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EU start-up calculator: impact of COVID-19 on aggregate employment

Scenario analysis for Denmark, Estonia, Finland, France, Latvia, Lithuania, Portugal and Sweden

Benedetti Fasil, C.
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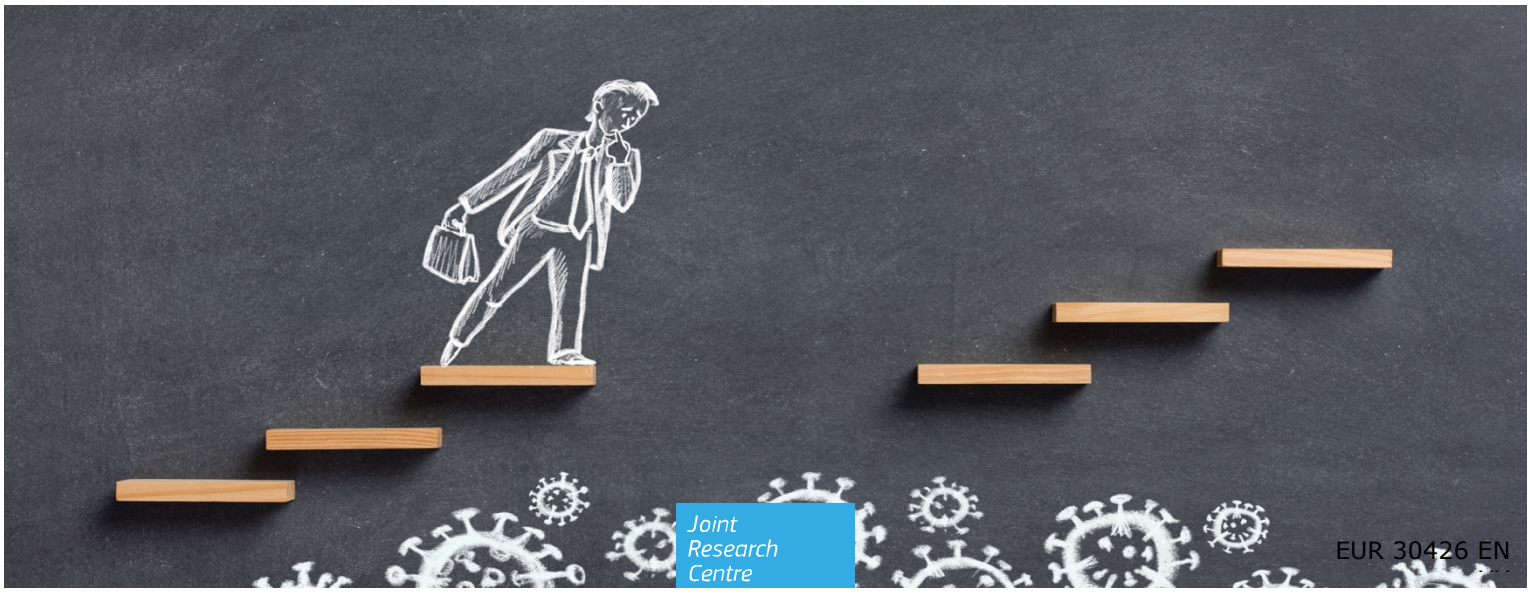

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Contents

Foreword

This paper is the second of a series of publications that use a newly developed EU start-up calculator. This is a simulator that allows to assess the disruptive impact of COVID-19 on start-up activity and ultimately aggregate employment in the European Union Member States. The paper explains the tool and performs scenario analysis for Denmark, Estonia, Finland, France, Latvia, Lithuania, Portugal and Sweden. After a general introduction and explanation of the tool, the presentation of the scenario analysis of each country is self-contained. This allows the reader to focus directly on the countries of interest.

The first report, Benedetti Fasil, Sedláček and Sterk (2020), presents a similar structure and discusses the scenario analysis for Austria, Belgium, Germany, Hungary, Italy and Spain. This paper will be followed by a third and last report that will analyse the remaining Member States for which EuroStat data are available.

The start-up calculator has been firstly developed by Sedláček and Sterk (2020) and applied to the US economy. It has subsequently been adapted to fit the employment profile of young firms in individual EU Member States.

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Abstract

Early data show that the COVID-19 pandemic has affected particularly strongly start-up business activity. This may have dramatic and lasting effects on aggregate employment which persist as the cohort of new firms age. To assess such an impact, we developed the EU start-up calculator. A first application targeted to Austria, Belgium, Germany, Hungary, Italy and Spain is discussed in Benedetti Fasil, Sedláček and Sterk (2020). The EU start-up calculator is an empirical tool that allows to conduct scenario analysis to compute the impact that the disruption of start-up activity has on aggregate employment on EU Member States and their economic sectors. In this paper, we simulate the effects of a strong (i.e. of magnitude equivalent to the Great Recession of 2008 and 2009) but short-lived (i.e. lasting one-year) crisis in Denmark, Estonia, Finland, France, Latvia, Lithuania, Portugal and Sweden. This shock generates important and persistent job losses in all the countries ranging between 0.9% (Portugal) and 4.5% (Latvia) from the employment trend in 2020 and results in a computed potential cumulative loss of jobs for the period 2020-2030 ranging from 59,000 (Estonia) to 798,000 (France). The potential negative impact is particularly high in Estonia, France, Latvia, Lithuania and Portugal, as well as in the service sector, which are characterized by a high firm turnover and a reliance on start-ups and young firms for job creation. We also find that in most countries the deterioration of the survival rate of young firms plays an important role in driving employment, seconded by the number of new entrants. As a consequence, policies aimed at supporting young firms and incentivizing the creation of new ones may significantly mitigate the medium-term effect of the pandemic. In fact, when we simulate bounce-back scenarios where the number of firms entering the economy rapidly increases in 2021, in every country the outlook is significantly improved, the recovery is faster and the aggregate job loss is lower.

Key words: COVID-19, start-ups, employment

1 Introduction

The EU start-up calculator is an empirical tool that allows researchers and policy analysts to compute an estimate of the medium-run impact, i.e. up to 2030, that COVID-19 may have on aggregate employment due to the disruption of start-ups and young firms. In the context of this study, start-ups are firms age zero or new entrants while young firms are less than six years old from when they registered as a business. The simulator allows to create different scenarios with the possibilities to vary three margins: (i) the number of start-ups, (ii) the survival rate of young firms and (iii) the growth potential of start-ups (i.e. the post-entry growth of firms in terms of employment). The start-up calculator uses publicly available data from Eurostat allowing analysis of the whole economy, as well as the industrial and service sectors in each Member State.

The focus is on the impact of COVID-19 on the employment-generating potential of start-ups and young firms. This category of firms is particularly important for a dynamic and productive economy. Start-ups and young firms are job creators and account for a large share of employment in the EU Member States (Figure 1). At the EU 27 level, 35% of firms are less than 5 years old and account for 12% of total European employment, with start-ups accounting for 2.5%. Figure 1 shows that in Estonia, Finland, Latvia, Lithuania and Portugal, young firms are particularly relevant actors in terms of their contribution to aggregate employment when compared to the EU average. In fact, among these countries the share of employment of young firms ranges between 14% in Estonia and 21% in Latvia. Even more striking is the disproportional contribution of start-ups and young firms to employment growth. In the EU 27, young firms accounted for 36% of employment growth in the period 2013-2017. This pattern is qualitatively present also in the other European countries analyzed which show a contribution of young firms to employment growth ranging between 25% in Denmark to 48% in France. Particularly interesting is the case of France where the employment share of young firms is close to the EU average while the contribution of young firms to aggregate employment growth is 13 percentage points higher than the EU average. Figure A1 in Appendix I reports the same descriptive statistics for a larger set of EU Member States.

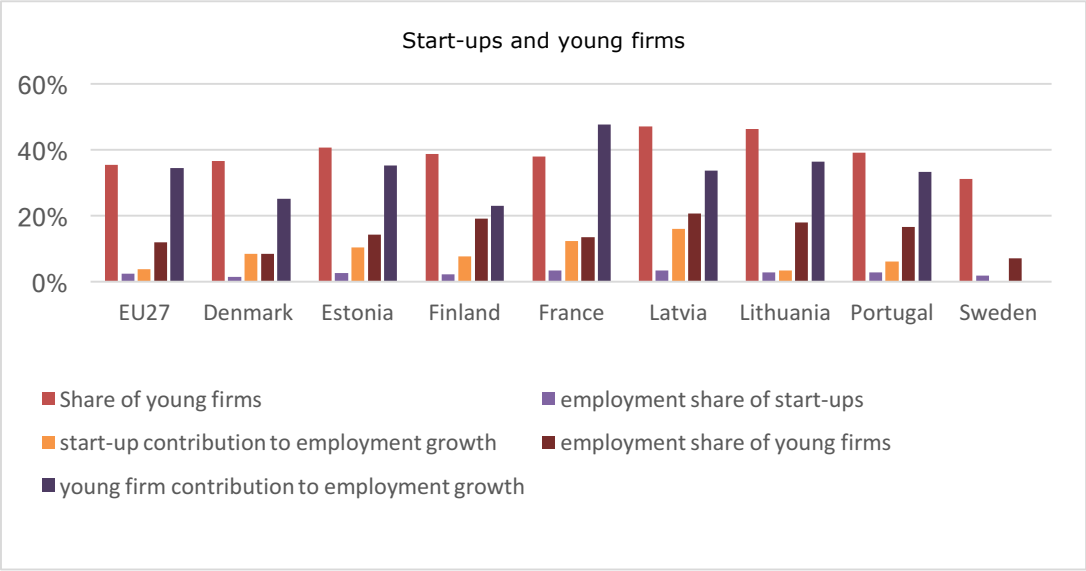


Figure 1. Importance of start-ups and young firms for aggregate employment

Source: JRC, Eurostat, Business Demography dataset, 2020.

Note(1): The time series for the EU27, Denmark and Finland is between 2012 and 2017, for Estonia, France, Latvia and Portugal between 2008 and 2017, for Lithuania from 2009 to 2017. The Business Demography dataset for Sweden does not have enough data to compute the start-up and young firm contribution to growth. Hence, this is omitted in the Figure. For the other statistics the time series is between 2012 and 2017.

Importantly, start-ups are also pivotal for the *creation* of new jobs. Figure 2 shows net job creation (i.e. creation minus destruction) by firm age, in the same set of countries. On average, the employment share of start-ups accounts for 1.8 in Denmark to 3.6% in Latvia of aggregate employment. Thus, a lack of start-up activity can lead to an important loss of aggregate employment. Figure 2 also shows that for firms of age 1 the contribution to net-job creation is substantially lower and even negative for Denmark. Beyond age 1, net job creation is negative in all the countries. That is, these age groups on average destroy more jobs (either via exit or scaling back) than they create. Again, this highlights the importance of start-ups in sustaining aggregate employment. Finally, the figure suggests that there is substantial variation across countries in the importance of start-ups for job creation, although qualitatively the patterns are similar. The interested reader can refer to Figure A2 in Appendix I to assess the net job creation in a larger set of EU Member States.

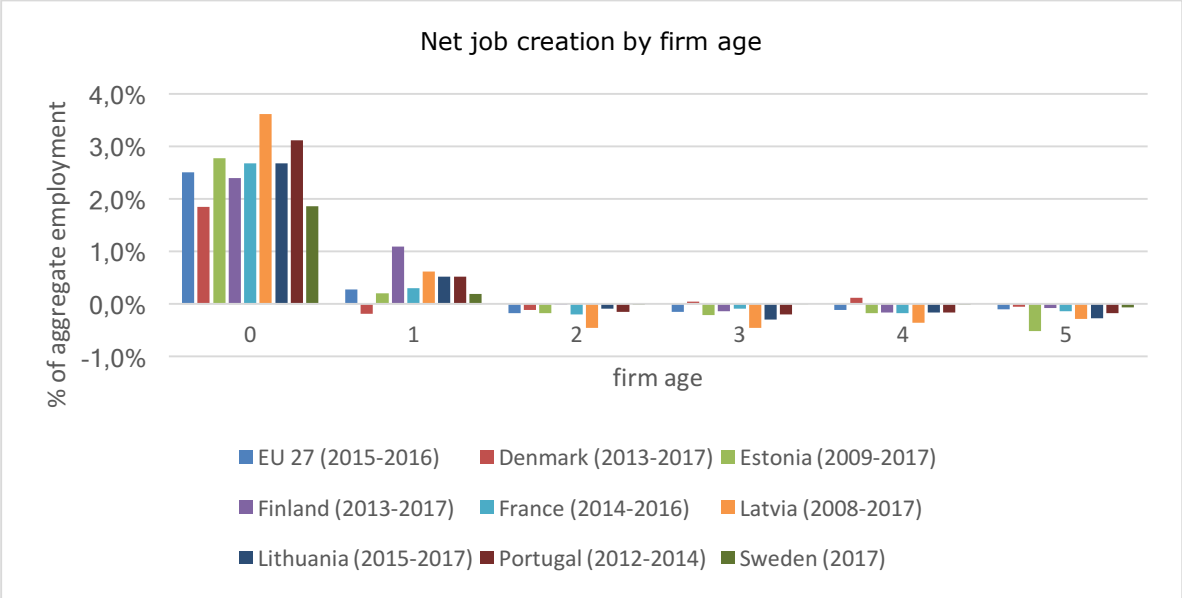


Figure 2. Importance of start-ups for job creation

Source: JRC, Eurostat, Business Demography dataset, 2020.

At the same time, start-ups (i.e. firms age 0 in Figure 2) and young firms find themselves in a fragile stage of their firm life-cycle being more susceptible to disruption of supply chains, a drop in demand for their products or services, limited access to funding and more stringent regulations. For this reason, the COVID-19 pandemic and its consequences in terms of containment measures adopted, changes in consumer preferences, increased uncertainty and related economic crisis is deemed to impact particularly strongly on start-ups and young firms. This is confirmed by recent data on the number of new business registrations in the first semester of 2020 which show a sharp decline with respect to the same months of the previous year across several EU countries. Figure 3 shows how the number of new companies created declines in the first and second quarter of 2020 with respect to the first and second quarter of 2019, i.e. -49.61% in Q1 and -54.36% in Q2 in Denmark, -10.01% in Q2 in Estonia, -2.1% in Q2 in Finland, -3.1% in Q1 and -18.44% in Q2 in France, -2.23% in Q1 and -1.52% in Q2 in Latvia, -1% in Q1 in Lithuania, and -23.94% in Q1 and – 46.07% in Q2 in Portugal (Figure A in Appendix I considers the annual variations for a larger set of EU Member States). These data hide large monthly drops in the number of new start-ups registered during the lockdowns and the consequent freeze of administrative activities. For instance, at the height of the first wave in France the number of start-ups dropped by almost 50%, in Estonia by 23%, in Lithuania by 41% and in Portugal by more than 70%, in all cases,

in April 2020 compared to April 2019.[1] The only exception is Sweden which registers an increment in the number of new companies registered in the first two quarters of 2020 with respect to the same period in 2019. Nevertheless, behind the positive trend, also the Swedish economy has registered a general slowdown in the economy and a decline in the number of new firms entering the market in April and May 2020 with respect to April and May 2019. In general, the resulting decline in job creation potential, due to the missing generation of start-ups, can have a dramatic and lasting effect on aggregate employment that persists as the cohorts of new firms mature (see Gourio et al. (2016) and Sedláček (2020)).

Acknowledging that challenging times may spark radical innovations (e.g. teleworking, contact-tracing applications) and the creation of new successful enterprises, the COVID-19 crisis is likely to affect negatively not only the start-up rate but also the survival rate of young firms and the growth potential of start-ups for which we do not have available data yet. In general, data show that start-ups and young firms have a much higher exit rate than older firms. Figure 4 shows the evolution of the average survival rate of start-ups during the first five years of activities. In particular, in the EU 27 about 20% of start-ups exit the market during their first year of activity, 43% within three years and only about half survive for five years.[2] Survival rates also vary considerably across countries. For instance, in Lithuania about 40% of start-ups exit during their first year while only one fourth survives longer than five years. This numbers are in sharp contrast with Sweden, which among the country sampled, shows the highest survival rates. In fact, about only 4% of start-ups exit the market during their first year and only 40% exit during the first five years of activity. Figure A4 in Appendix I shows the survival rates for a larger set of EU Member States. Furthermore, the literature suggests that the exit rates of young firms increase during downturns (e.g. Haltiwanger, Jarmin, and Miranda (2013)). Moreover, Sedláček and Sterk (2017) show that the growth potential of firms is linked to the business cycle. During business cycles job creation by start-ups and aggregate employment growth co-move and drop during recessions with a correlation between entrants employment and aggregate employment growth (GDP growth) of 0.36 (0.45). Hence, firms born during recessions are in general smaller and tend to stay smaller during their life-cycle. This is indicative that companies like Uber or Airbnb, born during previous crisis, represent an exception rather than a rule.

[1] See Section 4 for further data on each country analysed in this paper.

[2] Also business survival rates for Europe provided by statista.com show a similar pattern: in 2017 almost one in five start-ups exited the market within the first year of operation, about 58% of new companies survived for three years and only 44% survived for five years. Some sectors, such as the IT sector seems to be particularly characterized by high exit rates. CBInsights.com reports that about 70% of tech start-ups fail within 20 months after obtaining financing, and about 97% of consumer hardware start-ups eventually fail.

