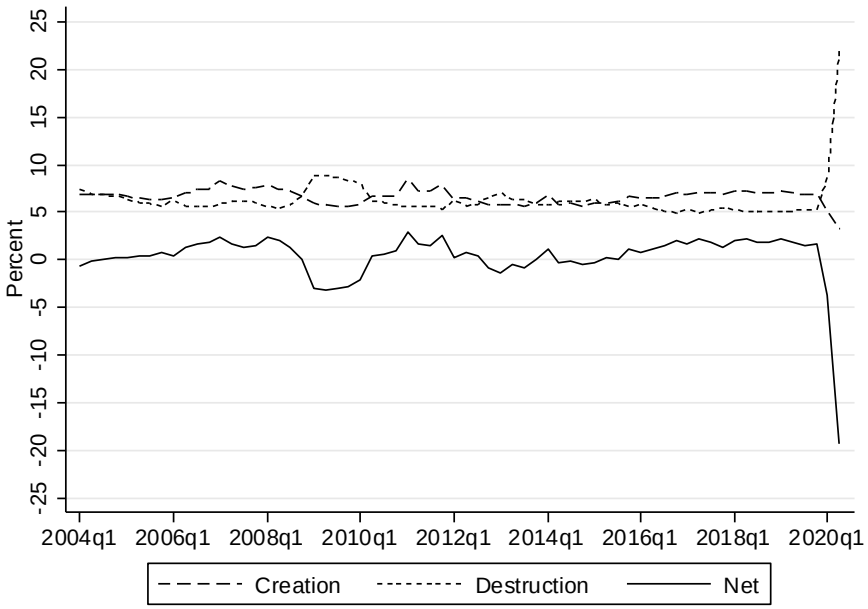
This section presents quarterly labor market indices in Belgium compiled from the NSSO firm-level data. Figure 1 shows job turnover rates covering the first quarter of 2004 through the second quarter of 2020. The indices plot year-on-year net employment growth, job creation, and job destruction rates computed using equations (2)-(4), respectively. In the first three months of 2020, the volume of employment (FTE) in Belgium fell by 4 percent compared to the first quarter of 2019. A sharp drop in FTE is expected since many firms initially placed their workers on temporary layoffs. This negative employment effect is stronger in the second quarter of 2020. Between April and June, aggregate employment dropped by 19 percent compared to the second quarter of 2019. The fact that the number of FTE has fallen sharply indicates that there is considerable overcapacity in Belgian companies and that they have consequently experienced a strong drop in GDP growth. Eurostat (2021)[8] reports that the GDP growth in Belgium declined by almost 14 percent in the second quarter of 2020, and by 2 percent in the first quarter of 2020 compared to the same quarter of the previous year. On the other hand, according to the National Bank of Belgium, over the second quarter of 2020, the average number of workers decreased by only 0.8 percent.[9] However, this measure of employment is related to temporary unemployment and includes those part-time workers on temporary layoff. The less outspoken drop in the number of workers reflects the fact that there are furlough schemes set up by the government to cushion the crisis. The challenge will be once the system runs out whether companies will take all these people back on a full-time basis. After the global and financial crisis of 2008, furlough schemes were also in place. However, 20 percent of the workers on furlough schemes were not back to work two years later.[10]

[8] https://ec.europa.eu/eurostat/documents/portlet_file_entry/2995521/2-02022021-AP-EN.pdf/0e84de9c-0462-6868-df3e-dbacaad9f49f

[9] https://www.nbb.be/doc/dq/e/dq3/histo/neat20ii.pdf

[10] Struyven, L.; Van Waeyenberg, H. en Vandekerckhove, S. (2016). "Het gebruik van economische werkloosheid in Vlaanderen: tijdelijke of blijvende bescherming tegen ontslag?" *Beleidsrapport STORE-B-15-015*

Figure 1. Job turnover rates in Belgium



To illustrate a richer picture of the dynamics behind aggregate changes in employment, we further look into gross job creation and gross job destruction rates. In this way, we identify whether a drop in net employment growth during the pandemic is due to lower job creation and higher job destruction or a combination of the two. We observe that during the first and second quarter of 2020, job destruction rates increased sharply by 9 and 22 percent, respectively. Job creation rates declined, however to a lesser degree compared to job destruction rates. We also note that the job destruction rate moves counter-cyclically and that during the crisis there is a considerable jump in jobs lost. This is also evident with the financial crisis of 2008. For instance, during the uptake of the Great Recession in 2008q3, the net employment growth was down by 3 percent, whereas the job destruction rate was 9 percent and the job creation rate was 6 percent. Nevertheless, these results indicate that the impact of the Covid-19 outbreak on employment is unprecedented and even more drastic than the financial crisis of 2008.

These findings provide a broad picture of the impact of the pandemic on the labor market for the first half of 2020. Other papers have shown similar negative short-run impacts mostly using survey data on sales (Bloom et al. 2021) and firm activity (Fairlie, 2020). Bloom et al. (2021) show the negative impact of Covid-19 on sales and employment peaked in the second quarter of 2020 in the US.

The aggregate picture of job creation and destruction masks important heterogeneity in the channels driving aggregate employment growth. In particular, it is the heterogeneity in firm growth that we will focus on next. The evidence from previous crises suggests that not only small firms but also young firms are vulnerable to external shocks and thus are affected the most (Haltiwanger et al. 2013). This size and age characteristic of the firms suggests that financial constraints, as well as uncertainty and the lack of confidence, hit young and small firms particularly hard. In the next sections, we further investigate how firms of different size and age are affected by recessions.

3.2. Firm size

Figure 2 depicts the evolution of net employment growth by firm size. To construct the size classes, we use the average firm size at *t* and *t-4*.[11] We adopt four size classes to indicate micro firms (0-9), small firms (10-49), medium firms (50-249), and large firms (>250). We observe that during the Great Recession employment dynamics of large firms were affected the most. The net employment growth within large firms went down by 5 percent, whereas micro firms saw a 2 percent decline in net growth. However, during the pandemic crisis micro firms with less than 10 workers were affected the most during the crisis. In particular, micro firms saw a drop in employment of around 31 percent between April and June 2020, while small and medium firms saw declines of 21 and 18 percent, respectively. Large firms with more than 250 employees saw around a 13 percent decline in FTE employment.