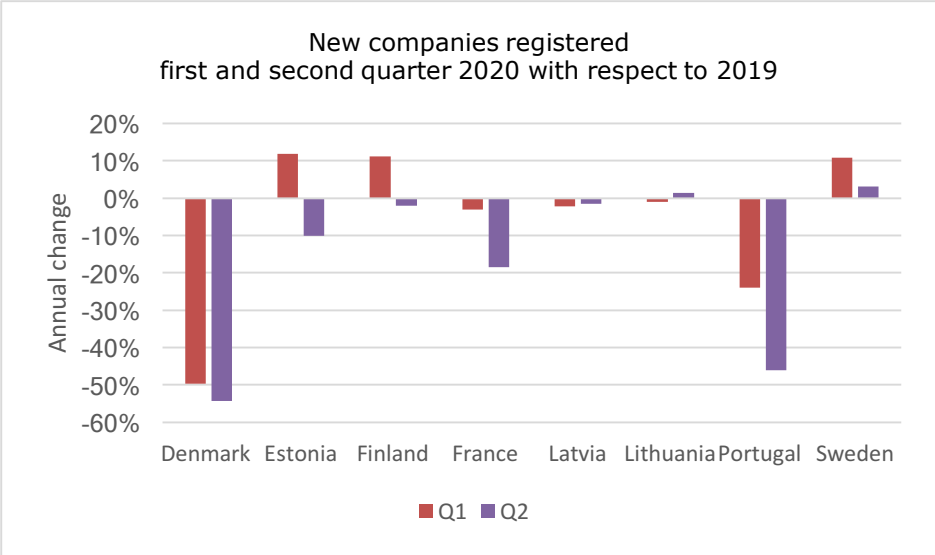


Figure 3. Annual change in the number of new companies registered in the first and second quarter of 2020 with respect to January to April 2019 (percentage)

Source: JRC, data from the Danish Statistical Institute (DST), Statistics Estonia (SE), Statistics Finland (SF), the National Institute of Statistics and Economic Studies (Insee), the Enterprise Register of Latvia (https://www.ur.gov.lv/en/statistics/), Statistics Lithuania (https://www.stat.gov.lt), the Portuguese National Statistical Institute (INE), the Swedish Registration Offices of Companies (Bolagsverket).

Note(1): The data, which come from national statistical offices or enterprise registers, are not harmonized across countries. As a consequence, Figure 3 does not allow for quantitative cross-country comparisons *per se*. Nevertheless, it is useful to visualize the different impact that COVID-19 has had across countries in terms of start-up creation.

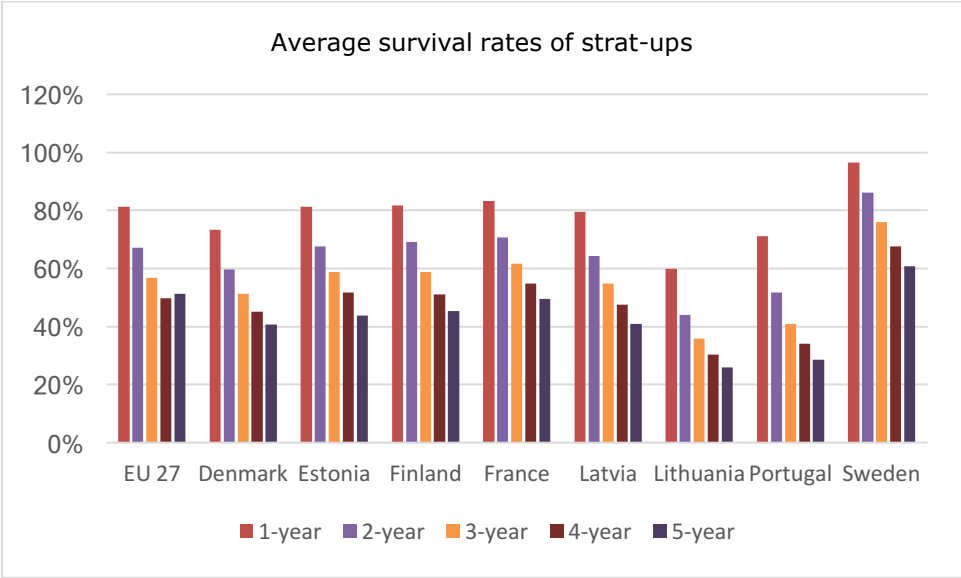


Figure 4. Y-o-y survival rate of start-ups

Source: JRC, Eurostat, Business Demography dataset, 2020.

Note(1): The Eurostat database provides the y-o-y survival rates for start-ups after one, two, three, four and five years of activities. The plotted percentages are the averages of the period from 2013 to 2017 for the EU 27, from 2008 to 2017 for Estonia, France, Latvia, from 2008 to 2018 for Finland, France, Lithuania, Portugal and Sweden and from 2009 to 2017 for Denmark.

At this point of the COVID-19 pandemic it is not clear whether the current economic crisis will be short lived or sustained over a much longer period and if the implications for start-ups will be consistent with what has been documented during previous economic downturns. For this reason, our baseline scenario assumes a strong but brief contraction with start-up activities affected negatively by the crisis, i.e. the number of start-ups, their growth potential and the survival rate of young firms drop for only one year to a level corresponding to that experienced during the Great Recession of 2008 and 2009 (or drop to the *minima* of the underling Eurostat time series). This baseline scenario constitutes a plausible scenario and we postpone to further research the analysis of alternatives conjectures. According to the EU start-up calculator, this scenario would create substantial and persistent aggregate employment losses, especially in Estonia, France, Latvia, Lithuania and Portugal. A full recovery to realign employment to its pre-crisis trend may take about a decade, even if start-up activity recovers to its pre-crisis level in one year.[3] The outlook is considerably improved in every country if specific policies would be introduced in 2021 targeted at increasing the number of firms entering the economy. Likewise, policies aimed at increasing the survival rate of young firms would also be quite effective in mitigating the negative impact of the crisis.[4] These results suggest that policy makers have ample space of manoeuvre for policies specifically targeting an easily identifiable category of firms, i.e. start-ups and young firms. Finally, in all the countries analyzed, the service sector may be affected more than the industry and manufacturing sectors, as young firms are important job creators in this sector. This also in the case in which the three margins are shocked symmetrically across sectors as the calculator embeds the employment structure of each sector considered.

In what follows, Section 2 introduces the EU start-up calculator. Section 3 discusses the data used and the methodology adopted to create the simulator. Section 4 applies the calculator to simulate how the destruction of start-up activities affects aggregate employment in Denmark, Estonia, Finland, France, Latvia, Lithuania, Portugal and Sweden. Business dynamism and scenario analysis is discussed separately for each country. A cross-country comparison is deferred to when the tool will be available for a larger set of Member States. Section 5 concludes.

[3] The persistence of our results is aligned to similar simulations based on the OECD DynEmp3 Database performed by Calvino et al. (2020). They evaluate the impact on aggregate employment over 3 to 14 years of a 20% decline in the number of entering firms in a year as average across 15 countries.

[4] For instance, Germany is initiating a start-up program aiming at supporting and expanding venture capital financing, France has created a 4 billion euros fund to support young firms liquidity, Italy has created the programme "Smart&Start Italia" which allocates 100 million euros to refinance innovative start-ups, as well as 200 million euros to support venture capital financing. This adds to further programs aiding start-ups and young firms with training and couching and the 34 billion euros more generally assigned to support liquidity needs of SMEs.

2 What is the start-up calculator?

The EU start-up calculator is an empirical tool which allows researchers and policy analysts to compute the medium-run impact, up to 2030, that COVID-19 has on aggregate employment due to the destruction of the activities of start-ups and young firms. In the context of this study, start-ups are defined as firms of age 0, i.e. newly registered firms, and young firms are those up to 5 years old. The calculator was firstly developed by Sedláček and Sterk (2020) for the US economy and then adapted to fit the employment profile of young firms in the EU Member States using publicly available Eurostat data.[5]

The EU start-up calculator will be made publically available as a web-based tool in the coming months. A user will be able to easily simulate the time path for aggregate employment for a given scenario of start-up activity. Different scenarios can be created varying the following three parameters or "margins"[6] (in economics parlance) related to entry, exit and growth of young firms which tend to worsen during a recession:

i) *the number of start-ups*, i.e. shift the number of start-ups (for incoming cohorts).
ii) *the survival rate of young firms*: i.e. shift the profile of firm survival rates by age (for all firms up to age fifteen).
iii) *the growth potential of start-ups*: i.e. shift the profile of average size by age (for incoming cohorts).

A decline in the number of start-ups directly translates into a decline in the number of new jobs created and hence employment. Furthermore, this lost generation of firms creates a persistent dent in aggregate employment as subsequent years will be characterized by a lower number of firms (see for instance Gourio, Messer, and Siemer (2016) and Sedláček (2020)). The survival rate of young firms is directly linked to their exit rate. In general, start-ups and young firms are more fragile than established incumbents. This fragility is exacerbated during recessions - see Haltiwanger, Jarmin, and Miranda (2013). An economic consequence of this pandemic is expected to be a higher exit rate of young firms, a lower firm survival rate and, thus, more job destruction. Finally, the growth potential of start-ups entering the economy in 2020 is expected to decline. Firms that are born during a recession start smaller and tend to stay smaller even when the economy has recovered as shown by Sedláček and Sterk (2017). Changing the growth potential margin will result in shifting downwards the entire growth of the employment profile of the cohort of companies entering the market in 2020.

When creating a scenario changing the three margins, the calculator computes the implied time-dependent changes in aggregate employment for the given country and sector from 2020 to 2030 and the cumulative job loss. The flexibility of the tool permits the user to analyse the overall employment effects or outcomes by country and sector resulting from different degrees of severity of the economic impact that COVID-19 has on start-ups and young firms. The scenarios can reflect V-, U-, W- or L- shaped recessions with the analysis being comparable across economic sectors and countries. The user should constrain the flexibility of the tool with knowledge of the possible impacts of COVID-19 on the three margins are likely to be in order to analyse plausible scenarios.

[5]The start-up calculator for US is available at the following website http://users.ox.ac.uk/~econ0506/Main/StartupCalculator.html

[6] where a marginal change is a relaxing or tightening of constraints or the response which this relaxation or tightening produces

3 Data and methodology

The EU start-up calculator is tailored to individual Member States. It allows scenarios to be analysed for the whole business economy, the industrial sector, the manufacturing sector and the service sector.[7] It uses data from Eurostat Business Demography Statistics on the number of firms, persons employed, average size and survival rate of cohorts of firms for the age bins 0, 1, 2, 3, 4, 5, and all covering the years from 2008 to 2017 for Estonia, France, Latvia and Portugal, from 2009 to 2017 for Lithuania and from 2012 to 2017 for Denmark, and Finland. It considers data of only employer businesses, that is businesses that have at least one employee.

The data for 2018 and 2019 are extrapolated for each age group assuming that the survival rates, the firm sizes and the number of start-ups linearly converge to their 2008-2017 average.[8] Similarly, the age profile of firm size and survival rate between age 6 and 15 for the years 2008 to 2017 are interpolated to obtain values per age bin that reflect trends consistent with the aggregate average values per age bin and year. The age profile of the number of firms older than 5 years is then simply obtained using the information on the interpolated yearly survival rate per age bin 6 to 15. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. This implies that the simulations should be considered as lower boundaries given that they do not take into account the impact of the crisis on firms older than 15. Finally, the different scenarios are simulated from 2020. The calculator allows analysis of bounce-back scenarios to capture the case in which the three margin would recover strongly, i.e. above the time series average, from 2021, for instance due to a policy intervention. See Appendix II for technicalities behind the interpolation extrapolation and creation of scenarios.

The start-up calculator allows also to adjust the simulations taking into consideration general equilibrium effects, i.e. potential employment reallocation towards surviving and older firms, which are driven by a lower wage rate caused by the decline in start-up employment. To this end the calculator is embedded in a standard heterogeneous firm model, which allows to connect the calculator with the literature on firm dynamics.[9] In models with firm heterogeneity, firms are distributed over different levels of productivity, unproductive firm exit the economy and are replaced by new entrants, while households consume and supply labour to firms. The interested reader can find in Appendix II the derivations formalizing the embedding of the calculator in a general equilibrium model with firm dynamics. When the COVID-19 pandemic hits the activity of start-ups and young firms, the general equilibrium reallocation mechanism dampens the effect. The disruption of start-up and young firm activities results in lower employment and a lower wage rate. Firms that remain in the market hire more labour partially absorbing the negative shock on employment. The magnitude of the equilibrium dampening effect depend on the labor supply and demand elasticities. In the EU start-up calculator, the elasticities are consistent with the literature and with the values adopted by the European Commission QUEST and RHOMOLO models. In particular, the labour supply elasticity is set at 0.25 and the labour demand elasticity at -0.1. These elasticities result in a dampening effect of 29% (see Appendix III).[10]

[7] The sectoral aggregation analysed reflects the classification available in Eurostat. That is, business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

[8] In the case of Denmark, Finland and Sweden, Eurostat data for the survival rate start in 2013. The short time series does not allow us to have 5 years to construct the 1-5 survival rate. As a consequence, the minimum, maximum and average value of the survival rate are the same number.

[9] As a reference to the canonical model of firm heterogeneity see Hopenhayn (1993) and Hopenhayn and Rogerson (1995).

[10] The elasticities chosen result in a conservative dampening effect. When setting the elasticities at values more commonly used in the macroeconomic literature, such that for the labour supply elasticity and –0.246 for the labour demand elasticity (Lichter et al. (2015)), the dampening effect reduces to 20%. In light of the large range of elasticities discussed in the literature the calculator features easily changeable elasticities enabling for robustness checks.

4 Country analysis

4.1 EU start-up calculator: Denmark

4.1.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, higher exit of young firms, and lower growth of start-ups.
- According to the EU start-up calculator, these developments are likely to create substantial aggregate employment losses, of up to -1.4% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 97,000.
- Effects are very persistent: full recovery may take more than a decade, even if start-up activity recovers to its pre-crisis level in one year.
- More than half of the aggregate employment loss is accounted for by the reduction of the survival rate and about 40% by the reduction in the number of start-ups. Policies targeted to support young firm survival and promote new firms' entry would seem to be the most effective. The outlook is improved if in 2021 there is a rapid increase in the number of firms entering the economy. i.e. the cumulative aggregate employment loss is reduced to 62,000.
- The Danish service sector may be affected relatively strongly, as young firms are particularly important job creators in this sector. In all three sectors more than 40% of the job loss is due to a decline in the survival rate of young firms.

4.1.2 Business dynamism in Denmark

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Danish firms, see Table I.

Table I. Descriptive statistics on the economy and sector dynamics of young firms - Denmark

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	11.7%	8.7%	7.8%	12.2%
survival rate	92%	91.9%	91.6%	93.6%	91.9%
share of young firms	36%	36.6%	28.5%	25.4%	38%
employment share of start-ups	2.5%	1.6%	0.7%	0.6%	1.8%
employment share of young firms	12%	8.5%	3.6%	3%	9.4%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2012 to 2017.

The statistics show that, when it comes to entry and exit of firms, the Danish economy has a higher start-up rate than the EU average. A seemingly important share of job creation is attributed to start-ups and young firms, although lower than the EU average. Over the sample, about 8% of firms exit within a given year, whereas the start-up rate is about 12%. Start-ups (firms of age zero) account for about 1.6% of aggregate

employment whereas firms up to age 5 together account for more than 8%.[11] When looking at the sectoral disaggregation, the service sector contributes to most of the business dynamic of the overall economy with a start-up rate of above 12% and an employment share of start-ups of almost 2%.

The creation of new companies has been affected by the crisis showing an overall contraction in the first months of 2020 with respect to the same period in 2019. This contraction is especially driven by the drop in the number of new start-ups with at least one employee.[12] Despite the fact that the negative trend in the number of new companies registered is present already before the pandemic, its effects are quite marked. In particular, Figure 5 shows how the number of new companies created drops in March by 32%, in April by 33% and in May by 23%, stabilizing to about -10% in June and July, in each case compared to the corresponding month of 2019. Hence, also Denmark has suffered from an important disruption of start-up activity due to the COVID-19 pandemic. The "unborn" start-ups may cause important repercussions for aggregate employment, especially if the number of start-ups recovers slowly and may be further affected by a second wave of the epidemic and a potential slowdown of the economy.

Figure 5. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Denmark

Source: JRC, provisional data on the total of new companies registered are provided by the Danish Statistical Institute (https://www.dst.dk)

[11] Table I also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

[12] See the article "Antal nystartede virksomheder endnu ikke pa niveau med 2019" by Jorgensen (2020) available at: https://www.dst.dk/da/Statistik/eksperimentel-statistik-covid-19#erhverv. Note that Jorgensen statistics of the period from April to July vary only slightly to the one reported in this report. The difference is attributed to the treatment of the data done by the Danish statistical office which considers only companies with VAT registration and that do not close within 14 days from the registration.

4.1.3 Scenario analysis

We consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups and the growth potential fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), while the survival rate drops considerably[13], see Table II.[14] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. The scenario is the one of a strong but short-lived crisis expecting that once the containment measures are lifted, the economic activity of start-ups and young firms will resume. This expectation seems to be consistent with the recent economic trend.

Table II. Scenario assumptions - Denmark

	All	Industry	Manufacturing	Services
# Start-ups	-25%	-25%	-25%	-25%
Growth potential	-6%	-30%	-30%	-6%
Survival rate	-10%	-10%	-10%	-10%

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Figure 6 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by just over 1.4%. The recovery is slow: by 2026, aggregate employment is still more than 0.4% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 96,850. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 69,180 (blue line in Figure 6). The decline in the survival rate accounts for about half of the effect. The number of start-ups accounts for about 40% and the growth potential for roughly 9%. These findings provide an important input for the policy discussion. The three different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards firm survival and to promote firm entry suggest to be highest. However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table I shows that, compared to manufacturing and overall industry, firms in the service sector are somewhat more dynamic. This sector has higher start-up and exit rate, and a much higher employment share of start-ups and other young firms.

Figure 7 shows the results of the calculator for the three industries. The service sector shows a larger employment loss, even though the decline in the three margins assumed is actually somewhat smaller, in particular in the shock to the growth potential (Table II). This result is driven by the fact that the service sector is more dynamic in terms of entry and exit and therefore reliant on young firms to provide employment.

[13] In the case of Denmark, Eurostat data for the survival rate start in 2013. The short time series does not allow us to have 5 years to construct the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate are the same number.

[14] Note that in Table II Industry, Manufacturing and Serving sector are set to their sample minima which happens to be the same for the number of start-ups. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	25%	1	0%	1
Growth Potential	6%	1	0%	1
Survival rate	10%	1	0%	1

Figure 6. Scenario analysis for employment and the three margins of start-up activity - Denmark

Source: EU start-up calculator, Denmark, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of start-ups and growth potential equal to their sample *minima* and of one year duration, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Denmark are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

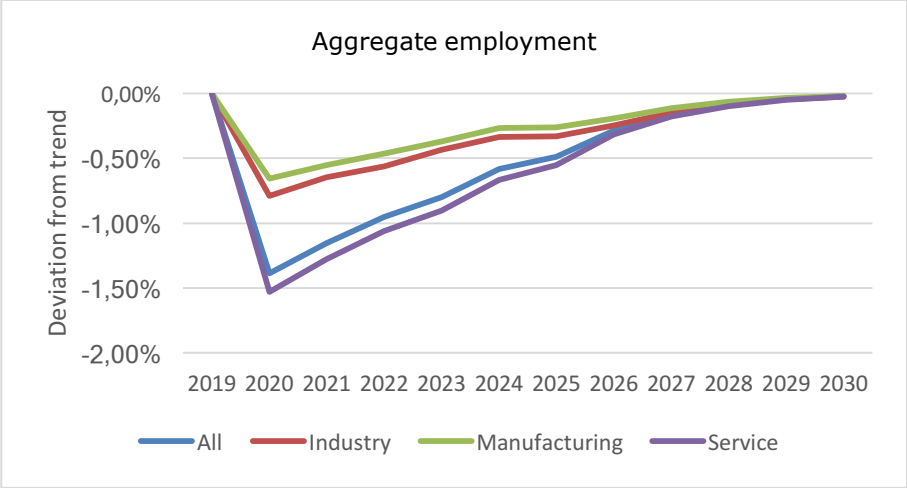


Figure 7. Sectors employment (not equilibrium adjusted) - Denmark

Source: JRC, EU start-up calculator, Denmark, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the number of start-ups and the growth potential equal to their sample *minima* in the respective sectors and of one year duration, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Denmark are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

Table III. Share of aggregate employment loss accounted for by the margins - Denmark

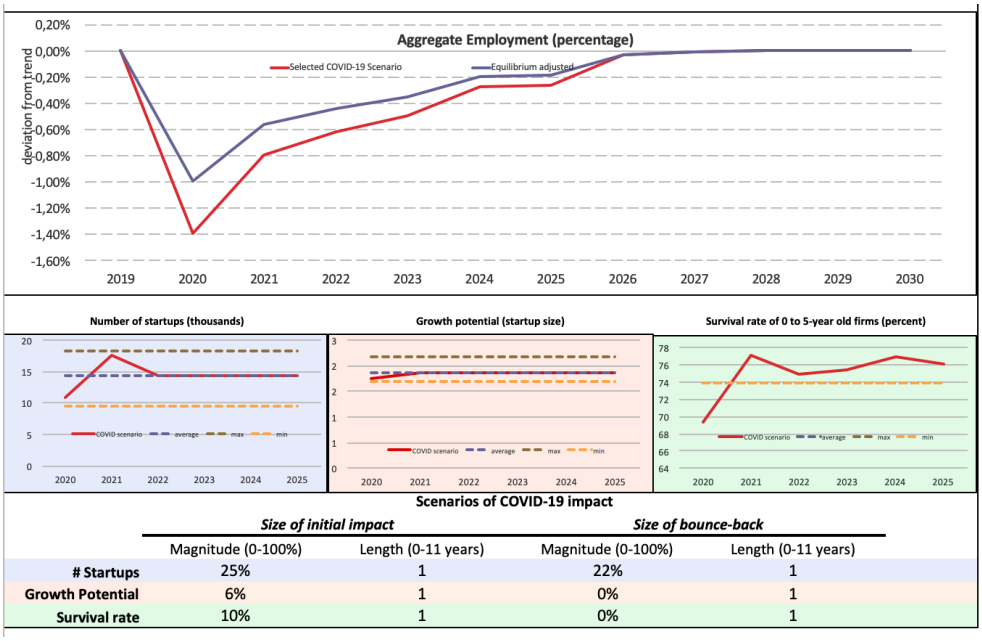
	All	Industry	Manufacturing	Services
Cumulative employment loss	97 k	13 k	10 k	75 k
# Start-ups	40%	30%	30%	40%
Growth potential	9%	36%	36%	10%
Survival rate	51%	42%	40%	50%

Source: JRC, EU start-up calculator, Denmark, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate employment of more than 75,360 jobs (Table III). In all the three sectors more than 40% of the job loss is attributed to the decline in the survival rate of young firms, while the decline in the number of start-ups account for more than 30%. In the industry and service sector the decline of the growth potential explains an important part of the overall employment loss as a consequence of a larger magnitude of the shock affecting this margin. These considerations are indicative that policy targeted to support firms to tackle survival challenges and support entry could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021 especially if supported by specific policies targeted to start-ups that could reduce the entry barriers, promote innovation and relax financial constraints. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 8 where, after the initial negative shock, the number of start-ups is increased in 2021 to the maximum level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes an improvement of the employment trend and a lower cumulative job loss totalling to about 62,450. Thanks to the better outlook aggregate employment reaches its pre COVID-19 level by 2026. This is due to the fact that the number of start-ups account for a large share of the impact on aggregate employment, i.e. about 40%, of the total effect on employment (see Table III).



Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	25%	1	22%	1
Growth Potential	6%	1	0%	1
Survival rate	10%	1	0%	1

Figure 8. Bounce-back scenario in the number of firms, results for aggregate employment - Denmark

Source: EU start-up calculator, Denmark, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of start-ups and the growth potential equal to their sample *minima* and of the duration of one year, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Denmark are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate) The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maximum* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.2 EU start-up calculator: Estonia

4.2.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, a higher exit of young firms, and lower growth of start-ups.
- According to the EU Start-up Calculator, these developments are likely to create an important aggregate employment loss, of up to -1.5% of aggregate employment in 2020 and up to -1.6% in 2021. The cumulative employment loss for the period 2020-2030 could be up to 59,000.
- Effects are very persistent: full recovery may take more than a decade, even if start-up activity recovers to its pre-crisis level in one year.
- The decline in the number of start-ups accounts for almost two-thirds of the employment loss, while the decline in the survival rate for almost 25%. Policies targeted to reduce exit of young firms and incentivise entry would seem to be the most effective in Estonia. The outlook is significantly improved if in 2021 there is a rapid increase in the number of firms entering the economy, i.e. the cumulative aggregate employment loss is reduced to 22,000.
- The Estonian service sector may be affected particularly strongly, as young firms are particularly important job creators in this sector.

4.2.2 Business dynamism in Estonia

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Estonian firms, see Table IV. The statistics show that, when it comes to firms' entry and exit, Estonia is dynamic and relies on start-ups for job creation. Over the sample, more than 8% of firms exit within a given year, whereas the start-up rate is about 12%. Both values are higher than the EU average. Start-ups (firms of age zero) account for about 2.7% of aggregate employment (similarly to the EU average) whereas firms up to age 5 together account for more than 14%, which is slightly higher with respect to the EU average of 12%. The importance of start-ups and young firms is evident in the service sector where young firms account for more than 40% of the total number of active firms and for more than 16% of total employment, whereas in the industry and manufacturing sectors young firms account for about 1% of employment.[15] As a consequence, we expect that effect of the disruption of start-up activity due to COVID-19 will be particularly high in the service sector.

Table IV. Descriptive statistics on the economy and sector dynamics of young firms - Estonia

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	11.7%	7.9%	8.1%	12.3%
survival rate	92%	91.4%	93.8%	93.6%	91.1%
share of young firms	36%	40.7%	29.7%	30.6%	42%
employment share of start-ups	2.5%	2.7%	1%	1.1%	3.1%
employment share of young firms	12%	14.4%	6.8%	7.3%	16.6%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat –i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2008 to 2017.

Moreover, provisional data provided by Statistics Estonia show an increasing contraction in the number of new businesses created since the beginning of the COVID-19 pandemic with respect to the same period in 2019. In particular, 22.7% less businesses were created in April, and 8.9% less in May, in each case compared to the corresponding month of 2019 (see Figure 9). Interestingly, in June and July 2020 the number of start-ups shows a bounce-back increasing by 4.2% and 2.5% with respect June and July 2019. If this trend persists the Estonian start-up scene may recover relatively quickly from the negative impact of the COVID-19 pandemic. Acknowledging the possibility of a rapid recovery in the number of start-ups during the second half of the year, these statistics show an important disruption of start-up activity due to the COVID-19 pandemic. This can have important repercussions for aggregate employment, especially if a second wave of the pandemic may result in interventions that may restrict again economic activities.

[15] Table IV also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Figure 9. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Estonia

Source: JRC, provisional data provided by Statistics Estonia (www.stat.ee), 2020.

4.2.3 Scenario analysis

We consider a deterioration of the three margins described above, which mirrors the scenario analysis done for the previous countries. Specifically, we assume that the number of start-ups, the survival rate, and the growth potential all fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), see Table V.[16] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. The scenario is the one of a strong but short-lived crisis expecting that once the COVID-19 crisis is tackled, the economic activity of start-ups and young firms will resume.

Table V. Scenario assumptions - Estonia

	All	Industry	Manufacturing	Services
# Start-ups	-40%	-40%	-40%	-40%
Growth potential	-10%	-20%	-20%	-8%
Survival rate	-4%	-5%	-5%	-3%

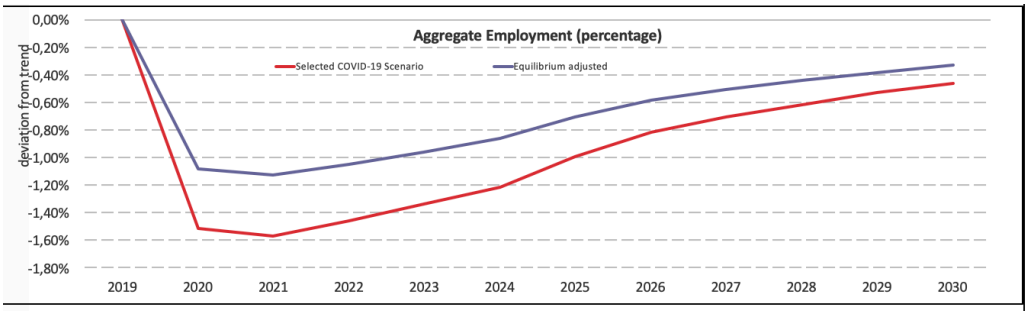
Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

[16] Note that in Table V Industry, Manufacturing and Serving sector are set to their sample *minima* which happens to be the same for the three margins in the industry and manufacturing sector, while lower in magnitude for the service sector. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

Figure 10 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by just 1.5% and for 2021 by 1.6%. The recovery is very slow: by 2030, aggregate employment is still more than 0.4% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 59,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 42,000.

The decline in the number of start-ups accounts for about two-thirds of the effect due also to the high shock applied to this margin. The survival rate accounts for about 23% and the growth potential for roughly 14%. These findings provide an important input for the policy discussion. The three different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards incentivizing entry of new enterprises and to support their survival suggest to be highest. However, the cost of different policy options must be considered.

Moreover, we consider how sectors may be affected differently. Table IV shows that, compared to manufacturing and overall industry, firms in the service sector are more dynamic: This sector has much higher start-up and exit rate, and a much higher employment share of start-ups and other young firms (Table IV).



Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	40%	1	0%	1
Growth Potential	10%	1	0%	1
Survival rate	4%	1	0%	1

Figure 10. Scenario analysis for employment and the three margins of start-up activity - Estonia

Source: EU start-up calculator, Estonia, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of the one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 11 shows the results of the calculator for the three industries. The service sector shows a much larger employment loss, even though the decline in the three margins assumed is actually somewhat smaller than in manufacturing and industry, especially in the growth potential and in the survival rate. This result is driven by the fact that the service sector has a high business dynamism and therefore reliant on start-ups and young firms to provide employment. Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate

employment of more than 37,000 jobs (Table VI). The decline in the number of start-ups accounts for more than two third of the employment loss (this is also due to the high magnitude of the shock applied to this margin), while the decline in the survival rate for almost 20%. In the industry and manufacturing sector, the decline in the number of start-ups account for about half of the aggregate effect, while the growth potential and the survival rate account for about 25%. This is indicative that policy targeted to incentivize firm entry and reduce exit could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment, especially in the service sector.

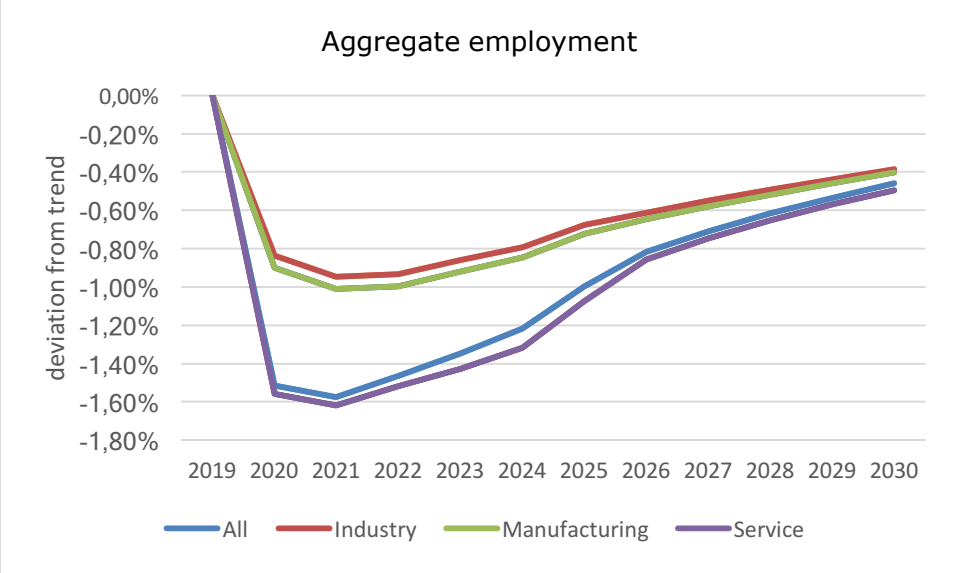


Figure 11. Sectors employment (not equilibrium adjusted) - Estonia

Source: JRC, EU start-up calculator, Estonia, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* in the respective sectors and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

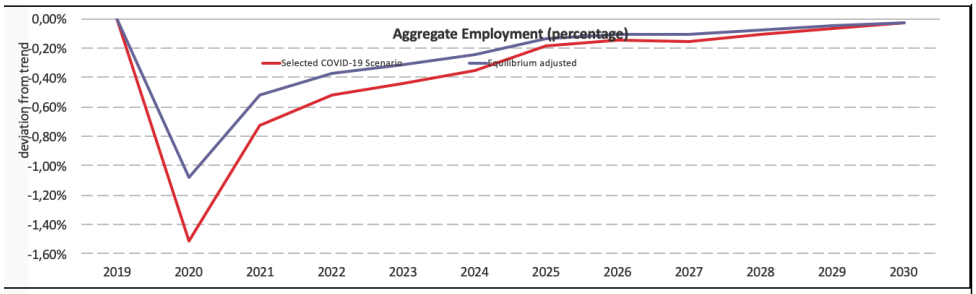
Table VI. Share of aggregate employment loss accounted for by the margins - Estonia

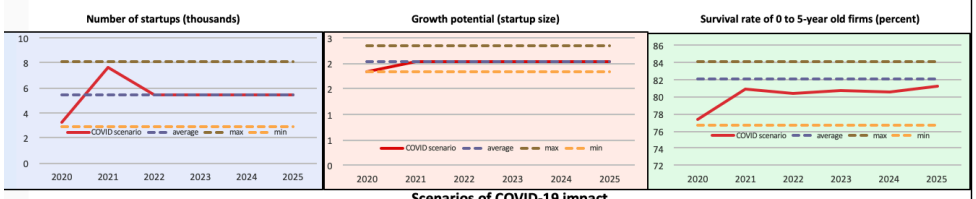
	All	Industry	Manufacturing	Services
Cumulative employment loss	59 k	47 k	10 k	37 k
# Start-ups	63%	50%	50%	68%
Growth potential	14%	25%	25%	14%
Survival rate	23%	25%	25%	18%

Source: JRC, EU start-up calculator, Estonia, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021, which could be stimulated by policies supporting entrants and the creation of new business ideas that could lead to radical innovations. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 12 where, after the initial negative shock, the number of start-ups is increased in 2021 to a level corresponding to the 2020 drop level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes a sharp improvement of the employment trend and a lower cumulative job loss totalling to about 22,000. Moreover, already in 2021 the aggregate employment loss is reduced to only 0.7% and 0.2% by 2025. Tre pre COVID-19 level of employment is reached by 2030.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	40%	1	40%	1
Growth Potential	10%	1	0%	1
Survival rate	4%	1	0%	1

Figure 12. Bounce-back scenario in the number of firms, results for aggregate employment - Estonia

Source: EU start-up calculator, Estonia, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maxima* and last one year. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.3 EU start-up calculator: Finland

4.3.1 Summary

- The COVID-19 crisis is likely to negatively affect young firms, leading to a decline in the start-up rate, a higher exit of young firms, and lower growth of start-ups.
- According to the EU start-up calculator, these developments are likely to create aggregate employment losses, of up to -3% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 230,000.
- Effects are somewhat persistent: full recovery may take about a decade, even if start-up activity recovers to its pre-crisis level in one year.
- About half of the aggregate employment loss is accounted for by the reduction of the survival rate and about 20% by the reduction in the number of start-ups. A

policy mix targeted to reduce exit of young firms, incentivise entry and scale-ups would seem to be the most effective. The outlook is significantly improved if in 2021 there is a rapid increase in the number of firms entering the economy. i.e. the cumulative aggregate employment loss is reduced to 165,000.