Figure 2. Net employment growth by firm size

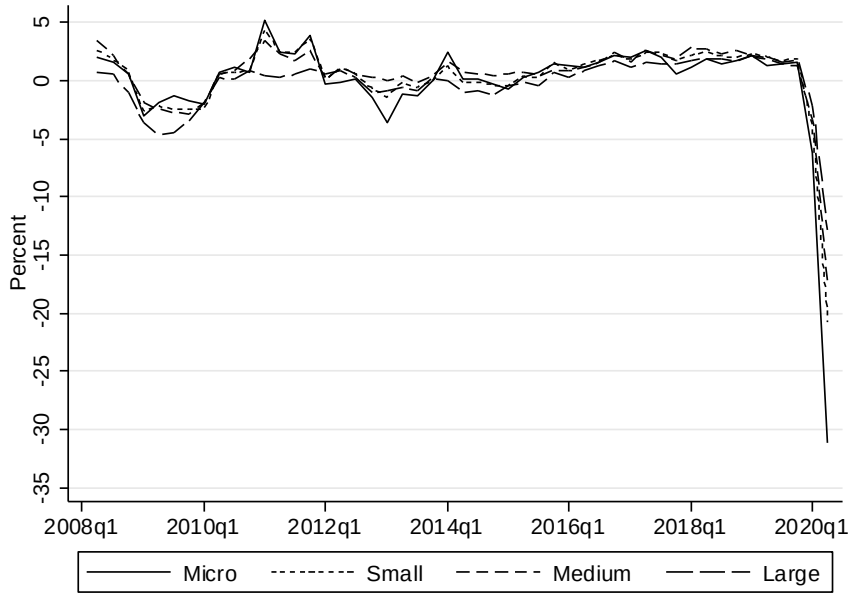
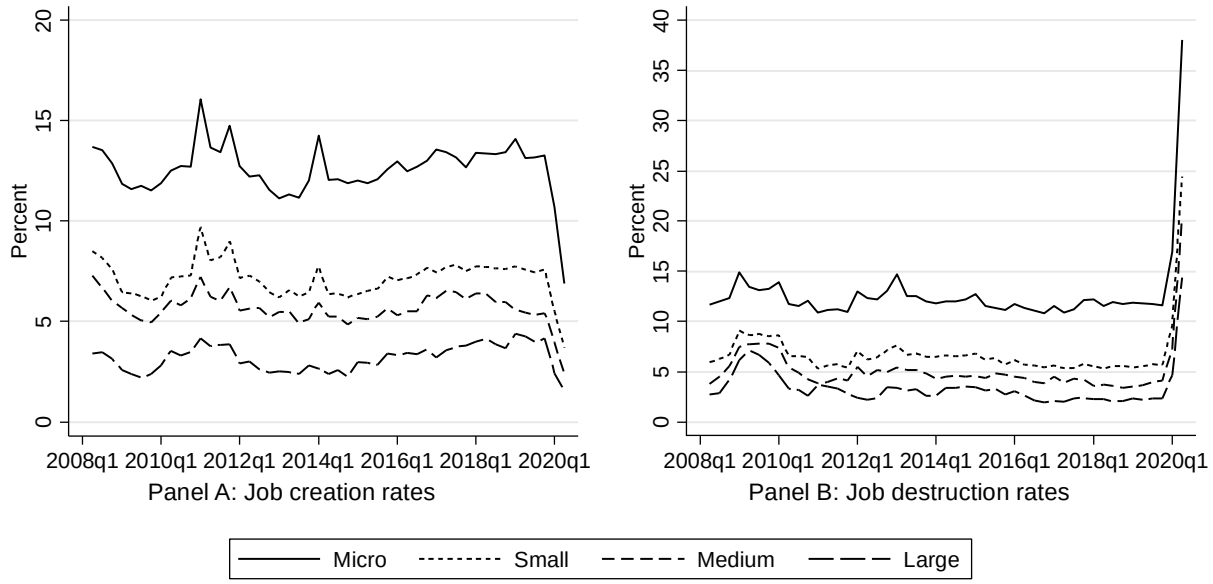


Figure 3 depicts the relative job creation rates (Panel A) and job destruction rates (Panel B) for each size category. We find that large firms destroyed more jobs during the Great Recession, whereas during the first half of 2020 micro firms' employment dynamics were more affected than large firms both on the job creation and on the job destruction margin.

[11] To avoid the statistical pitfall, i.e. regression to the mean bias, we opt to use average size as described in Davis et al. 1996 and Haltiwanger et al. (2013).

Figure 3. Job creation and destruction rate by firm size



The differential response by firm size during the pandemic appear to be in line with the recent findings from the US (Bartik et al. 2020; Cajner et al. 2020; Bloom et al. 2021). Cajner et al. 2020 report that during the first few months after the pandemic shock hit the US economy, small firms with less than 50 workers were hit the most with a 25 percent decline in employment over the first quarter of 2020. These results are broadly consistent with the previous studies which state that small firms are more responsive to business cycles as they tend to be more adversely affected by credit constraints (Sharpe, 1994; Gertler and Gilchrist, 1995). This contrasts the view of Moscarini and Postel-Vinay (2012) who document that large firms have a disproportionate response to business cycles relative to small firms due to a poaching effect. In particular, during an economic expansion when the unemployment rate is low and the workers' pool is limited, large firms have a greater ability to poach workers away from smaller firms. During an economic downturn, large firms shed more workers and consequently, are more cyclically sensitive than small firms. Nevertheless, these studies ignore the role of start-ups and the age of the firms. Fort et al. (2013) find that in the US, both small and young firms are more sensitive to cyclical downturns, whereas older firms are less responsive to the business cycle fluctuations. In the next section, we look at the heterogeneous impact of the crises on the employment dynamics of young and old firms.

3.3. Firm age

Figure 4 plots the evolution of net employment growth by age category.[12] We adopt two age categories: young and old firms.[13] Young firms are defined as those with less than or equal to 5 years of

[12] We retrieve the age of the firm by taking the difference between the current year of operation and the first year of occurrence in the sample.

[13] Results yield very similar conclusions when we exclude entry (age 0), i.e. focus on surviving and exiting firms only (see Appendix, Figures A1 and A2).

operation and old firms are those older than 6 years.[14] In the first quarter, net employment growth within young firms is still positive, while during the second quarter it dropped by 19 percent. During the Great Recession and the pandemic crisis, the growth rate of young firms was more affected than older firms. Figure 4 also shows that the differential net employment growth between young and old firms just before the pandemic was about 15 percent and dropped by less than 35 percent during the second quarter of 2020, emphasizing the stronger effect of the pandemic on the employment growth for young firms.

Figure 4. Net employment growth by firm age

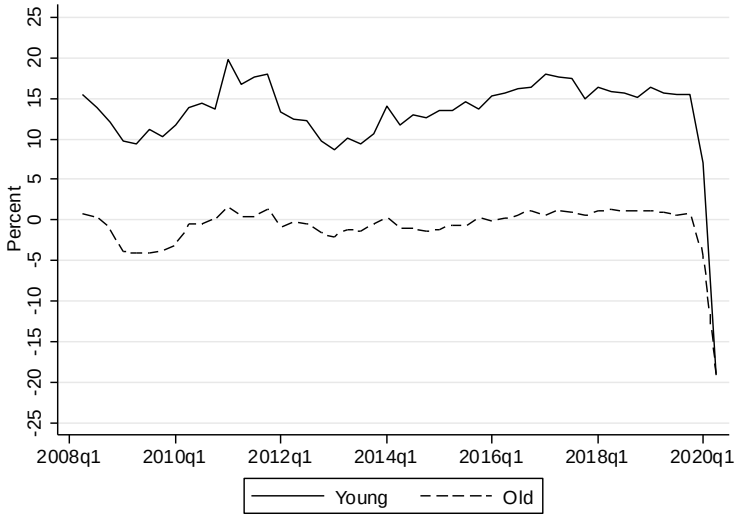
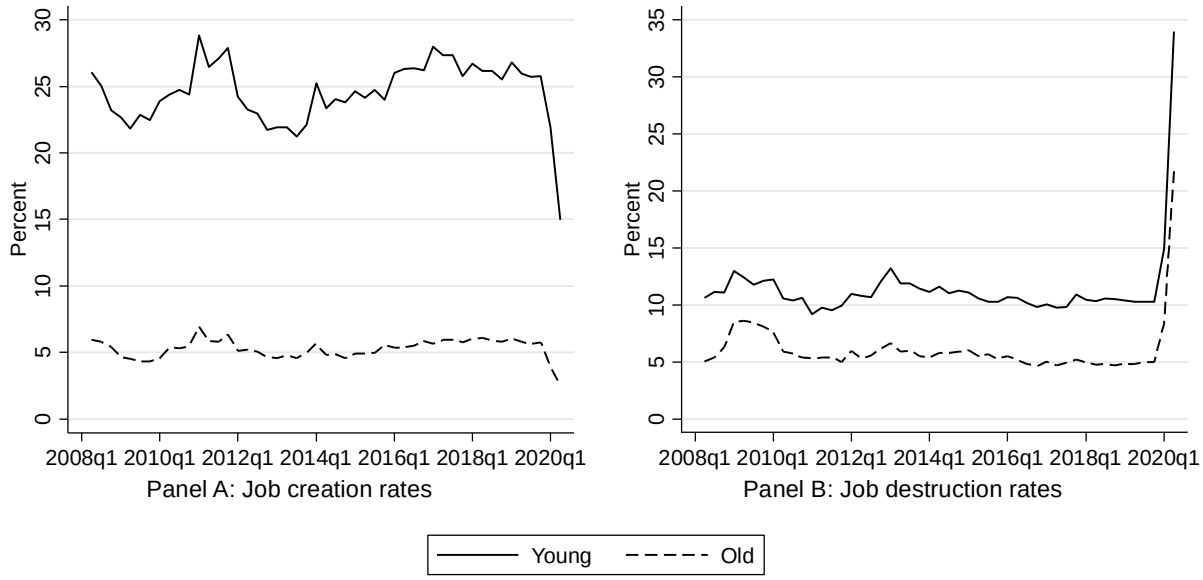


Figure 5 depicts the relative job creation rates (Panel A) and job destruction rates (Panel B) for the young and old firm category. We find that the employment dynamics, in terms of creation and destruction rates, of young firms were more affected during both crisis periods. Young firms created fewer jobs and destroyed more jobs during the Great Recession and the first half of 2020 compared to old firms.

[14] As we track every firm for at least 5 years, we observe young (0-5 years) and old firms (6+ years) starting from 2008q1.

Figure 5. Job creation and destruction rate by firm age



The importance of young firms on firm growth has been well documented recently (Haltiwanger et al. 2013; Criscuolo et al. 2014; Lawless, 2014). Haltiwanger et al. (2013) show that young firms, in particular, are very heterogeneous. They are typically small due to their lack of reputation in product and credit markets, constraining them to scale-up. Hence they are often characterized by an "up or out" dynamics with high job creation and job destruction rates. Fort et al. (2013) find that small and young firms are more sensitive to cyclical conditions than mature firms and provide evidence that shocks in house prices and restricted access to credit due to home equity financing by small and young firms might explain these results. We show that small firms (10-49) account for about 24 percent of all jobs (Table 1), yet they only contribute 7 percent to job creation and 6 percent to job destruction, on average (Figure 3), so they contribute disproportionately less to overall job creation and job destruction (likewise for micro firms). In contrast, young firms account for only about 7 percent of aggregate employment, yet they contribute more than proportionate to job creation and job destruction, 25 and 10 percent respectively, on average. Furthermore, they are also more responsive to crisis years, which is especially clear from the pandemic shock. These findings indicate that young firms are more important than small firms for net employment growth and for overall job creation and destruction.

3.4. Industry effect

The results by firm size and age reflect the difference in responses to crises by small and large firms that stems from the industry-specific effects of the shocks that we document in this section. Figure 6 shows the evolution of net employment growth by broad sectors, manufacturing, services, and trade. The largest decline in employment during the 2008 crisis was in manufacturing whereas during the pandemic crisis, the services sector that requires substantive interpersonal interactions was hit the most. For instance, through March, FTE employment in the services sector fell by 21 percent, whereas employment in manufacturing sector dropped by 16 percent.

Figure 6. Net employment growth by sectors

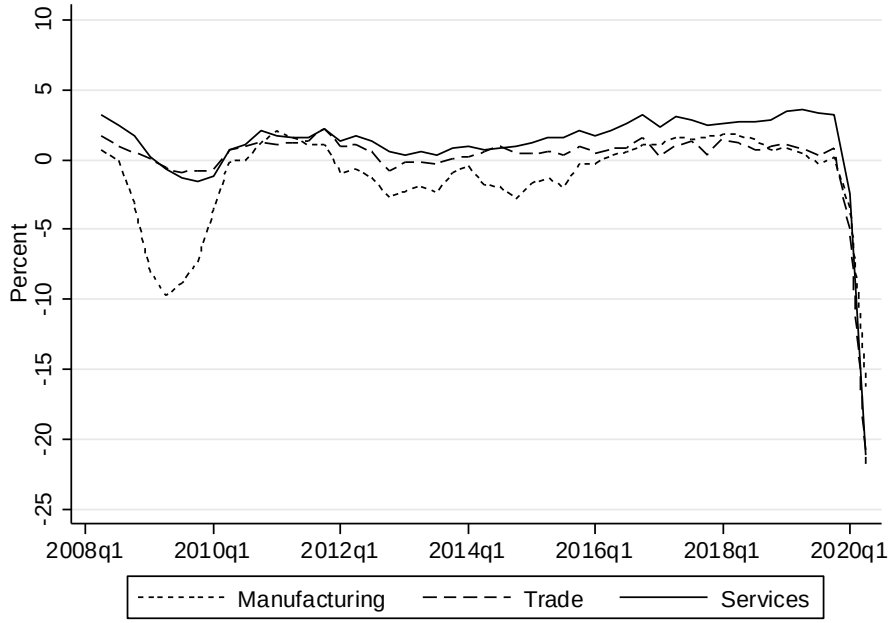
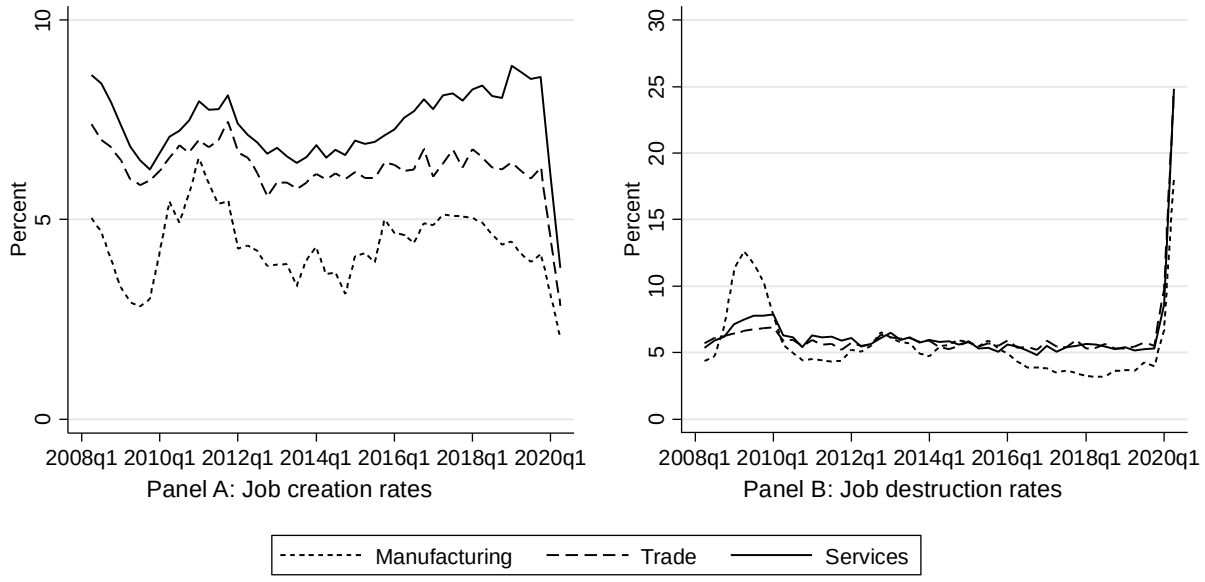