- The Finnish service sector may be affected more strongly than the industry and manufacturing sectors, as young firms are important job creators in this sector. This also in the case of symmetric shocks across sectors.

4.3.2 Business dynamism in Finland

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Finnish firms, see Table VII. The statistics show that the Finnish economy has a higher firms' entry and exit compared to the average EU one, especially in the service sector which seems to be characterized by a large share of young firms. Over the sample about 12% of firms exit within a given year, whereas the start-up rate is above 11%. These values are above the EU average of 9.2% and 8% for entry and exit rate, respectively. Also the employment share of Finnish start-ups and young firms is somewhat higher than the EU average. Start-ups (firms of age zero) account for more than 2% of aggregate employment whereas firms up to age 5 together account for almost 20% while EU average is 12%.[17] This indicates that in Finland the depositaries of employment growth are young firms.

Similarly to other European countries, also the Finnish economy has been affected by the COVID crisis. Provisional data provided by Statistics Finland show an increasing contraction in the number of new businesses created since the beginning of the COVID-19 pandemic with respect to the same period in 2019. In particular, 10.9% less businesses were created in April and 5.7% less in May, in each case compared to the corresponding month of 2019 (see Figure 13). However, in June 2020 the number of start-ups shows a considerable bounce-back increasing by 12.6% with respect June 2019. If this bounce-back persists the Finnish start-up scene may recover relatively quickly from the negative impact of the COVID-19 pandemic. Acknowledging the possibility of a rapid recovery in the number of start-ups during the summer months, we are at moment entering the second wave of the pandemic. If it will cause further disruption of start-up activity, the repercussions for aggregate employment may be important.

Table VII. Descriptive statistics on the economy and sector dynamics of young firms - Finland

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	11.2%	7.8%	7%	11.7%
survival rate	92%	88%	91.5%	91.5%	87.3%
share of young firms	36%	38.9%	26.6%	26.2%	40%
employment share of start-ups	2.5%	2.3%	1.5%	1.4%	2.4%
employment share of young firms	12%	19.2%	11.8%	11.3%	21%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2012 to 2017.

[17] Table IV also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Figure 13. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Finalnd

Source: JRC, data provided by Statistic Finland (www.stat.fi)

4.3.3 Scenario analysis

We consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups, and the growth potential fall from the sample *averages* to the sample *minima* during the period 2012-2017, while the survival rate is arbitrarily assumed to drop considerably[18], see Table VIII.[19] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. Hence, the scenario is the one of a strong but short-lived crisis expecting that once the pandemic is under control, the economic activity of start-ups and young firms will resume.

Table VIII. Scenario assumptions - Finland

	All	Industry	Manufacturing	Services
# Start-ups	-15%	-15%	-15%	-15%
Growth potential	-25%	-30%	-30%	-30%
Survival rate	-10%	-10%	-10%	-10%

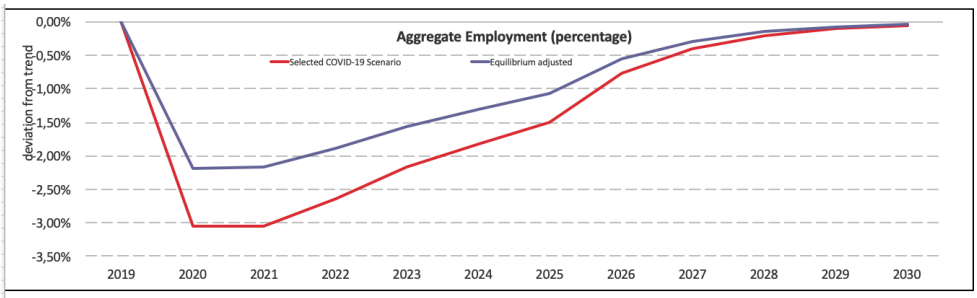
Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

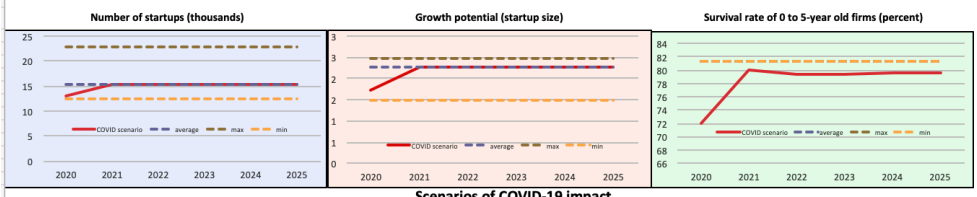
[18] In the case of Finland, Eurostat data for the survival rate start in 2013. The short time series does not allow us to have 5 years to construct the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate are the same number.

[19] Note that in Table VIII Industry, Manufacturing and Serving sector are set to their sample *minima* which happens to be the same across sectors. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

Figure 14 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by about 3%. The recovery is slow: only by 2030 aggregate employment is at the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 230,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 164,000. The decline in the survival rate accounts for about half of the effects. The number of start-ups accounts for almost 21% and the growth potential for roughly 35% each. These findings provide an important input for the policy discussion. The three different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards firm survival suggest to be highest. At the same time policies to reduce entry barriers and increase young firm growth potential could support a faster recovery. However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table VII shows that, compared to manufacturing and overall industry, firms in the service sector are relatively dynamic. This sector has much higher start-up and exit rate, and a much higher employment share of start-ups and other young firms.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	0%	1
Growth Potential	25%	1	0%	1
Survival rate	10%	1	0%	1

Figure 14. Scenario analysis for employment and the three margins of start-up activity - Finland

Source: EU start-up calculator, Finland, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of start-ups and growth potential equal to their sample *minima* and of one year duration, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Finland are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 15 shows the results of the calculator for the three sectors, namely industry, manufacturing and service sector. The service sector shows a much larger employment loss, even though the decline in the three margins assumed is actually symmetric to the one assumed in manufacturing and industry. This result is driven by the fact that the service sector has a higher turnover rate and is more reliant on young firms to provide employment. Hence, a disruption to start-ups and other young firms affects the service

sector stronger than the other sectors causing a loss of aggregate employment of more than 171,000 jobs (Table IX). In all the three sectors the decline in the survival rate accounts for about 45% of the employment loss. This is indicative that policy targeted to incentivize reduce firm exit could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment.

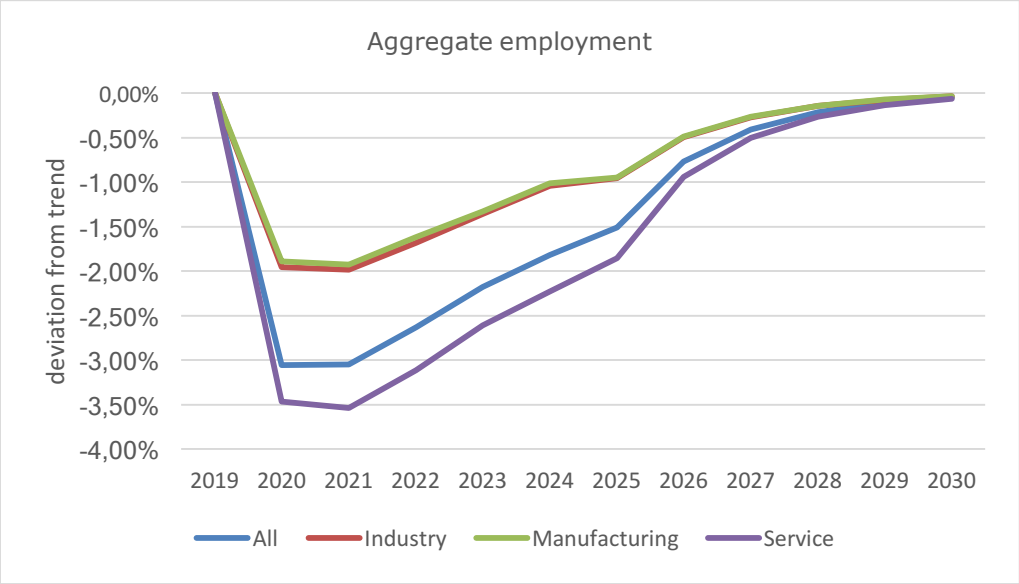


Figure 15. Sectors employment (not equilibrium adjusted) - Finland

Source: EU start-up calculator, Finland, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the number of firms and the growth potential equal to their sample *minima* in the respective sectors and of one year duration, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Finland are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

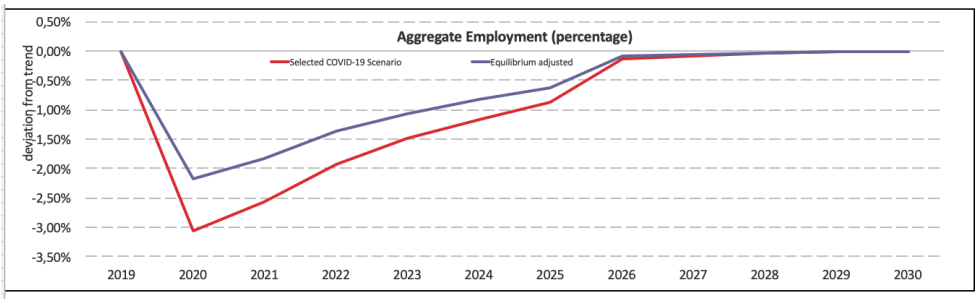
Table IX. Share of aggregate employment loss accounted for by the margins - Finland

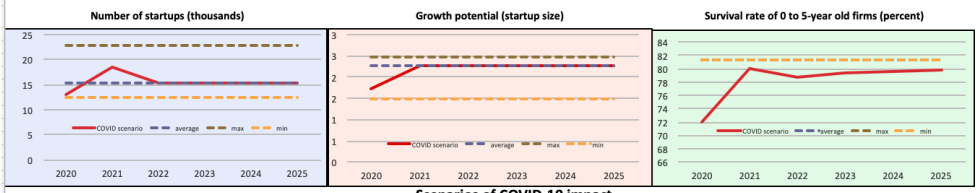
	All	Industry	Manufacturing	Services
Cumulative employment loss	230 k	36 k	32 k	171 k
# Start-ups	21%	20%	20%	20%
Growth potential	35%	40%	40%	40%
Survival rate	48%	45%	45%	45%

Source: JRC, EU start-up calculator, Finland, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021 and it should be supported by policies promoting and facilitating firm entry. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 16 where, after the initial negative shock, the number of start-ups is increased in 2021. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes a speedy recovery of aggregate employment and a lower cumulative job loss totalling to about 165,000. Thanks to this enhanced firm entry aggregate employment reaches its pre COVID-19 level by 2026.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	20%	1
Growth Potential	25%	1	0%	1
Survival rate	10%	1	0%	1

Figure 16. Bounce-back scenario in the number of firms, results for aggregate employment - Finland

Source: EU start-up calculator, Finland, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of firms and growth potential are equal to their sample *minima* and of one year duration, for the survival rate it is arbitrarily assumed to be of -10%. The Business Demography data of Eurostat for Denmark are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal in magnitude to the negative shock experienced in 2020. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.4 EU start-up calculator: France

4.4.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate and lower growth of start-ups.
- According to the EU start-up calculator, these developments are likely to create substantial aggregate employment losses, of up to -1% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 798,000.
- Effects are somewhat persistent: full recovery may take about a decade, even if start-up activity recovers to its pre-crisis level in one year.
- The decline in the growth potential accounts for about more than two-thirds and the number of start-ups account for about 30% of the aggregate employment loss. Policies targeted to support firm scalability and incentivise entry would seem to be the most effective in France. The outlook is significantly improved if in 2021 there is a rapid increase in the number of firms entering the economy, i.e. the cumulative aggregate employment loss is reduced to 434,000 jobs and by 2027 the employment would reach the level that it would have attained without the COVID-19 crisis.
- The French service sector may be affected stronger than the industry and manufacturing sectors, as young firms are important job creators in this sector. This also in the case of symmetric or less severe shocks to the service sector.

4.4.2 Business dynamism in France

As before, we consider a number of statistics on the dynamism of French firms, see Table X. The statistics show that in terms of firms' entry and exit the French economy is somewhat more dynamic than the EU average. Over the sample about 11% of firms exit within a given year, whereas the start-up rate reaches almost 12%. Start-ups (firms of age zero) account for 3.4% of aggregate employment whereas firms up to age 5 together account for about 13.6%.[20] Additionally, young firms represent 38% of the population of active firms in line with the EU average of about 36%.

Similarly, to other European countries, also the business dynamism of the French economy has been affected by the crisis. The contraction in the creation of new companies appears evident starting from March 2020. Figure 17 shows how the number of new companies created starts to decline in March by 23.4%, to then drop in April by 48.7% and in May by 17.6%, in each case compared to the corresponding month of 2019. Hence, France has suffered from a significant disruption of start-up activity during the first peak of the COVID-19 pandemic. Fortunately, as the lockdown measures have been progressively lifted in May, the summer months have been characterized by a bounce-back in the number of new enterprises registered. However, in France the pandemic seems to dramatically accelerate again. If this will once more slow-down start-up activity the repercussion for aggregate employment may be persistent and important.

[20] Table X also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Table X. Descriptive statistics on the economy and sector dynamics of young firms - France

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	11.6%	7.6%	7.5%	11.7%
survival rate	92%	88.5%	91.2%	91.1%	88.8%
share of young firms	36%	38%	28.5%	28.2%	39.3%
employment share of start-ups	2.5%	3.4%	2%	1.9%	3.5%
employment share of young firms	12%	13.6%	9.6%	8.7%	13.3%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2008 to 2017.

Figure 17. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - France

Source: JRC, data available from the National Institute of Statistics and Economic Studies (Insee, https://www.insee.fr). The series is seasonally and working day adjusted, 2020.

4.4.3 Scenario analysis

We consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups, the growth potential and the survival rate of young firms all fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), see Table XI.[21] Moreover, we assume that

[21] Note that in Table XI the shocks to the Industry, Manufacturing and Serving sector are set to relatively similar values. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative

this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. As for the previous countries, our benchmark scenario assumes a one-off and short-lived negative effect of the Corona-crisis on start-up activities expecting that once the pandemic is under control, the economic activity of start-ups and young firms will resume.