Figure 7 shows that both a steep change in employment dynamics in terms of job creation and destruction rates for the manufacturing sector during the Great Recession. During 2020, services sector saw a steep change in job creation and destruction rates. The volume of workers declined by more 25 percent in services sector during this period compared to the 18 percent decline in manufacturing sector.

Figure 7. Job creation and destruction rate by sectors



These findings suggest that the difference in responses to crises by small and large firms stems from the industry-specific effects of the shocks. In particular, a manufacturing sector containing, on average, larger firms, was hit harder by the Great Recession whereas the services sector, comprised primarily of small firms, has been disproportionately affected by the pandemic crisis. These findings reflect the underlying cause and the nature of the recessions. The Great Recession was a result of disruptions in credit markets that started in the housing sector and resulted in lower demand for consumer and capital goods, produced in manufacturing. On the other hand, the Covid-19 disease is entirely an exogenous shock that require containment measures and precautionary behavior thus affecting non-tradable service sectors that require substantive interpersonal interactions, such as leisure and hospitality industries.

4. Econometric analysis

Although the figures in the previous section offer a snapshot of the unequal employment effect of the pandemic across size and age groups, the effects shown were confounded by the overlapping compositions across these groups that were all hit differently by the pandemic. To this end, we draw from the empirical approach developed by Haltiwanger et al. (2013) and estimate the following employment-weighted OLS regressions to analyze the relative contribution to net employment creation by different size and age classes:

$$gr_{it} = \alpha + \sum_j \beta_j \, size_{it} + \sum_k \gamma_k \, age_{it} + \sum_c \delta_c \, crisis_t + \sum_{cj} \eta_{cj} \, size_{it} * crisis_t + \sum_{ck} \theta_{ck} \, age_{it} * crisis_t + \mu_s + \gamma_t + \varepsilon_{it}, \quad (5)$$

where gr_{it} is the net employment growth rate of firm i at time t, as defined in equation (1), $size_{it}$ and age_{it} are vectors of size and age dummies a firm belongs to at each point in time. Similar to previous sections, we adopt four size categories (0-9, 10-49, 50-249, 250+) and 3 age categories (0, 1-5, and 6+)[15]. $crisis_t$ is a vector of dummies indicating the period of the pandemic crisis and the 2008-2009 financial crisis.[16] μ_s and γ_t are 2-digit NACE industry and time fixed-effects, respectively. ε_{it} is the i.i.d error term.[17] We are interested in the coefficients of the interaction terms to examine the net employment growth by size and age groups during the pandemic. A significant negative estimate means that the employment outcomes of a given group were worse than the reference group.

We estimate employment-weighted OLS regressions using the average size classification to account for the regression to the mean bias (following Davis et al., 1996 and Haltiwanger et al., 2013). The estimated coefficients can be interpreted as employment-weighted conditional means since the dependent variable, net growth is weighted by average employment. We also note that estimating a fully saturated model with all possible interactions between size, age, industry, and time groups would yield unbiased estimates (Angrist and Pischke, 2008). However, this specification is computationally intensive since it requires the estimation of thousands of parameters (Huber et al. 2017; Mina and Santoleri, 2021). Hence, drawing on previous literature, we estimate equation (5) based on a two-way model without

[15] Age category 0 corresponds to entry, i.e. the growth rate that is equivalent to 2.

[16] We also employ an effect of 2012q2-2013q1 as an addition to the 2008 crisis to account for the double-dip recession. The results are broadly unaltered.

[17] Please note that, since we use time fixed effects the coefficient on $crisis_t$ will be absorbed when estimating equation (1).

interactions. Alternatively, we experimented with the almost fully-saturated specification with age and size categories and their interactions as well as a full set of time and industry dummies. Results yielded very similar conclusions and are available upon request.

Table 2 presents the results. The baseline category is large firms with more than 250 employees and old firms with more than 6 years of economic activity. Column 1 shows the results for size and age categories only, whereas columns 2 and 3 show the same categories that interacted with the 2008, 2008-2012, and 2020 crises. It can be seen from Column 1 that when controlling for age, there is a positive relationship between net growth and firm size, meaning that smaller firms grow less than larger firms. We observe that firms with less than 10 employees grow 4.1 percentage points less than firms with more than 250 employees. However, in contrast to the US findings, the inclusion of age does not induce firm size to lose statistical significance. Thus Gibrat's law, which states that firm growth is not proportional to its size, seems not to hold. Nevertheless, these findings are consistent with the findings for the European economies as documented in Huber et al. (2017) and Mina and Santoleri (2021). Furthermore, we observe that young firms exhibit higher growth rates compared to their older counterparts. In fact, controlling for size, young firms less than 5 years old grow 12.6 percentage points more than those older than 6 years.

Next, we evaluate specifically how the size, age, and growth relationship is altered during economic downturns. Column 2 reports the results when we interact size and age categories with the 2008 financial crisis and 2020 pandemic crisis. The impact on size and age groups varies by the crises. First, we observe that during the first half of 2020, micro firms with less than 10 workers were hit the hardest compared to other size categories. For instance, net employment growth was down by 10.8 percentage points in this size category compared to a category of large firms. Second, young firms did worse compared to old firms during the same crisis. Net growth was down by about 2.8 percentage points in this category compared to the category of old firms. These patterns somewhat differ during the Great Recession. During the 2008 financial crisis, all size categories did better relative to the large firm category, where employment growth was found positive and statistically significant in all cases. Compared to the findings of Fort et al. 2013, Belgian firms have been more resilient to the crisis than in the US. These findings are also found to be true for other EU economies (Bartz and Winkler; 2016, Huber et al. 2017; Mina and Santoleri, 2021).

Although the impact on firm size varies by the crisis, the negative age impact is still in place. Young firms suffer more during crisis times, both the Great Recession and the pandemic crisis. We observe that during the financial crisis, young firms decreased their growth rates by approximately 1 percentage point. In sum, young firms have been affected the most by both the 2008 and 2020 crises, while small firms did relatively better during the 2008 crisis and worse during the 2020 pandemic crisis. This hints at the dynamics of young vs. small firms and the nature of the crisis affecting the economy. When we include the impact of a double-dip recession in Column 3, the results remain very similar to Column 2.

Table 2. Net employment growth regressions

	1	2	3
0-9	-0.041***	-0.037***	-0.036***
	(0.000)	(0.000)	(0.000)
10-49	-0.006***	-0.005***	-0.004***
	(0.000)	(0.000)	(0.000)
50-249	0.002***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)
Young	0.126***	0.128***	0.130***
	(0.000)	(0.000)	(0.000)
Crisis 2020 # 0-9		-0.108***	-0.110***
		(0.001)	(0.001)
Crisis 2020 # 10-49		-0.052***	-0.052***
		(0.001)	(0.001)
Crisis 2020 # 50-249		-0.035***	-0.036***
		(0.001)	(0.001)
Crisis 2020 # Young		-0.028***	-0.030***
		(0.002)	(0.002)
Crisis 2008 # 0-9		0.005***	
		(0.001)	
Crisis 2008 # 10-49		0.008***	
		(0.001)	
Crisis 2008 # 50-249		0.009***	
		(0.001)	
Crisis 2008 # Young		-0.011***	
		(0.001)	
Crisis 2008-2012 # 0-9			-0.005***
			(0.001)
Crisis 2008-2012 # 10-49			0.000
			(0.001)
Crisis 2008-2012 # 50-249			0.003***
			(0.001)
Crisis 2008-2012 # Young			-0.017***
			(0.001)
Constant	0.060***	0.059***	0.058***
	(0.001)	(0.001)	(0.001)
Industry dummies	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes
R2	0.0891	0.0900	0.0901
Obs.	8357731	8357731	8357731

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In Table 3 we evaluate the sectoral impact of the pandemic crisis. Consistent with the results of Section 3.4, we observe that micro and small firms in the accommodation and food sector, as well as real estate, and wholesale and retail trade sectors have been hit the most by the crisis compared to their larger counterparts. Table 3 also shows that micro and small firms within manufacturing and wholesale and retail trade sectors also performed relatively better during the financial crisis of 2008. We further provide a breakdown of regression results by 2-digit NACE industries separately in Tables A2 and A3, respectively. We find that within manufacturing the relatively positive effect is driven by the manufacture of motor

vehicles, trailers, and semi-trailers industry (NACE 28). Similarly, within the trade sector, the effect is driven by wholesale and retail trade and repair of motor vehicles and motorcycles industry (NACE 45). During the 2008 crisis, the automotive industry was more severely hit than any industry except for housing and finance. The governments provided bailouts in different ways. In Belgium, huge subsidies were provided in the form of credit support and loan guarantees to troubled firms. Hence, small firms were likely to better weather the crisis.

Table 3. Net employment growth regressions, by sector

	Accommodation & Food	Admin & support	Construction	Finance	ICT	Manufacturing	Professional Services	Real estate	Transportation	Wholesale & Retail
0-9	-0.020***	-0.056***	-0.064***	-0.037***	0.030	-0.009***	-0.037***	-0.037***	-0.016	-0.058***
	(0.001)	(0.002)	(0.012)	(0.001)	(0.029)	(0.001)	(0.002)	(0.001)	(0.011)	(0.001)
10-49	0.015***	-0.010***	-0.026**	-0.004***	0.030**	0.023***	-0.001	-0.009***	0.009	-0.017***
	(0.001)	(0.001)	(0.012)	(0.001)	(0.015)	(0.001)	(0.002)	(0.001)	(0.009)	(0.001)
50-249	0.013***	0.021***	-0.026**	0.008***	0.025**	0.018***	0.001	-0.003***	0.035***	-0.012***
	(0.002)	(0.001)	(0.012)	(0.001)	(0.011)	(0.001)	(0.002)	(0.001)	(0.008)	(0.001)
0	2.018***	2.032***	1.995***	2.035***	1.970***	2.016***	2.021***	2.035***	2.037***	2.027***
	(0.006)	(0.016)	(0.018)	(0.007)	(0.258)	(0.014)	(0.020)	(0.016)	(0.257)	(0.008)
Young	0.066***	0.197***	0.081***	0.122***	0.201***	0.094***	0.175***	0.128***	0.060**	0.143***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.027)	(0.002)	(0.003)	(0.002)	(0.029)	(0.001)
Crisis 2020 # 0-9	-0.183***	0.068***	0.010	-0.023***	-0.130	-0.060***	-0.080***	-0.061***	0.001	-0.065***
	(0.006)	(0.007)	(0.034)	(0.005)	(0.117)	(0.006)	(0.009)	(0.005)	(0.049)	(0.004)
Crisis 2020 # 10-49	-0.155***	0.014**	0.031	-0.012**	-0.014	-0.032***	-0.031***	-0.024***	-0.016	-0.049***
	(0.007)	(0.006)	(0.034)	(0.005)	(0.059)	(0.006)	(0.007)	(0.003)	(0.041)	(0.004)
Crisis 2020 # 50-249	-0.118***	-0.001	-0.013	-0.056***	-0.324***	-0.017***	-0.014**	-0.008***	-0.101***	-0.038***
	(0.008)	(0.006)	(0.035)	(0.005)	(0.043)	(0.005)	(0.007)	(0.003)	(0.037)	(0.004)
Crisis 2020 # 0	0.459***	0.139	0.030	0.116***	0.156	0.067	0.095	0.123	0.114	0.067*
	(0.037)	(0.087)	(0.089)	(0.036)	(1.614)	(0.062)	(0.096)	(0.081)	(1.328)	(0.038)
Crisis 2020 # Young	0.013**	-0.121***	0.064***	-0.027***	0.032	-0.042***	0.012	0.002	0.074	-0.021***
	(0.005)	(0.010)	(0.013)	(0.005)	(0.170)	(0.009)	(0.011)	(0.010)	(0.169)	(0.005)
Crisis 2008 # 0-9	-0.012***	-0.001	0.175***	-0.015***	0.222	0.000	-0.012	0.021***	0.013	-0.039***
	(0.004)	(0.006)	(0.050)	(0.003)	(0.161)	(0.004)	(0.007)	(0.003)	(0.038)	(0.003)
Crisis 2008 # 10-49	-0.011**	0.000	0.181***	-0.016***	0.194**	0.006	0.001	0.019***	-0.014	-0.030***
	(0.005)	(0.005)	(0.051)	(0.003)	(0.079)	(0.004)	(0.005)	(0.002)	(0.032)	(0.003)
Crisis 2008 # 50-249	0.062***	-0.003	0.131**	0.008**	0.072*	0.004	0.033***	0.010***	0.046	-0.052***
	(0.005)	(0.005)	(0.051)	(0.004)	(0.041)	(0.004)	(0.005)	(0.002)	(0.030)	(0.003)
Crisis 2008 # 0	0.039*	-0.008	0.049	0.028	-0.170	0.003	0.014	0.033	0.037	-0.001
	(0.022)	(0.052)	(0.056)	(0.023)	(0.946)	(0.049)	(0.072)	(0.048)	(0.386)	(0.026)

Crisis 2008 # Young	-0.013***	-0.016***	-0.067***	-0.007**	-0.080	-0.004	-0.006	-0.004	0.098	-0.018***
	(0.004)	(0.005)	(0.009)	(0.003)	(0.110)	(0.007)	(0.009)	(0.006)	(0.080)	(0.004)
Constant	-0.017***	0.064***	0.041***	0.023***	0.039**	-0.007***	-0.010**	0.031***	0.009	0.051***
	(0.003)	(0.004)	(0.014)	(0.002)	(0.015)	(0.002)	(0.004)	(0.002)	(0.092)	(0.002)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.2150	0.1194	0.0750	0.1022	0.1209	0.0705	0.0845	0.0622	0.0967	0.1056
Obs.	979077	408125	218474	1265408	3666	371642	240049	797821	5613	856654

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

As an alternative to nested model above, in this section we focus on whether the age-size-growth relationships observed so far are altered during periods of economic distress. To this end, we estimate Equation (1) by splitting the sample across the non-crisis (i.e. without 2008-2012 and 2020 crises) and crisis period (i.e. 2008, 2008-2012, and 2020 crisis). Results are displayed in Table 4. We estimate both a one-part model based on Haltiwanger et al. (2013) and a two-part model based on Huber et al. (2017), where the latter explicitly accounts for the differences between exiting and surviving firms. We observe that the relationship between firm size and employment growth is similar across the two models. Similar to our previous findings (Table 2), during the 2020 pandemic crisis, we observe a significant decrease in net employment growth for small firms compared to large firms.