Table XI. Scenario assumptions - France

	All	Industry	Manufacturing	Services
# Start-ups	-8%	-8%	-8%	-8%
Growth potential	-18%	-30%	-25%	-18%
Survival rate	-0.5%	-0.5%	-1%	-1%

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

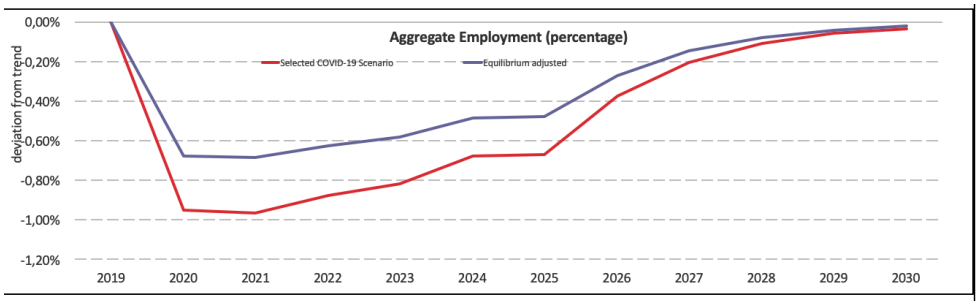
Figure 18 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator.[22] For 2020, the calculator shows that the three margins together reduce aggregate employment by about 1%. The recovery is slow, it may take up to a decade to recover the level of aggregate employment that could have been attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 798,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 570,000.

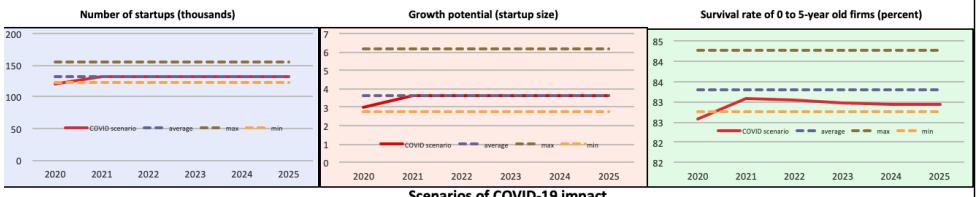
The decline in the growth potential of start-ups account for 67% of the negative employment effect, while the decline in the number of start-ups for about 30%. Instead, the survival rate has only a marginal impact: the low magnitude of the shock to this margin reveals that exit rate does not fluctuate much in France. As a consequence, it has only a minor impact on aggregate employment. These findings provide an important input for the policy discussion. The different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards scaling-up of young firms, entry of high-innovative start-ups, and ease entry suggest to be highest. At the same time policies to reduce entry barriers could support a faster recovery (see also Figure 20 which simulates a bounce-back scenario). However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table X shows that, compared to manufacturing and overall industry, firms in the service sector are more dynamic. This sector has a much higher start-up rate, and a much higher employment share of start-ups and other young firms.

scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

[22] Note that the shock on the survival rate amount to 0.5% is equivalent to set the survival rate to its sample *minimum* during the period 2008-2017. Hence, firm exit seems to be somewhat constant in France and not so sensitive to crisis.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	8%	1	0%	1
Growth Potential	18%	1	0%	1
Survival rate	1%	1	0%	1

Figure 18. Scenario analysis for employment and the three margins of start-up activity - France

Source: EU start-up calculator, France, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 19 shows the results of the calculator for the three industries. Upon impact, all three sectors react somewhat strong to the shock, with the industry and manufacturing sectors recovering faster than the service sector. The service sector shows a much larger employment loss, even though the decline in the three margins assumed is actually somewhat less severe than in the industry and manufacturing sector. This result is driven by the fact that the service sector is more dynamic and therefore reliant on young firms to provide employment. Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate employment of more than 623,000 jobs (Table XII). The decline in the growth potential of start-ups seems to be the most important margin that account for up to 80% of the employment loss in the industry sector. The number of start-ups accounts for about 20-28% across the industries. This is indicative that policy targeted to incentivize firm entry and scalability could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment in France.

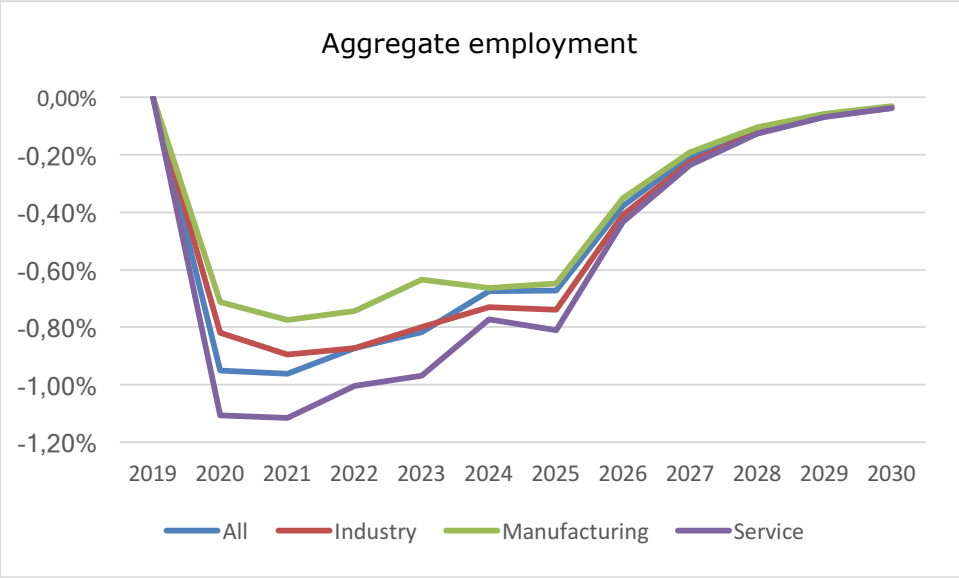


Figure 19. Sectors employment (not equilibrium adjusted) - France

Source: JRC, EU start-up calculator, France, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* in the respective sectors and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

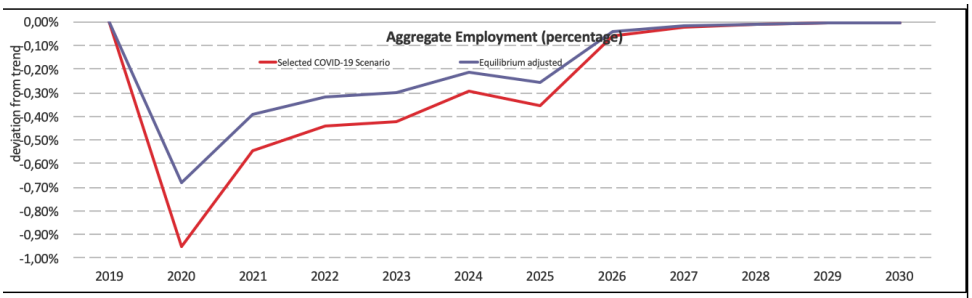
Table XII. Share of aggregate employment loss accounted for by the margins - France

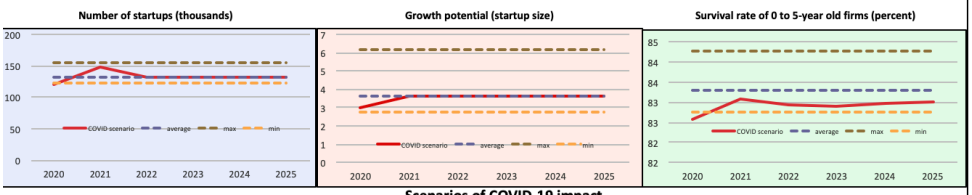
	All	Industry	Manufacturing	Services
Cumulative employment loss	798 k	174 k	132 k	623 k
# Start-ups	30%	20%	23%	28%
Growth potential	67%	80%	75%	64%
Survival rate	6%	4%	5%	11%

Source: JRC, EU start-up calculator, France, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021 especially if stimulated by policies targeted to support the creation of new firms and innovative ideas. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 20 where, after the initial negative shock, the number of start-ups is increased in 2021 to the *maximum* level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes a speedy recovery of aggregate employment and a lower cumulative job loss during the period 2020-2030 totalling to about 434,000. Thanks to this enhanced firm entry aggregate employment reaches its pre COVID-19 trend by 2027.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	8%	1	12%	1
Growth Potential	18%	1	0%	1
Survival rate	1%	1	0%	1

Figure 20. Bounce-back scenario in the number of firms, results for aggregate employment - France

Source: EU start-up calculator, France, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maximum* and last one year. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.5 EU start-up calculator: Latvia

4.5.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, a higher exit of young firms, and lower growth of start-ups.
- According to the EU Start-up Calculator, these developments are likely to create large aggregate employment losses, of up to almost -4.5% in 2020 and 2021 of aggregate employment. The cumulative employment loss for the period 2020-2030 could be up to 219,000.
- Effects are highly persistent: full recovery may take more than a decade; by 2030, aggregate employment is still more than 1% below the level it would have attained without the disruption of start-up activity.
- The decline in the number of start-ups accounts for about 20% of the employment loss, the decline in the survival rate for almost 45% and the decline of the growth potential of start-ups for about 35%. A holistic approach to policies targeted to reduce exit of young firms and incentivise entry and productivity of new firms would seem to be the most effective in Latvia. The outlook is significantly improved if in 2021 there is a rapid increase in the number of firms entering the economy, i.e. the cumulative aggregate employment loss is reduced to 176,000.
- The Latvian service sector may be affected particularly strongly, as young firms are particularly important job creators in this sector.

4.5.2 Business dynamism in Latvia

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Latvian firms, see Table XIII. The statistics show that, when it comes to firms' entry and exit, the Latvian economy is relatively dynamic when compared with the EU average, and relies heavily on start-ups for job creation. Over the sample, more than 10% of firms exit within a given year, whereas the start-up rate is about 12.8%. Start-ups (firms of age zero) account for about 3.5% of aggregate employment. Firms up to age 5 together account for more than 20% of aggregate employment (while the EU average settles at 12%).

Table XIII. Descriptive statistics on the economy and sector dynamics of young firms - Latvia

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	12.8%	10.2%	10.2%	12.9%
survival rate	92%	89.7%	91.7%	91.4%	89.8%
share of young firms	36%	47.2%	38.6%	39%	47.5%
employment share of start-ups	2.5%	3.5%	1.9%	2.1%	3.9%
employment share of young firms	12%	20.7%	12.4%	13.5%	22.5%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2008 to 2017.

The importance of start-ups and young firms is particularly evident in the service sector where young firms account for about half of the total number of active firms and for more than 22% of total employment (Table XIII).[23] Hence, it has to be expected that this sector will be most strongly hit by a disruption of start-up activities also when shocks across sectors are symmetric.

Even before the spread of COVID-19, the creation of new companies in Latvia showed a contraction with respect the same period in 2019. This negative trend persists throughout the COVID-19 pandemic with a monthly contraction of new start-up registered which varies between 1.8% to 1.3% compared to the corresponding months of 2019 (Figure 21). These provisional statistics show an important and persistent disruption of start-up activity that seems to characterize the year 2020. This can have important repercussions for aggregate employment, especially if the number of start-ups does not recover.

[23] Table XIII also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Figure 21. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Latvia

Source: provisional data from the Latvian Enterprise Register (https://www.ur.gov.lv), 2020.

4.5.3 Scenario analysis

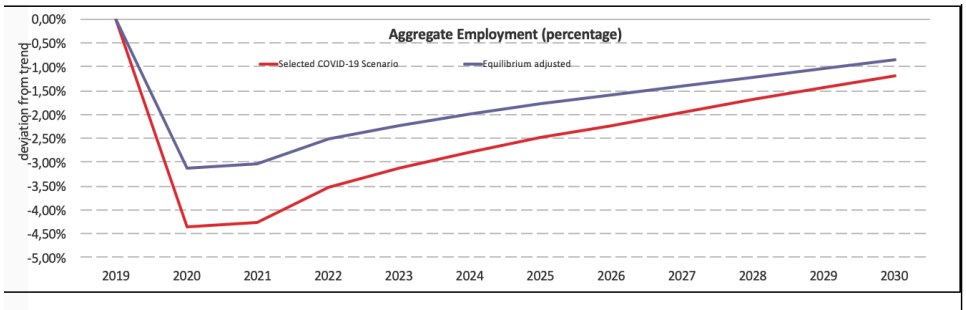
As for the previous countries analysed, we consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups, the survival rate, and the growth potential all fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), see Table XIV.[24] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. The scenario is the one of a strong but short-lived crisis expecting that once the COVID-19 pandemic will be tackled, the economic activity of start-ups and young firms will resume.

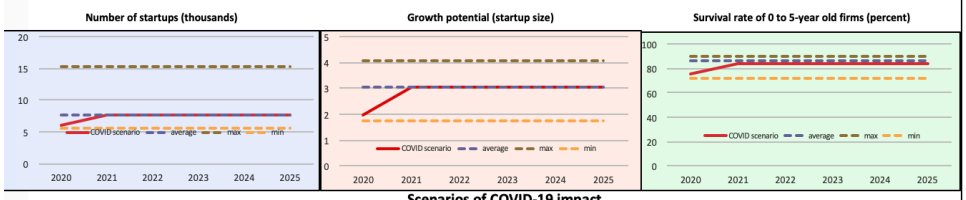
Table XIV. Scenario assumptions - Latvia

	All	Industry	Manufacturing	Services
# Start-ups	-20%	-20%	-20%	-30%
Growth potential	-35%	-40%	-40%	-35%
Survival rate	-10%	-10%	-10%	-10%

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

[24] Note that in Table XIV Industry, Manufacturing and Serving sector are set to their sample *minima* which happens to be lower for the service sector only in the number of start-ups. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	20%	1	0%	1
Growth Potential	35%	1	0%	1
Survival rate	10%	1	0%	1

Figure 22. Scenario analysis for employment and the three margins of start-up activity - Latvia

Source: EU start-up calculator, Latvia, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 22 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by almost 4.5%. The negative trend persists during 2021. The recovery is very slow: by 2030, aggregate employment is still more than 1% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 219,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 156,000. The decline in the survival rate accounts for about 45% of the effects. The number of start-ups accounts for about 20% and the growth potential for roughly 35% each. These findings provide an important input for the policy discussion pointing to the need of a holistic policy approach. The three different margins can be influenced by a mix of targeted policies. While, potential employment benefits of policies targeted towards firm survival suggest to be highest, promoting firm entry and the growth potential of entrants plays an essential role. However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table XIII shows that, compared to manufacturing and overall industry, firms in the service sector are more dynamic. This sector has much higher start-up rate, and a much higher employment share of start-ups and other young firms.

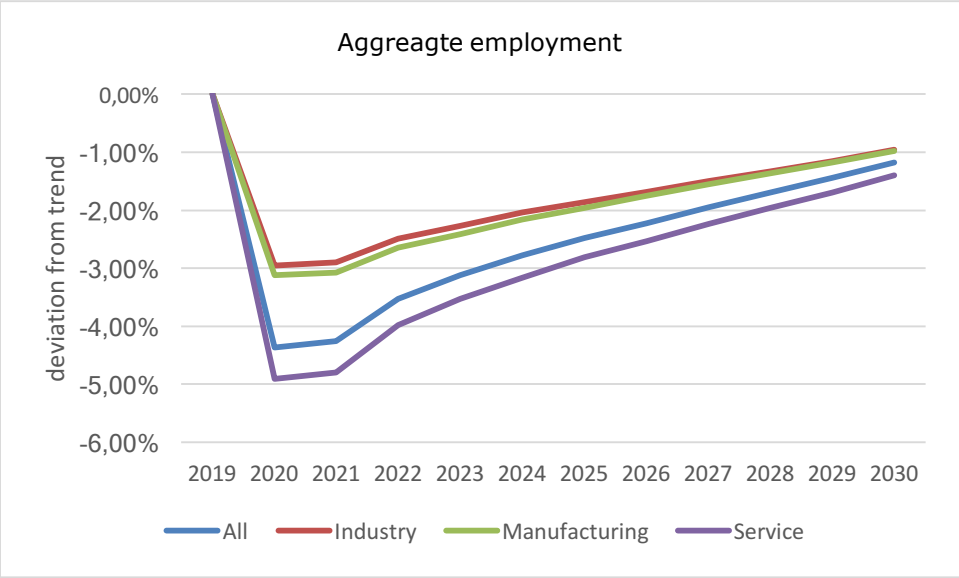


Figure 23. Sectors employment (not equilibrium adjusted) -Latvia

Source: JRC, EU start-up calculator, Latvia, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* in the respective sectors and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

Table XV. Share of aggregate employment loss accounted for by the margins Latvia

	All	Industry	Manufacturing	Services
Cumulative employment loss	219 k	35 k	31 k	167 k
# Start-ups	20%	19%	19%	27%
Growth potential	35%	37%	38%	32%
Survival rate	45%	44%	43%	41%

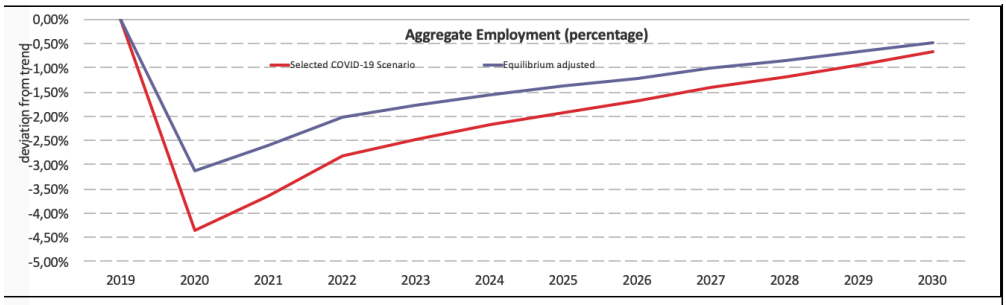
Source: JRC, EU start-up calculator, Latvia, 2020.