In terms of firm growth by age class, we observe that while firms aged less than 5 years have 13 percentage points higher employment growth rate relative to older firms in the period of non-crisis, they decrease their growth rates to 11 percent during 2008, and to 12 percent during the first half of 2020. These results are based on one-part model regression analysis. Nevertheless, while young firms appear to be the most fragile ones, they are the most dynamic group even after controlling for crises, indicating their role in net creation throughout the business cycle.

To sum up, these results confirm our previous findings. During economic downturns young firms, while remaining the most dynamic group of firms, are the most affected, whereas small firms have been hit the most during the pandemic crisis.

Table 4. Net employment growth, crisis vs non-crisis times

	One-part model			Two-part model		
	Non-crisis period	2008 crisis	2020 crisis	Non-crisis period	2008 crisis	2020 crisis
0-9	-0.037***	-0.040***	-0.107***	-0.019***	-0.024***	-0.095***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.004)	(0.008)
10-49	-0.005***	-0.001	-0.039***	0.001	0.006	-0.035***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.004)	(0.007)
50-249	0.003***	0.012***	-0.027***	0.007***	0.016***	-0.023***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.004)	(0.007)
Young	0.129***	0.110***	0.119***	0.137***	0.119***	0.123***
	(0.000)	(0.001)	(0.002)	(0.001)	(0.003)	(0.008)
Constant	0.058***	0.006	0.162***	5.056***	5.003***	5.162***
	(0.001)	(0.004)	(0.005)	(0.003)	(0.008)	(0.011)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.0806	0.0975	0.2160	0.1023	0.1230	0.2361
Obs.	6682298	674666	328390	6518046	656911	167259

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

In this paper, we study the impact of the pandemic crisis on employment growth across firm size and age categories in Belgium and provide a comparison with the Great Recession. We show that during the first and second quarter of 2020, net employment growth was down by 4 and 19 percent, respectively. The contrasting response by firm size indicates that the pandemic crisis is different than the Great Recession. During the Great Recession, large firms were affected harder compared to small and medium-sized firms, whereas during the pandemic crisis micro and small firms were hit particularly hard. We find that the difference stems from the industry-specific effects of the shocks. In particular, during the Covid-19 crisis, the largest declines in employment were in sectors that are characterized by intensive interpersonal interactions, such as the hospitality industry, which typically contain many small firms. On the other hand, during the financial crisis, the manufacturing sector containing, on average, larger firms, was hit harder by the Great Recession. Finally, we show that young firms were hit relatively harder during both crisis periods. Moreover, young firms contribute disproportionately more to overall job creation and job destruction and are more volatile over the business cycle.

From a policy point of view, a good understanding of the extent to which firms of different size and age respond to external shocks is vital to formulate policies to mitigate the negative employment effect during economic downturns. Although the response to the pandemic recession is still ongoing, our results suggest that targeted support for small firms during crisis times may not always be effective. Instead, the paper supports policy initiatives that target young firms, as they are found to be the most vulnerable ones to external shocks, yet, they remain main contributors to employment growth in the short run and are potentially the high growth firms of the future.

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Appendix

Figure A1. Net employment growth by firm age, excluding entry

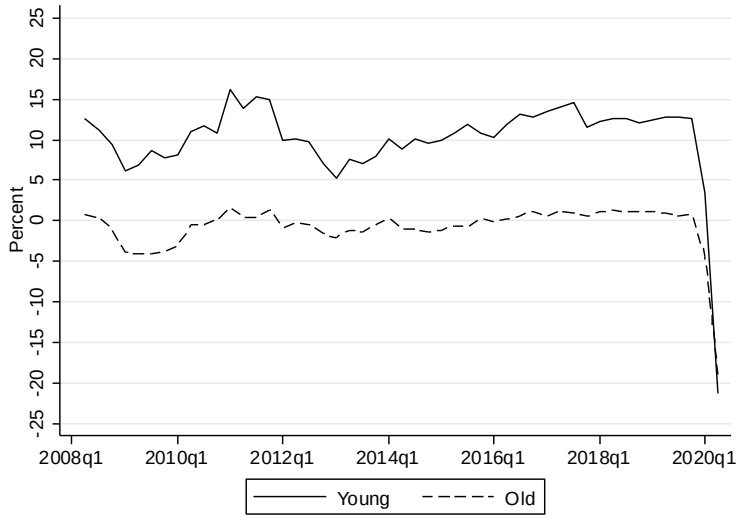

Figure A2. Job creation and destruction rate by firm age, excluding entry

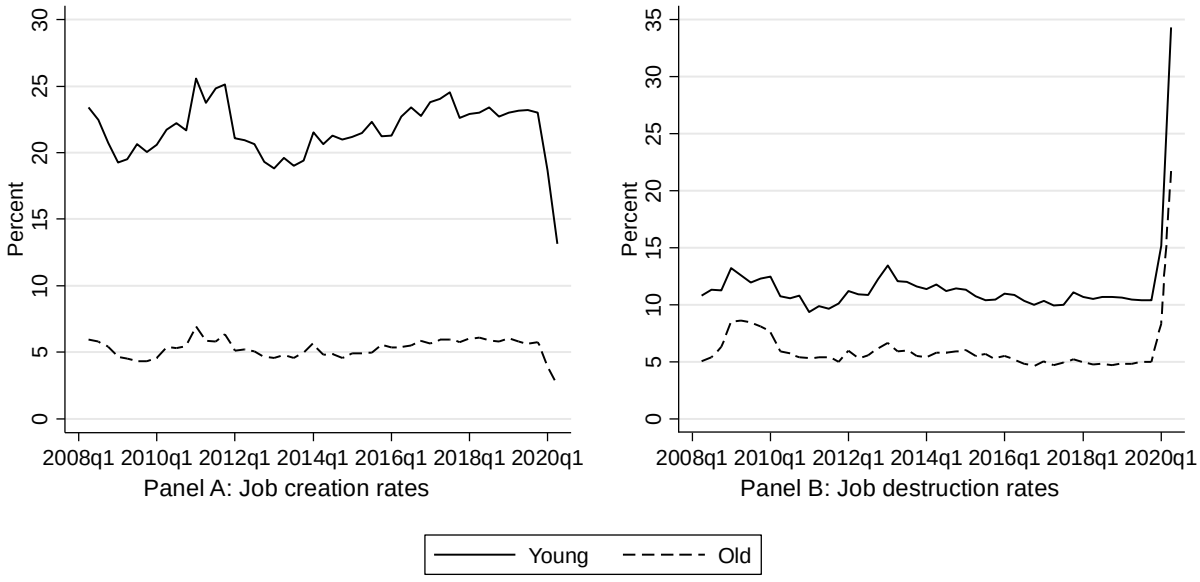

Table A1. Net employment growth regressions for NACE 10-33

	10	11	12	13	14	15	16	17	18	19	20
0-9	-0.022***	0.040***	0.046	-0.031***	-0.056***	-0.060***	-0.052***	-0.035***	-0.059***	-0.143	0.020**
	(0.002)	(0.008)	(0.057)	(0.005)	(0.006)	(0.013)	(0.005)	(0.008)	(0.005)	(0.172)	(0.009)
10-49	0.001	0.022***	-0.011	-0.020***	-0.026***	-0.035***	-0.027***	-0.005	-0.045***	0.045	0.023***
	(0.001)	(0.004)	(0.019)	(0.003)	(0.005)	(0.010)	(0.004)	(0.004)	(0.005)	(0.040)	(0.004)
50-249	0.002*	0.016***	-0.010	-0.001	-0.023***	-0.024**	-0.035***	-0.019***	-0.036***	-0.008	0.021***
	(0.001)	(0.003)	(0.015)	(0.003)	(0.005)	(0.010)	(0.004)	(0.003)	(0.005)	(0.013)	(0.002)
Young	0.129***	0.196***	-0.003	0.063***	0.097***	0.080**	0.124***	0.128***	0.114***	-0.276***	0.138***
	(0.003)	(0.017)	(0.131)	(0.012)	(0.012)	(0.033)	(0.008)	(0.018)	(0.006)	(0.088)	(0.016)
Crisis 2020 # 0-9	-0.061***	-0.255***	-0.074	0.044*	-0.189***	0.079	-0.006	-0.058	-0.244***	-0.071	-0.137***
	(0.008)	(0.039)	(0.314)	(0.026)	(0.031)	(0.056)	(0.023)	(0.041)	(0.026)	(2.198)	(0.041)
Crisis 2020 # 10-49	-0.029***	-0.112***	0.059	0.014	-0.112***	0.041	0.022	-0.078***	-0.076***	0.309*	-0.067***
	(0.006)	(0.019)	(0.103)	(0.018)	(0.026)	(0.056)	(0.017)	(0.019)	(0.024)	(0.160)	(0.019)
Crisis 2020 # 50-249	-0.018***	-0.013	0.042	0.080***	-0.128***	0.087*	-0.012	0.009	-0.063***	0.008	-0.021*
	(0.005)	(0.016)	(0.080)	(0.015)	(0.028)	(0.053)	(0.019)	(0.014)	(0.024)	(0.072)	(0.011)
Crisis 2020 # Young	-0.032**	0.114*	0.573	0.022	-0.193**	0.315**	-0.036	0.063	-0.005	0.000	0.146
	(0.014)	(0.064)	(0.744)	(0.084)	(0.088)	(0.159)	(0.043)	(0.122)	(0.036)	(.)	(0.095)
Crisis 2008 # 0-9	-0.002	0.034	-0.021	0.015	-0.108***	-0.026	-0.357***	0.000	-0.016	1.138***	-0.020
	(0.005)	(0.032)	(0.170)	(0.016)	(0.018)	(0.037)	(0.015)	(0.025)	(0.017)	(0.348)	(0.029)
Crisis 2008 # 10-49	0.008*	0.005	-0.136**	0.047***	-0.064***	0.033	-0.355***	-0.001	-0.013	0.029	-0.013
	(0.005)	(0.014)	(0.066)	(0.010)	(0.016)	(0.029)	(0.013)	(0.013)	(0.016)	(0.141)	(0.013)
Crisis 2008 # 50-249	0.005	0.022**	0.001	-0.024***	-0.039**	0.105***	-0.366***	0.011	-0.008	0.037	-0.023***
	(0.004)	(0.011)	(0.047)	(0.009)	(0.016)	(0.034)	(0.014)	(0.009)	(0.016)	(0.043)	(0.008)
Crisis 2008 # Young	-0.024***	-0.175**	0.134	0.111***	0.127***	0.191**	0.212***	0.106**	0.045***	0.000	0.005
	(0.009)	(0.079)	(0.210)	(0.035)	(0.034)	(0.096)	(0.022)	(0.053)	(0.016)	(.)	(0.046)
Constant	0.010***	-0.020**	0.146***	-0.058***	0.019*	0.007	0.026***	-0.015*	0.065***	0.002	-0.016**
	(0.003)	(0.008)	(0.042)	(0.009)	(0.011)	(0.019)	(0.009)	(0.008)	(0.007)	(0.025)	(0.007)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.0692	0.1772	0.1671	0.1213	0.1169	0.5136	0.1041	0.0755	0.0827	0.2117	0.0408
Obs.	209802	6523	1054	30491	14780	1847	28660	9419	49569	289	21079

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A1 continued.