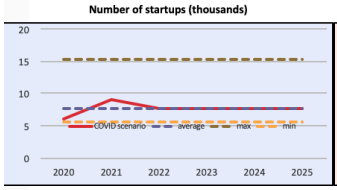
Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

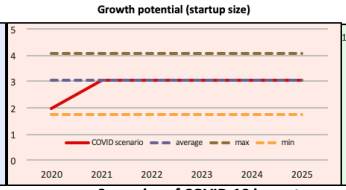
Figure 23 shows the results of the calculator for the three industries. The service sector shows a much larger reaction to the negative shock to the three margin. Employment declines of 5% in 2020 and the cumulative employment loss in the period 2020-2030 is of more than 160,000 jobs. This result is partly due to a larger shock to the number of start-ups compared to the decline assumed in manufacturing and industry. Most importantly, it is driven by the fact that the service sector is more dynamic (in terms of entry and exit rates) and therefore reliant on young firms to provide employment. Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly. Finally, in all the three sectors the decline in the survival rate accounts for more than 40% of the effect. The decline of the number of start-ups seems to be stronger in

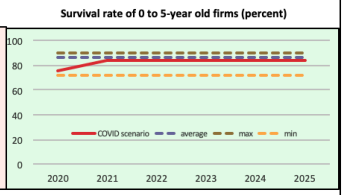
the service sector accounting for almost 30% of the effect while in industry and manufacturing accounts is fewer than 20%. Finally, the decline in the growth potential accounts for more than 30% in each sector. These considerations summarized in Table XV can be of relevance for the policy discussion.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of delayed entry, pushing up the start-up rate in 2021. Following the discussion above, policies aimed at facilitating the entry of new firms in the market can be quite effective. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 24 where, after the initial negative shock, the number of start-ups is increased in 2021 equivalent to the drop experienced in 2020. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes a significant improvement of the employment trend and a lower cumulative job loss totalling to about 176,000. Despite the better outlook the recovery is still sluggish and aggregate employment still does not reach its pre COVID-19 level by 2030.









Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	20%	1	20%	1
Growth Potential	35%	1	0%	1
Survival rate	10%	1	0%	1

Figure 24. Bounce-back scenario in the number of firms, results for aggregate employment - Latvia

Source: EU start-up calculator, Latvia, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maxima* and last one year. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.6 EU start-up calculator: Lithuania

4.6.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, higher exit of young firms, and lower growth of start-ups.
- According to the EU start-up calculator, these developments are likely to create substantial aggregate employment losses, of up to -2.5% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 134,000.
- Effects are very persistent: full recovery may take more than a decade, even if start-up activity recovers to its pre-crisis level in one year.
- More than 40% of the aggregate employment loss is accounted for by the reduction in the number of start-ups and the survival rate, each. Policies targeted to support young firm survival and promote new firms' entry would seem to be the most effective. The outlook is improved if in 2021 there is a rapid increase in the number of firms entering the economy. i.e. the cumulative aggregate employment loss is reduced to 74,000.
- The Lithuanian service sector may be affected particularly strongly, as young firms are particularly important job creators in this sector. In this sector most of the employment loss is due to the decline in the number of start-ups and in the survival rate. Instead, in the manufacturing and service sectors also the decline in the growth potential plays an important role.

4.6.2 Business dynamism in Lithuania

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Lithuanian firms, see Table XVI.

Table XVI. Descriptive statistics on the economy and sector dynamics of young firms - Lithuania

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	10.3%	8.9%	7.4%	10.5%
survival rate	92%	91.8%	92.6%	93.3%	91.9%
share of young firms	36%	46.4%	38.3%	34.9%	47%
employment share of start-ups	2.5%	2.9%	2%	1.5%	3.1%
employment share of young firms	12%	18%	11.6%	11%	21.5%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2008 to 2017.

The statistics show that, when it comes to entry and exit of firms, the Lithuanian economy has a higher start-up rate than the EU average. An important share of job creation is attributed to start-ups and young firms, which is higher than the EU average. Over the sample, about 8% of firms exit within a given year, whereas the start-up rate is about 10%. Start-ups (firms of age zero) account for about 3% of aggregate

employment whereas firms up to age 5 together account for more than 18%.[25] When looking at the sectoral disaggregation, the service sector contributes to most of the business dynamic of the overall economy with a start-up rate of above 10% and an employment share of start-ups of more than 20%.

Moreover, provisional data provided by Statics Lithuania show an increasing contraction in the number of new businesses created since the beginning of the COVID-19 pandemic with respect to the same period in 2019. In particular, 20.9% less businesses were created in March, 41.2% less in April, and 7.5% less in May, in each case compared to the corresponding month of 2019 (see Figure 25). Interestingly, in June 2016 the number of start-ups shows a bounce-back increasing by 57.5% with respect June 2019, while July and August show only a slight contraction with respect to last year values. If this trend persists the Lithuanian start-up scene may recover relatively quickly from the negative impact of the COVID-19 pandemic. Acknowledging the possibility of a rapid recovery in the number of start-ups during the second half of the year, these statistics show an important disruption of start-up activity due to the COVID-19 pandemic. This can have important repercussions for aggregate employment, especially if a second wave of the pandemic may result in interventions that may restrict again economic activities.

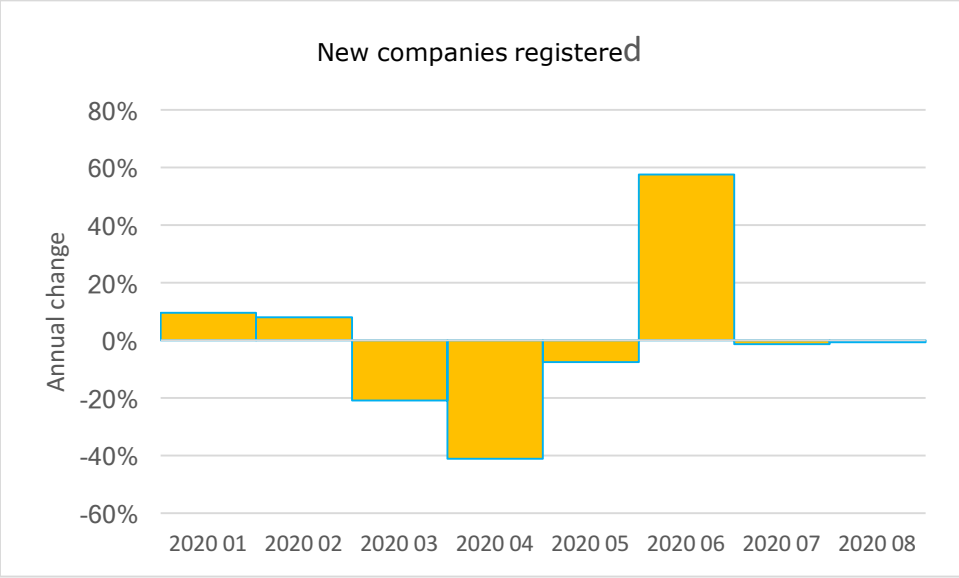


Figure 25. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Lithuania

Source: JRC, provisional data on the total of new companies registered are provided by Statistics Lithuania (www.stat.gov.lt)

4.6.3 Scenario analysis

We consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups, the survival rate and the growth potential fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), see Table XVII.[26] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back

[25] Table XVI also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

[26] Note that in Table XVII Industry, Manufacturing and Serving sector are set to their sample *minima* which happens to be similar for the number of start-ups. Moreover, the shock to the service sector is characterized by a higher decline of the survival rate but a considerably lower decline in the growth potential of start-ups. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown and restrictive measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

at their sample averages. The scenario is the one of a strong but short-lived crisis expecting that once the pandemic is under control, the economic activity of start-ups and young firms will resume. This expectation seems to be consistent with the recent economic trend.

Table XVII. Scenario assumptions - Lithuania

	All	Industry	Manufacturing	Services
# Start-ups	-25%	-25%	-22%	-25%
Growth potential	-10%	-30%	-17%	-3%
Survival rate	-7%	-4%	-5%	-7%

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

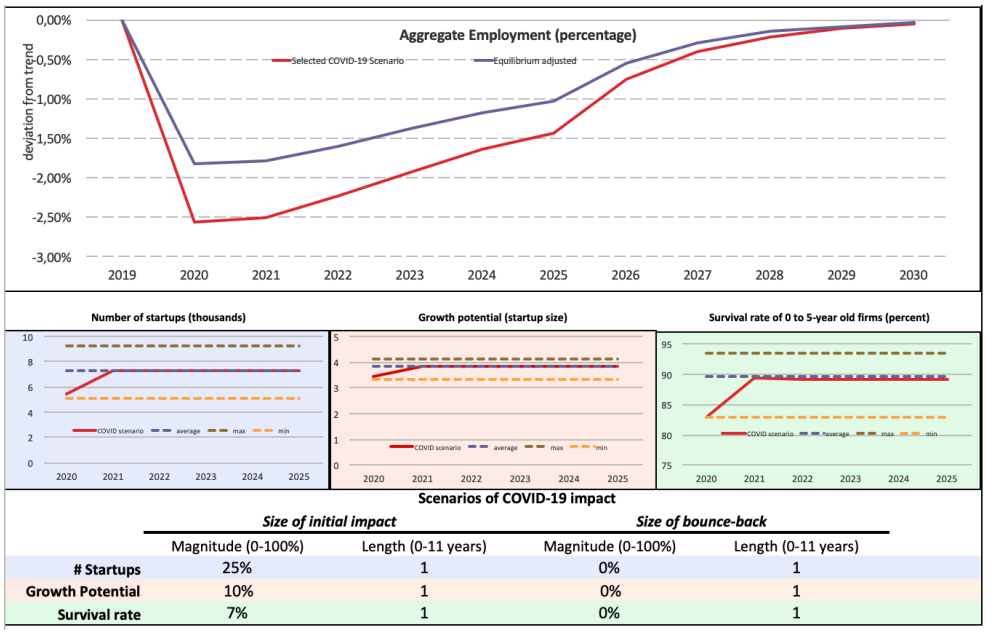


Figure 26. Scenario analysis for employment and the three margins of start-up activity - Lithuania

Source: EU start-up calculator, Lithuania, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 26 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by over 2.5%. The recovery is slow: by 2026, aggregate employment is still more than 0.8% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 134,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 95,000 (blue line in Figure 26). The decline in the number of start-ups and in the survival rate account for about 40% each, while the growth potential for roughly 17%. These findings provide an important input for the policy discussion. The three

different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards firm survival and to promote firm entry suggest to be highest. However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table XVI shows that, compared to manufacturing and overall industry, firms in the service sector are more dynamic. This sector has higher start-up and exit rate, and a much higher employment share of start-ups and other young firms.

Figure 27 shows the results of the calculator for the three industries. The service sector shows a larger employment loss, even though the decline in the growth potential of start-ups is considerably smaller (Table XVII). This result is driven by the fact that the service sector is more dynamic in terms of entry and exit and therefore reliant on young firms to provide employment.

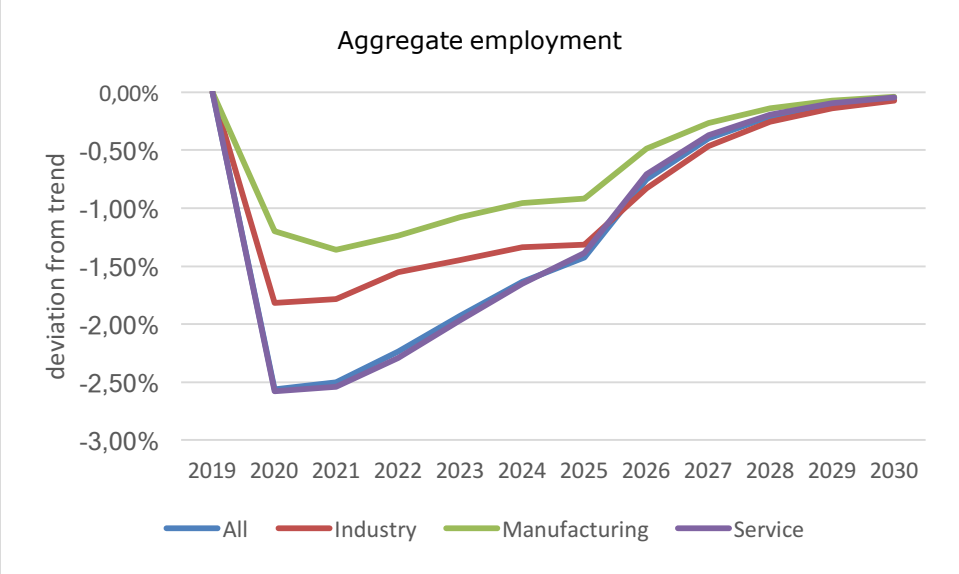


Figure 27. Sectors employment (not equilibrium adjusted) - Lithuania

Source: JRC, EU start-up calculator, Lithuania, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* in the respective sectors and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate employment of more than 84,000 jobs (Table XVIII). The decline in the number of start-ups explains about half of the employment effect, while the survival rate about 45%, leaving only a marginal role played by the growth potential. Instead, in the industry and manufacturing sector the decline of the growth potential explains more than 30% of the overall employment loss as a consequence of a larger magnitude of the shock affecting this margin in these sectors. These considerations are indicative that policy targeted to support firms to tackle survival challenges and support entry could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment.

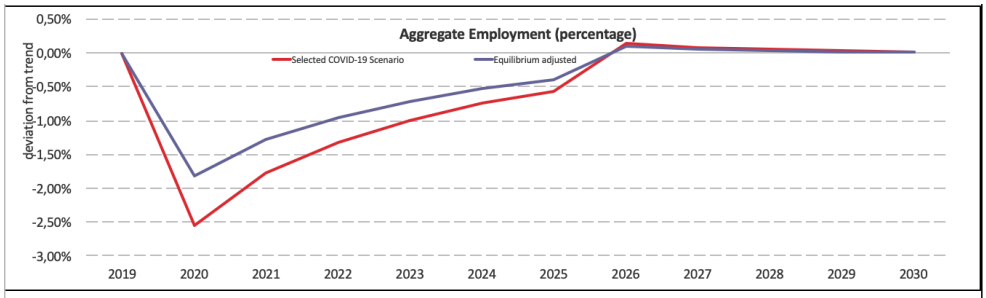
Table XVIII. Share of aggregate employment loss accounted for by the margins - Lithuania

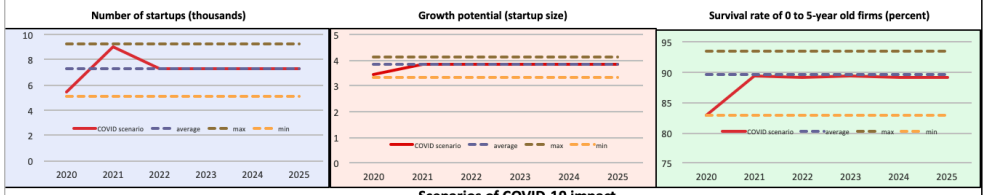
	All	Industry	Manufacturing	Services
Cumulative employment loss	134 k	27 k	17 k	84 k
# Start-ups	43%	36%	39%	49%
Growth potential	17%	44%	30%	6%
Survival rate	40%	20%	31%	45%

Source: JRC, EU start-up calculator, Lithuania, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021 especially if supported by specific policies targeted to start-ups that could reduce entry barriers, promote innovation and relax financial constraints. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 28 where, after the initial negative shock, the number of start-ups is increased in 2021 to the *maximum* level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes an improvement of the employment trend and a lower cumulative job loss totalling to about 74,000. Thanks to the better outlook aggregate employment reaches its pre COVID-19 level by 2026. This is due to the fact that the number of start-ups account for a large share of the impact on aggregate employment, i.e. about 43%, of the total effect on employment (see Table XVIII).





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	25%	1	25%	1
Growth Potential	10%	1	0%	1
Survival rate	7%	1	0%	1

Figure 28. Bounce-back scenario in the number of firms, results for aggregate employment - Lithuania

Source: EU start-up calculator, Lithuania, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maxima* and last one year. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

4.7 EU start-up calculator: Portugal

4.7.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, a higher exit of young firms, and lower growth of start-ups.
- According to the EU start-up calculator, these developments are likely to create substantial aggregate employment losses, of up to -0.9% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 131,000.
- Effects are very persistent: full recovery may take more than a decade, even if start-up activity recovers to its pre-crisis level in one year. By 2026, aggregate employment is still more than 0.3% below the level it would have attained without the disruption of start-up activity
- The decline in the number of start-ups accounts for about 60% of the employment loss, while the decline in the growth potential of start-ups and in the survival rate of young firms for about 20% each. Policies targeted to incentivise entry would seem to be the most effective in Portugal. The outlook is significantly improved if in 2021 there is a rapid increase in the number of firms entering the economy, i.e. the cumulative aggregate employment loss is reduced to 79,000.
- The Portuguese service sector may be affected particularly strongly, as young firms are particularly important job creators in this sector.

4.7.2 Business dynamism in Portugal

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Portuguese firms, see Table XIX. The statistics show that, when it comes to firm entry and exit, the Portuguese economy is in line with the EU 27 average, relying importantly on start-ups for job creation. Over the sample, more than 11% of firms exit within a given year, whereas the start-up rate is above 9%. Start-ups (firms of age zero) account for about 3% of aggregate employment whereas firms up to age 5 together account for more than 16% implying a higher contribution from young firm as job creators in Portugal relative to the EU average of 12%. [27]

Table XIX. Descriptive statistics on the economy and sector dynamics of young firms - Portugal

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	9.4%	6.6%	6.6%	10%
survival rate	92%	89.9%	92.1%	92.1%	89.9%
share of young firms	36%	39.2%	30.2%	30%	40.7%
employment share of start-ups	2.5%	2.9%	1.6%	1.7%	3.3%
employment share of young firms	12%	16.7%	11.6%	11.7%	18.1%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2008 to 2017.

Moreover, recent data from the Portuguese National Statistical Institute shows an increasing contraction in the number of new businesses created since the beginning of the year with respect to the same period in 2019. While the negative trend is present since the beginning of the year, it has sharply deteriorated since the start of the COVID-19 pandemic and the ensuing hibernation of most of the economic activities. In particular, 51.4% less businesses were created in March, (when the COVID-19 pandemic started), 70.8% less in April (when strict lockdown measures have been implemented), 41.2% less in May and 17% less in June and July, in each case compared to the corresponding month of 2019 (see Figure 29). These statistics show an important and persistent disruption of start-up activity due to the COVID-19 pandemic, which seems to continue also over the summer months. This can have important repercussions for aggregate employment, especially if the number of start-ups does not recover quickly as Figure 29 seems to suggest.

[27] Table XIX also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Figure 29. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Portugal

Source: JRC, data from the Portuguese National Statistical Institute (http://www.ine.pt), 2020.

4.7.3 Scenario analysis

We consider a deterioration of the three margins described above. Specifically, we assume that the number of start-ups, the survival rate, and the growth potential all fall from the sample *averages* to the sample *minima* (which were reached in the years following the financial crisis of 2008), see Table XX.[28] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. The scenario is the one of a strong but short-lived crisis expecting that once the containment measures are lifted, the economic activity of start-ups and young firms will resume.

Table XX. Scenario assumptions - Portugal

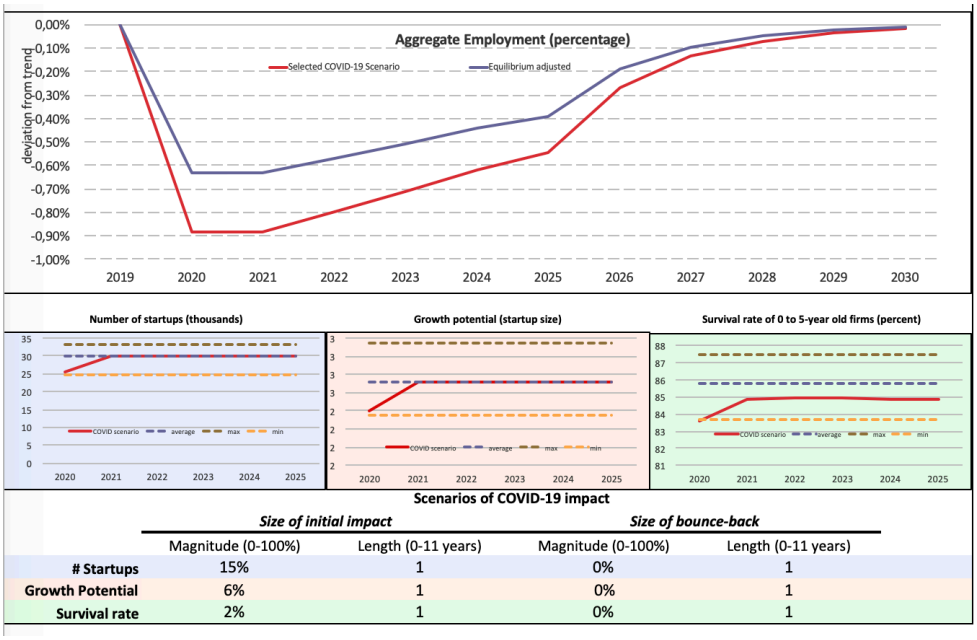
	All	Industry	Manufacturing	Services
# Start-ups	-15%	-8%	-8%	-15%
Growth potential	-6%	-7%	-7%	-6%
Survival rate	-1,5%	-2%	-2%	-1.5%

Note(1): The sector aggregate reflects the classifications available in Eurostat, i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Figure 30 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by over 0.9%, decline that persist also in 2021. The recovery is very slow: by 2026, aggregate

[28] Note that in Table XX Industry, Manufacturing and Serving sector are set to their sample *minima*. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

employment is still more than 0.3% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 131,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 93,000. The decline in the number of start-ups accounts for about 60%. The survival rate and the growth potential for roughly 20% each. These findings provide an important input for the policy discussion. The three different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards ease firm entry suggest to be highest. However, the cost of different policy options needs to be taken into account.



Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	0%	1
Growth Potential	6%	1	0%	1
Survival rate	2%	1	0%	1

Figure 30. Scenario analysis for employment and the three margins of start-up activity - Portugal

Source: EU start-up calculator, Portugal, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Moreover, we consider how sectors may be affected differently. Table XIX shows that, compared to manufacturing and overall industry, firms in the service sector are relatively more dynamic. This sector has much higher start-up and exit rate, and a much higher employment share of start-ups and other young firms.

Figure 31 shows the results of the calculator for the three industries. The service sector shows a much larger employment loss, partially due to a larger shock assumed in the number of start-ups and despite the decline in the survival rate and growth potential assumed is actually somewhat smaller than in manufacturing and industry. This result is driven by the fact that the service sector is relatively dynamic and therefore reliant on young firms to provide employment. Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate employment of more than 87,000 jobs (Table XXI). The decline in the number of start-ups account for about 60% of the employment loss. In the industry ad manufacturing sectors, the decline of the three margins account for more than 20% each. This is indicative that different policy mixes should be targeted at different sectors. Policies aimed at easing firm entry seems particular effective in the service sector, while a policy targeted to incentivize firm entry, scalability and reduce exit in the industry and

manufacturing sector could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment.

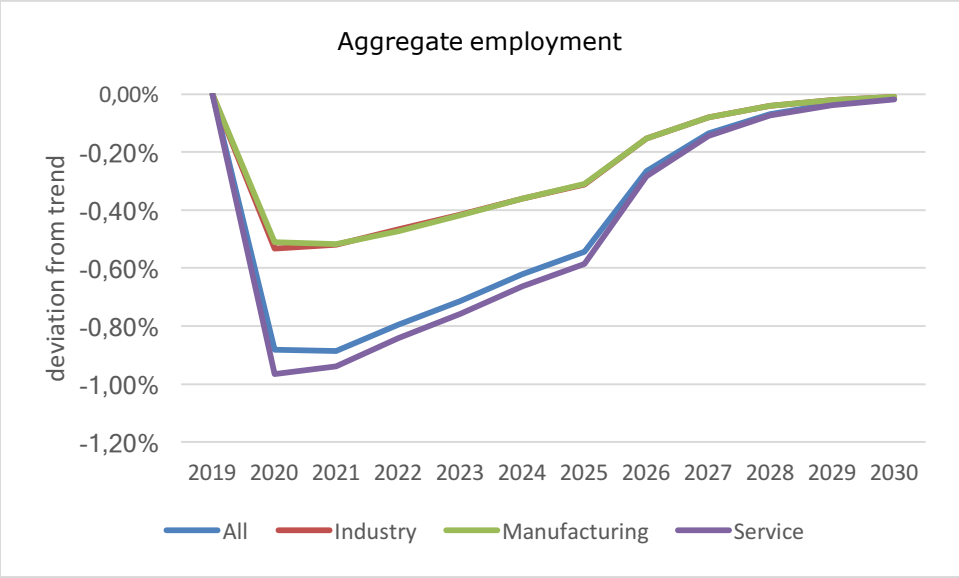


Figure 31. Sectors employment (not equilibrium adjusted) - Portugal

Source: JRC, EU start-up calculator, Spain, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat - i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* in the respective sectors and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

Table XXI. Share of aggregate employment loss accounted for by the three margins - Portugal

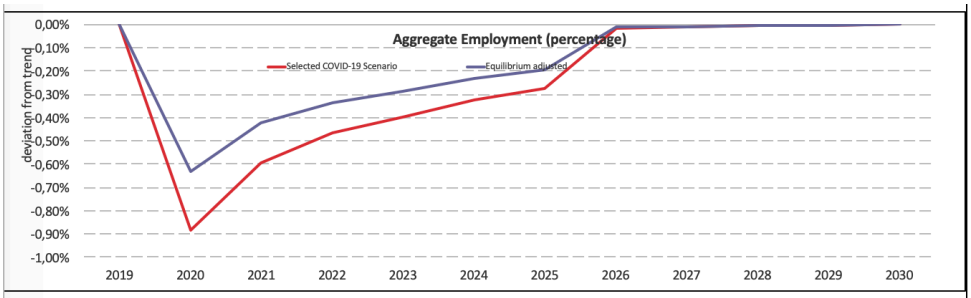
	All	Industry	Manufacturing	Services
Cumulative employment loss	131 k	20 k	18 k	87 k
# Start-ups	60%	37%	38%	60%
Growth potential	24%	32%	33%	24%
Survival rate	19%	32%	31%	18%

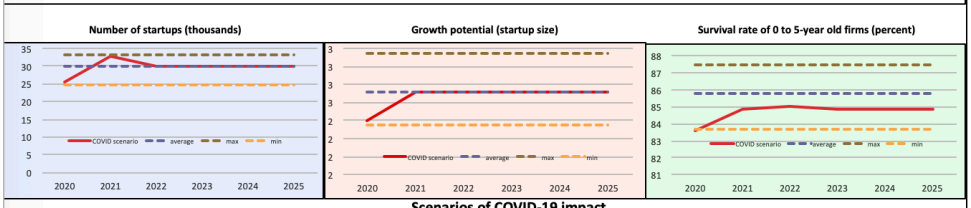
Source: JRC, EU start-up calculator, Portugal, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021, especially when targeted policies to promote firm entry are put in place. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 32 where, after the initial negative shock, the number of start-ups is increased in 2021 to the maximum level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in

2021 causes an improvement of the employment trend and a lower cumulative job loss totalling to about 79,000. Thanks to the better outlook aggregate employment reaches its pre COVID-19 level by 2026.





Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	10%	1
Growth Potential	6%	1	0%	1
Survival rate	2%	1	0%	1

Figure 32. Bounce-back scenario in the number of firms, results for aggregate employment - Portugal

Source: EU start-up calculator, Portugal, 2020.

Note(1): The simulation on aggregate employment considers a shock on the three margins equal to their sample *minima* and of one year duration. The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maximum* and last one year. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

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4.8 EU start-up calculator: Sweden

4.8.1 Summary

- The COVID-19 crisis is likely to heavily affect young firms, leading to a decline in the start-up rate, higher exit of young firms, and lower growth of start-ups despite Sweden has not imposed strict lockdown measures.
- According to the EU start-up calculator, these developments are likely to create substantial aggregate employment losses, of up to -2% of aggregate employment in 2020. The cumulative employment loss for the period 2020-2030 could be up to 267,000.
- Effects are very persistent: full recovery may take more than a decade, even if start-up activity recovers to its pre-crisis level in one year.
- About two-thirds of the aggregate employment loss is accounted for by the reduction of the survival rate and about 25% by the reduction in the number of start-ups. Policies targeted to support young firm survival and promote new firms' entry suggest to be the most effective. The outlook is improved if in 2021 there is a rapid increase in the number of firms entering the economy. i.e. the cumulative aggregate employment loss is reduced to 200,000.
- The Swedish service sector may be affected particularly strongly, as young firms are particularly important job creators in this sector. Across the three sectors, the

survival rate accounts for the larger share of employment loss: about 65% in the service sector and more than 80% in the industry and manufacturing sectors.

4.8.2 Business dynamism in Sweden

Before presenting the scenario analysis, we consider a number of statistics on the dynamism of Swedish firms, see Table XXII.

Table XXII. Descriptive statistics on the economy and sector dynamics of young firms - Sweden

	EU 27 All	All	Industry	Manufacturing	Services
start-up rate	9.2%	10.2%	5.7%	5.6%	10.8%
survival rate	92%	91.4%	93.5%	93.6%	90.7%
share of young firms	36%	31.2%	19.3%	18.9%	33%
employment share of start-ups	2.5%	2%	0.5%	0.5%	2.3%
employment share of young firms	12%	7.1%	1.8%	1.8%	8.1%

Source: JRC, Eurostat, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies. The time series is from 2012 to 2017.

The statistics show that, when it comes to entry and exit of firms, the Swedish economy has a slightly higher start-up rate and exit rate than the EU average.[29] A seemingly important share of job creation is attributed to start-ups and young firms, although lower than the EU average. Over the sample, about 9% of firms exit within a given year, whereas the start-up rate is about 10%. Start-ups (firms of age zero) account for about 2% of aggregate employment whereas firms up to age 5 together account for more than 7%.[30] When looking at the sectoral disaggregation, the service sector contributes to most of the business dynamism of the overall economy with a start-up rate reaching almost 11% and an employment share of young firms of more than 8%, while industry and manufacturing have an average start-up rate of 5.6% and an employment share of young firms lower than 2%.

Sweden has not imposed any lockdown measure to limit the spread of the COVID-19 virus and relied only on behavioural recommendation for its population. This approach has affected the number of new companies registered in 2020 with respect to the same period in 2019. In particular, Figure 33 shows that the creation of new companies has been impacted by the crisis only in April and May showing a small contraction in 2020 with respect to the same period in 2019. This contraction is more than compensated by a sharp increment in the number of new companies registered in June 2020 with respect to June 2019. Nevertheless, real time data suggests that the overall economy has been slowed down by the pandemic (e.g. drop in the Market Confidence Index, in the number of restaurant bookings, in the mobility rate and similar indicators, especially during the months of March, April and May – see c19impact.com).

[29] Differently to what commonly observed, the exit rate of Swedish firms seems to increase as firm age (Eurostat, Business Demography dataset, 2020).

[30] Table XXII also indicates that industry and manufacturing are very similar to each other as the latter is a large component of the former.

Figure 33. Annual change in the number of new companies registered in 2020 with respect to the same period in 2019 (percentage) - Sweden

Source: JRC, provisional data on the total of new companies registered are provided by the Swedish Registration Offices of Companies (www.bolagsverket.se). The data in the chart consider all types of new companies registered monthly during the period January 2019 and September 2020.

4.8.3 Scenario analysis

We consider a deterioration of the three margins described above consistent with the scenarios assumed for the other Nordic countries. Specifically, we assume that the number of start-ups and the survival rate fall from the sample *averages* to the sample *minima*, while the survival rate drops considerably and seemingly to what simulated for Denmark and Finland[31], see Table XXIII.[32] Moreover, we assume that this decline lasts for one year only. From 2021 onwards, the three margins are assumed to be back at their sample averages. The scenario is the one of a strong but short-lived crisis.

Table XXIII. Scenario assumptions - Sweden

	All	Industry	Manufacturing	Services
# Start-ups	-15%	-5%	-4%	-15%
Growth potential	-6%	-6%	-6%	-6%
Survival rate	-10%	-10%	-10%	-10%

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

[31] In the case of Sweden, Eurostat data for the survival rate start in 2013. The short time series does not allow us to have 5 years to construct the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate are the same number.

[32] Note that in Table XXIII the margins of the Industry, Manufacturing and Serving sectors are set to their sample *minima,* which happens to be the larger in magnitude only for the number of start-ups in the service sector. However, the COVID-19 crisis seems to have impacted particularly strongly the service sector imposing strict lockdown measures to sectors such as transport, tourism, and hospitality. Alternative scenarios that take into account this asymmetry can easily be computed as soon as sectoral data become available.

Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	0%	1
Growth Potential	6%	1	0%	1
Survival rate	10%	1	0%	1

Figure 34. Scenario analysis for employment and the three margins of start-up activity - Sweden

Source: EU start-up calculator, Sweden, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of start-ups and the growth potential equal to their sample *minima* and of one year duration (for the survival rate it is arbitrarily assumed to be of -10%). The Business Demography data of Eurostat for Sweden are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

Figure 34 shows the scenario assumptions on the three margins, as well as the implications for aggregate employment produced by the calculator. For 2020, the calculator shows that the three margins together reduce aggregate employment by almost 2%. The recovery is slow: by 2026, aggregate employment is still more than 0.5% below the level it would have attained without the disruption of start-up activity. The employment loss, cumulated up to 2030 is 267,000. Accounting for equilibrium adjustments, aggregate effects are dampened by 29%, leaving a cumulative employment loss of about 191,000 (blue line in Figure 34). The decline in the survival rate accounts for about 65% of the effect, while the decline in the number of start-ups accounts for about 25%. These findings provide an important input for the policy discussion. The three different margins can be influenced by targeted policies. Potential employment benefits of policies targeted towards firm survival and to promote firm entry suggest to be highest. However, the cost of different policy options needs to be taken into account.