	20	21	22	23	24	25	26	27	28	29	30	31	32	33
0-9	0.020**	-0.049*	-0.001	-0.024***	-0.092***	-0.013***	-0.003	0.037***	0.003	-0.060***	0.001	-0.050***	-0.006	0.033***
	(0.009)	(0.028)	(0.006)	(0.004)	(0.020)	(0.002)	(0.012)	(0.008)	(0.005)	(0.019)	(0.016)	(0.006)	(0.004)	(0.005)
10-49	0.023***	-0.012	0.015***	-0.008***	-0.060***	0.001	0.006	0.045***	0.016***	-0.038***	0.016	-0.037***	0.008**	0.049***
	(0.004)	(0.010)	(0.003)	(0.003)	(0.010)	(0.002)	(0.005)	(0.004)	(0.003)	(0.009)	(0.011)	(0.005)	(0.004)	(0.004)
50-249	0.021***	-0.007	0.017***	-0.009***	-0.026***	0.005**	-0.001	0.045***	0.008***	-0.030***	0.028***	-0.032***	0.002	0.057***
	(0.002)	(0.006)	(0.003)	(0.002)	(0.006)	(0.002)	(0.004)	(0.004)	(0.002)	(0.006)	(0.007)	(0.005)	(0.004)	(0.003)
Young	0.138***	0.341***	0.174***	0.145***	0.407***	0.125***	0.160***	0.110***	0.117***	0.148***	0.206***	0.109***	0.110***	0.155***
	(0.016)	(0.027)	(0.011)	(0.008)	(0.028)	(0.003)	(0.022)	(0.012)	(0.011)	(0.040)	(0.026)	(0.006)	(0.006)	(0.006)
Crisis 2020 # 0-9	-0.137***	-0.093	-0.124***	0.007	0.057	-0.045***	-0.120**	-0.201***	0.002	0.117	0.173***	-0.130***	-0.287***	-0.077***
	(0.041)	(0.150)	(0.029)	(0.019)	(0.107)	(0.010)	(0.054)	(0.041)	(0.023)	(0.095)	(0.064)	(0.022)	(0.019)	(0.021)
Crisis 2020 # 10-49	-0.067***	-0.013	-0.039***	0.018	0.006	-0.047***	-0.007	-0.091***	0.017	0.113**	0.299***	-0.075***	-0.185***	-0.082***
	(0.019)	(0.049)	(0.015)	(0.012)	(0.051)	(0.008)	(0.024)	(0.022)	(0.013)	(0.050)	(0.045)	(0.021)	(0.018)	(0.018)
Crisis 2020 # 50-249	-0.021*	0.026	-0.045***	0.024**	0.090***	-0.040***	-0.004	-0.102***	0.011	-0.012	0.142***	-0.143***	-0.131***	-0.091***
	(0.011)	(0.027)	(0.013)	(0.011)	(0.025)	(0.008)	(0.021)	(0.019)	(0.012)	(0.030)	(0.030)	(0.021)	(0.019)	(0.016)
Crisis 2020 # Young	0.146	-0.086	0.018	0.083	-0.373**	-0.023	0.063	0.006	-0.020	-0.029	0.221	0.124***	0.105***	-0.051*
	(0.095)	(0.133)	(0.064)	(0.051)	(0.173)	(0.017)	(0.106)	(0.086)	(0.056)	(0.216)	(0.135)	(0.033)	(0.036)	(0.027)
Crisis 2008 # 0-9	-0.020	0.017	0.025	-0.000	0.064	-0.021***	0.034	-0.026	0.040***	0.205***	-0.048	0.024	-0.073***	0.006
	(0.029)	(0.090)	(0.019)	(0.012)	(0.066)	(0.007)	(0.039)	(0.025)	(0.015)	(0.066)	(0.056)	(0.015)	(0.013)	(0.017)
Crisis 2008 # 10-49	-0.013	-0.063	0.009	0.001	0.071**	-0.024***	0.004	-0.030**	0.057***	0.128***	0.087***	0.006	-0.044***	-0.023*
	(0.013)	(0.040)	(0.010)	(0.008)	(0.031)	(0.006)	(0.018)	(0.013)	(0.008)	(0.028)	(0.025)	(0.014)	(0.013)	(0.012)
Crisis 2008 # 50-249	-0.023***	-0.034	-0.004	0.006	0.016	-0.031***	-0.010	-0.084***	0.042***	0.076***	0.076***	0.006	-0.040***	0.020*
	(0.008)	(0.021)	(0.008)	(0.007)	(0.016)	(0.006)	(0.013)	(0.012)	(0.008)	(0.018)	(0.024)	(0.014)	(0.013)	(0.011)
Crisis 2008 # Young	0.005	0.006	-0.100***	0.008	0.413***	-0.003	-0.038	-0.129***	-0.004	-0.418***	0.002	0.011	-0.021	-0.014
	(0.046)	(0.135)	(0.030)	(0.024)	(0.098)	(0.009)	(0.070)	(0.026)	(0.026)	(0.113)	(0.088)	(0.018)	(0.018)	(0.026)
Constant	-0.016**	0.026*	0.003	0.022***	0.011	0.033***	-0.008	0.005	0.048***	-0.028**	-0.054***	0.033***	-0.031***	0.001
	(0.007)	(0.015)	(0.007)	(0.006)	(0.011)	(0.004)	(0.011)	(0.009)	(0.006)	(0.011)	(0.021)	(0.007)	(0.009)	(0.009)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.0408	0.0674	0.0706	0.0739	0.2080	0.0911	0.0795	0.1083	0.1188	0.2037	0.3500	0.0889	0.1311	0.1435
Obs.	21079	4610	24696	42412	7677	151116	8600	12828	41994	10433	3431	42587	35032	27474

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2. Net employment growth regressions for NACE 45-47

	45	46	47
0-9	0.019***	-0.016***	-0.025***
	(0.001)	(0.001)	(0.001)
10-49	0.041***	0.002**	-0.010***
	(0.001)	(0.001)	(0.001)
50-249	0.042***	0.007***	-0.001
	(0.002)	(0.001)	(0.001)
Young	0.102***	0.112***	0.108***
	(0.002)	(0.001)	(0.001)
Crisis 2020 # 0-9	-0.187***	-0.136***	-0.105***
	(0.007)	(0.004)	(0.003)
Crisis 2020 # 10-49	-0.134***	-0.076***	-0.063***
	(0.007)	(0.004)	(0.003)
Crisis 2020 # 50-249	-0.101***	-0.033***	-0.169***
	(0.008)	(0.004)	(0.004)
Crisis 2020 # Young	0.002	0.043***	0.030***
	(0.010)	(0.006)	(0.004)
Crisis 2008 # 0-9	0.091***	0.011***	0.007***
	(0.004)	(0.003)	(0.002)
Crisis 2008 # 10-49	0.099***	0.016***	0.011***
	(0.004)	(0.003)	(0.002)
Crisis 2008 # 50-249	0.124***	0.014***	0.041***
	(0.005)	(0.003)	(0.003)
Crisis 2008 # Young	-0.007	-0.000	-0.017***
	(0.006)	(0.004)	(0.003)
Constant	-0.035***	0.024***	0.023***
	(0.003)	(0.002)	(0.001)
Industry dummies	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes
R2	0.1353	0.0936	0.1345
Obs.	333332	818475	1301295

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3. Net employment growth regressions for NACE 77-82, excl. NACE 78

	77	79	80	81	82
0-9	-0.102***	-0.009***	0.037*	-0.040***	-0.020***
	(0.008)	(0.003)	(0.020)	(0.002)	(0.003)
10-49	-0.069***	0.016***	0.033***	-0.011***	0.013***
	(0.008)	(0.003)	(0.010)	(0.002)	(0.003)
50-249	-0.061***	0.002	0.095***	0.022***	0.035***
	(0.008)	(0.004)	(0.008)	(0.002)	(0.003)
Young	0.144***	0.108***	0.188***	0.211***	0.172***
	(0.005)	(0.006)	(0.016)	(0.002)	(0.004)
Crisis 2020 # 0-9	-0.209***	-0.065***	-0.125	0.190***	-0.157***
	(0.021)	(0.019)	(0.082)	(0.009)	(0.015)
Crisis 2020 # 10-49	-0.086***	-0.105***	-0.011	0.044***	-0.038***
	(0.019)	(0.020)	(0.048)	(0.007)	(0.013)
Crisis 2020 # 50-249	-0.004	0.013	-0.045	-0.018***	0.019
	(0.019)	(0.020)	(0.034)	(0.007)	(0.012)
Crisis 2020 # Young	0.075***	-0.034	-0.021	-0.180***	0.030
	(0.028)	(0.028)	(0.069)	(0.011)	(0.019)
Crisis 2008 # 0-9	-0.001	0.019**	0.095	-0.002	-0.051***
	(0.012)	(0.010)	(0.075)	(0.008)	(0.011)
Crisis 2008 # 10-49	0.004	-0.012	-0.057	0.028***	-0.074***
	(0.011)	(0.010)	(0.038)	(0.007)	(0.010)
Crisis 2008 # 50-249	0.000	0.014	0.030	-0.005	-0.053***
	(.)	(0.013)	(0.037)	(0.007)	(0.010)
Crisis 2008 # Young	-0.009	-0.021	-0.107	-0.013**	-0.069***
	(0.016)	(0.016)	(0.073)	(0.006)	(0.012)
Constant	0.122***	0.017**	0.069***	0.057***	0.028***
	(0.012)	(0.007)	(0.018)	(0.006)	(0.007)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes
R2	0.1333	0.1732	0.1103	0.1823	0.0956
Obs.	41585	44524	7309	214749	91291

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$