Moreover, we consider how sectors may be affected differently. Table XXII shows that, compared to manufacturing and overall industry, firms in the service sector are somewhat more dynamic. This sector has higher start-up and exit rate, and a much higher employment share of start-ups and other young firms compared to the industry and manufacturing sectors.

Figure 35 shows the results of the calculator for the three industries. The service sector shows a larger employment loss. This result is driven by the fact that the service sector is more dynamic in terms of entry and exit and young firms account for a larger share of employment compare to the industry and manufacturing sectors.

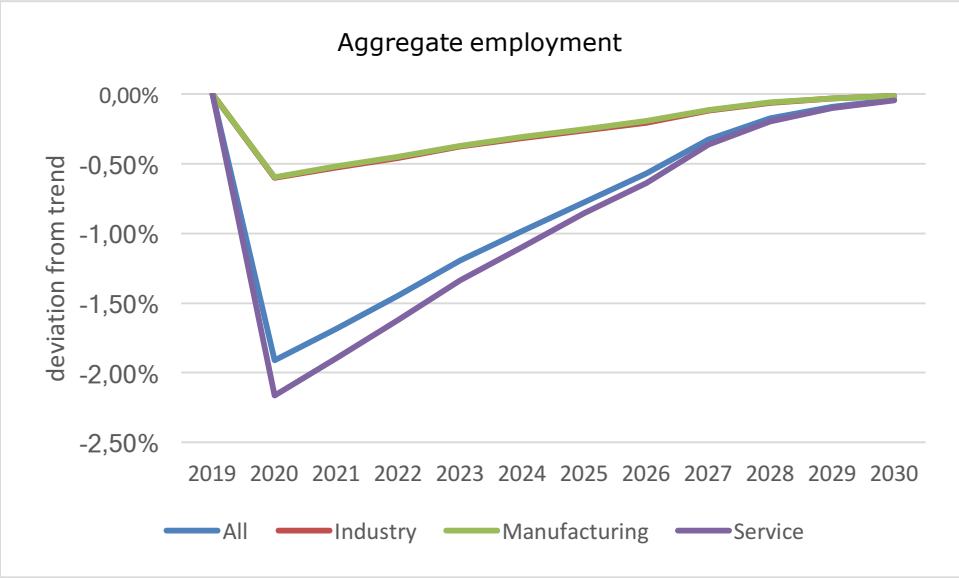

Figure 35. Sectors employment (not equilibrium adjusted) - Sweden

Source: JRC, EU start-up calculator, Sweden, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Note(2): The simulation on aggregate employment considers a shock on the number of start-ups and the growth potential equal to their sample *minima* in the respective sectors and of one year duration (for the survival rate it is arbitrarily assumed to be of -10%). The Business Demography data of Eurostat for Sweden are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate). Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The employment path does not take into account general equilibrium effects.

Table XXIV. Share of aggregate employment loss accounted for by the margins - Sweden

	All	Industry	Manufacturing	Services
Cumulative employment loss	267 k	18 k	15 k	200 k
# Start-ups	25%	9%	7%	25%
Growth potential	10%	10%	10%	10%
Survival rate	65%	81%	83%	65%

Source: JRC, EU start-up calculator, Sweden, 2020.

Note(1): The sector aggregate reflects the classifications available in Eurostat – i.e. all business economy except the activities of holding companies, the industrial sector except construction, and the service sector of the business economy except activities of holding companies.

Hence, a disruption to start-ups and other young firms affects the service sector relatively strongly causing a loss of aggregate employment of about 200,000 jobs (Table XXIV). In all the three sectors the margin with the highest impact on aggregate employment is the survival rate. Its decline accounts for more than 80% of the job loss in the industry and manufacturing sector and for about 65% in the service sector. The decline in the number of start-ups accounts plays an important role in the service sector accounting for about 25% of the employment loss. These considerations are indicative that policy targeted to support firms to tackle survival challenges across sectors and

support entry in the service sector could have a significant effect in mitigating the impact that the COVID-19 pandemic will have on aggregate employment.

Scenarios of COVID-19 impact

	Size of initial impact		*Size of bounce-back*	
	Magnitude (0-100%)	Length (0-11 years)	Magnitude (0-100%)	Length (0-11 years)
# Startups	15%	1	9%	1
Growth Potential	6%	1	0%	1
Survival rate	10%	1	0%	1

Figure 36. Bounce-back scenario in the number of firms, results for aggregate employment - Sweden

Source: EU start-up calculator, Sweden, 2020.

Note(1): The simulation on aggregate employment considers a shock on the number of start-ups and growth potential equal to their sample *minima* and of the duration of one year (for the survival rate it is arbitrarily assumed to be of -10%). The Business Demography data of Eurostat for Sweden are available from 2012 to 2017. The short time series does not allow to compute the 1-5 survival rate. As a consequence, the *minimum*, *maximum* and average value of the survival rate collapse to the same number (yellow line in the plot related to the shock to the survival rate) The bounce-back in the number of start-ups is assumed to take place in 2021, to be equal to the sample *maximum* and of one year duration. Firms older than 15 are unaffected by the three margins and their time-path does not quantitatively affect the analysis. The blue line represents the impact on aggregate employment taking into account general equilibrium effects.

The subdued firm entry in 2020 due to the COVID-19 crisis may be the result of a pent-up with more firm entry in 2021 especially if supported by specific policies targeted to start-ups that could reduce the entry barriers, promote innovation and relax financial constraints. The optimistic outlook for a bounce-back in the number of start-ups is simulated in Figure 36 where, after the initial negative shock, the number of start-ups is increased in 2021 to the maximum level registered in the time series. After an initial sharp decline in aggregate employment, the increased number of start-ups entering in 2021 causes an improvement of the employment trend and a lower cumulative job loss totalling to about 227,000. Thanks to the better outlook aggregate employment reaches its pre COVID-19 level faster.

5 Conclusions

The COVID-19 crisis is likely to heavily affect start-ups and young firms and ultimately affect aggregate employment. To understand the impact, we developed the EU start-up calculator. This is an empirical tool which allows to assess the medium-term impact that the COVID-19 pandemic has on aggregate employment via the destruction of start-up activities varying three margins: (i) the number of start-ups, (ii) the growth potential and (iii) the survival rate. Different scenarios have been analysed for the business economy, the industry, manufacturing and service sector of Denmark, Estonia, Finland, France, Latvia, Lithuania, Portugal and Sweden. This work follows closely the first report on the "EU start-up calculator which analyses the start-up dynamics for Austria, Belgium, Germany, Hungary, Italy and Spain (Benedetti Fasil, Sedláček and Sterk (2020)).

A strong but short lived-crisis may result in important and persist job losses in all the countries that range between 0.9 (Portugal) to 4.5% (Latvia) in 2020 and adds to a cumulative employment loss for the period 2020-2030 that ranges between 59,000 (Estonia) to 798,000 (France). These losses seem to be particularly high in countries and sectors characterized by a high firm turnover and that rely on start-ups and young firms for job creation, e.g. Estonia, France, Latvia, Lithuania and Portugal, as well as the service sector rather than the industry and manufacturing sector. As for the margins considered, in most countries the deterioration of the survival rate of young firms seems to play an important role in driving employment, seconded by the number of new entrants. The exceptions are France, where the decline in the growth potential accounts for more than two-thirds of the aggregate employment loss, and Estonia and Portugal where the lion share in explaining the employment loss is played by the decline in the number of start-ups.

Notwithstanding the significant economic disruption caused by the COVID-19 pandemic, the medium-term effects on aggregate employment may be significantly mitigated by policies aimed at supporting young firms and incentivizing the creation of new ones. This represents a positive factor as this group of firms, i.e. start-ups and young firms, is easily identifiable by policy makers and hence represents an easy target for policy interventions. With this in mind we explored the potential impact that policies may have on aggregate employment. In particular, we simulated bounce-back scenarios where the number of firms entering the economy rapidly increases in 2021. In every country, the outlook is significantly improved, the recovery is faster and the aggregate job loss is lower. Hence, policy makers may have amble margin of manoeuvre to alleviate the crisis with a mix of policies that while being targeted may also be efficient.

Along these lines, the European Union has launched a series of guidelines and instruments, such as InvestEu, the European Innovation Council and, as a result of the COVID-19 pandemic, the Recovery Resilience Facility. One of the goals of these instruments is to support the creation of a vibrant and more resilient entrepreneurial ecosystem with particular attention to promote start-ups and young firms. The interventions include access to liquidity and funding to start-ups and young firms in the forms of grants, equity or zero-interest loans especially targeted to scale-ups, to promising innovators and R&D investments, and to support young enterprises' needs. Also the use of in-kind support, such as training programs, creation of network opportunities with peer-entrepreneurs, customers and suppliers to rebuild the value chain, and the promotion of knowledge transfer from applied research to the entrepreneurial ecosystem are considered as priorities. Focus is also put on the creation of new opportunities via the promotion of digitalization and of the green transition. Finally, there is the indication to reduce and simplify the red-tape costs upon entry and the general administrative burden that firms face. If policy makers will be able to design and target these instruments to promote start-ups and young firms, then the recovery from the COVID-19 disruption will be considerably faster and the outlook much more positive. We postpone to further research the assessment on how these interventions may affect the three margins that govern the scenario creation of the start-up calculator and ultimately the impact that they will have on aggregate employment.

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Appendix

Appendix I. Figures

The introduction avails of a series of figures summarising summary statistics for start-ups and young firms, their importance for job creation and timely date on the registration of new companies in the first two quarters of 2020 with respect to the same period in 2019. This Appendix proposes the same figures for a larger set of Member States.

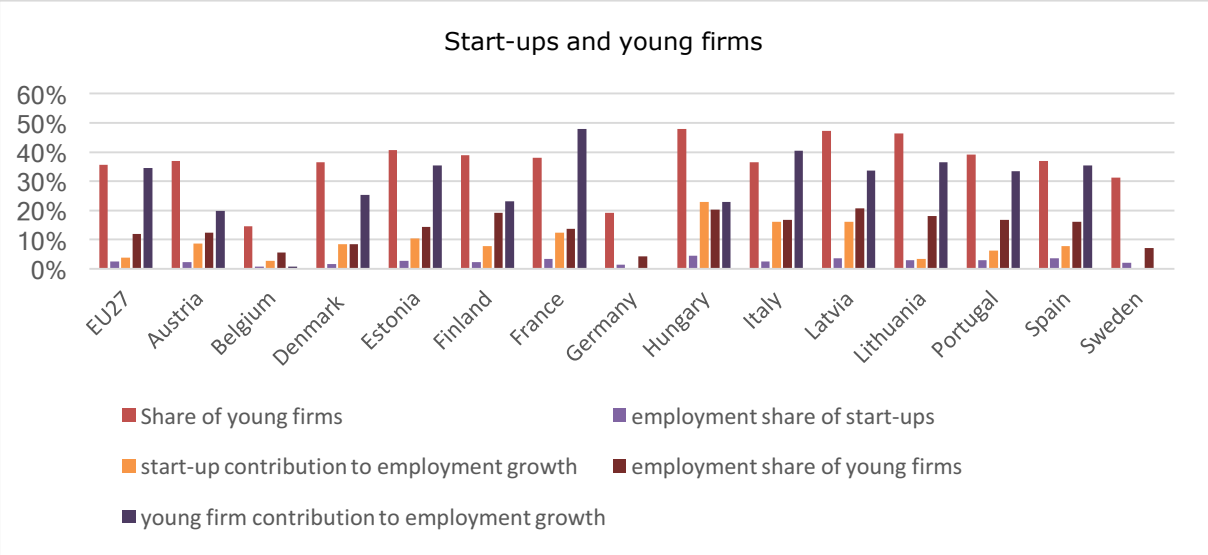

Figure A1. Importance of start-ups and young firms for aggregate employment

Source: JRC, Eurostat, Business Demography dataset, 2020.

Note(1): The time series for the EU27, Denmark and Finland is between 2012 and 2017, for Austria, Belgium, Estonia, France, Latvia, Hungary, Italy, Portugal and Spain between 2008 and 2017, for Lithuania from 2009 to 2017. The Business Demography dataset for Germany and Sweden does not have enough data to compute the start-up and young firm contribution to growth. Hence, this is omitted in the Figure. For the other statistics the time series is between 2012 and 2017.

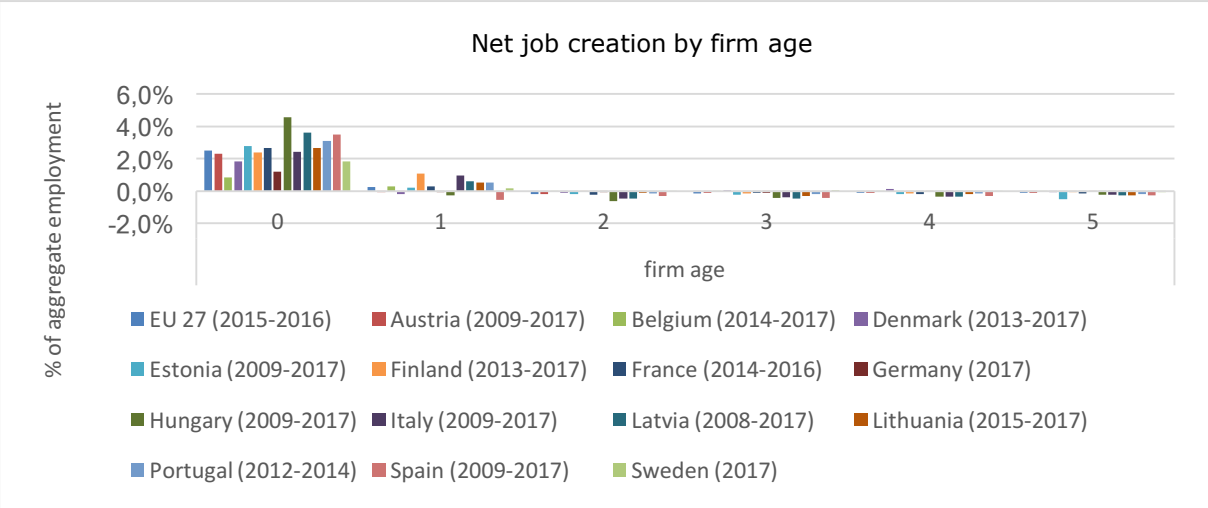

Figure A2. Importance of start-ups for job creation

Source: JRC, Eurostat, Business Demography dataset, 2020.

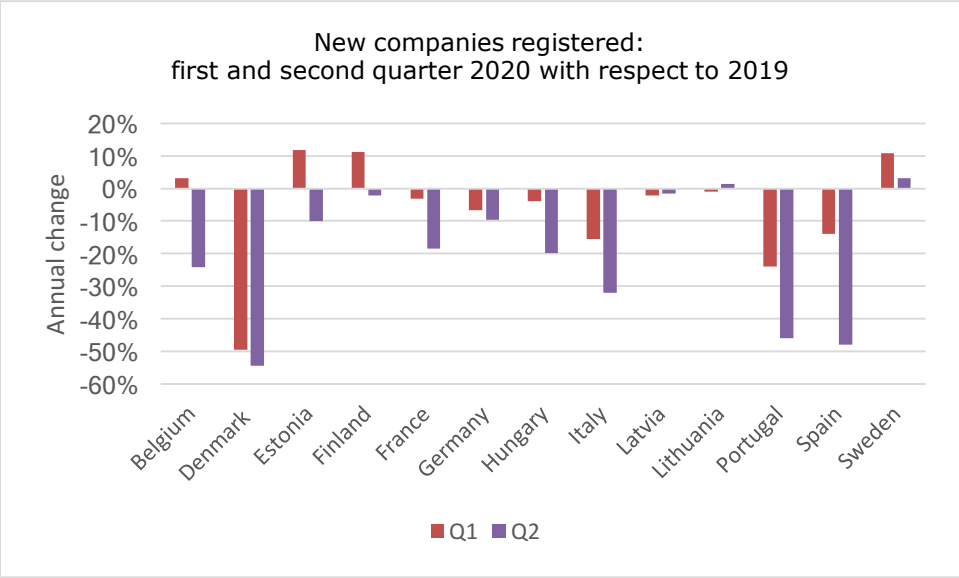

Figure A3. Annual change in the number of new companies registered in the first and second quarter of 2020 with respect to January to April 2019 (percentage)

Source: JRC, data from Statistics Belgium (STABEL), the Danish Statistical Institute (DST), Statistics Estonia (SE), Statistics Finland (SF), the National Institute of Statistics and Economic Studies (Insee), the Federal Statistical Office of Germany providing preliminary data (DESTATIS), the Hungarian Central Statistical Office (KSH), the Italian Association of the Chamber of Commerce (IC), the Enterprise Register of Latvia (https://www.ur.gov.lv/en/statistics/), Statistics Lithuania (https://www.stat.gov.lt), the Portuguese National Statistical Institute (INE), the Spanish National Statistical Institute (INE) and the Swedish Registration Offices of Companies (Bolagsverket).

Note(1): The data, which come from national statistical offices or enterprise registers, are not harmonized across countries. As a consequence, Figure 3 does not allow for quantitative cross-country comparisons *per se*. Nevertheless, it is useful to visualize the different impact that COVID-19 has had across countries in terms of start-up creation.

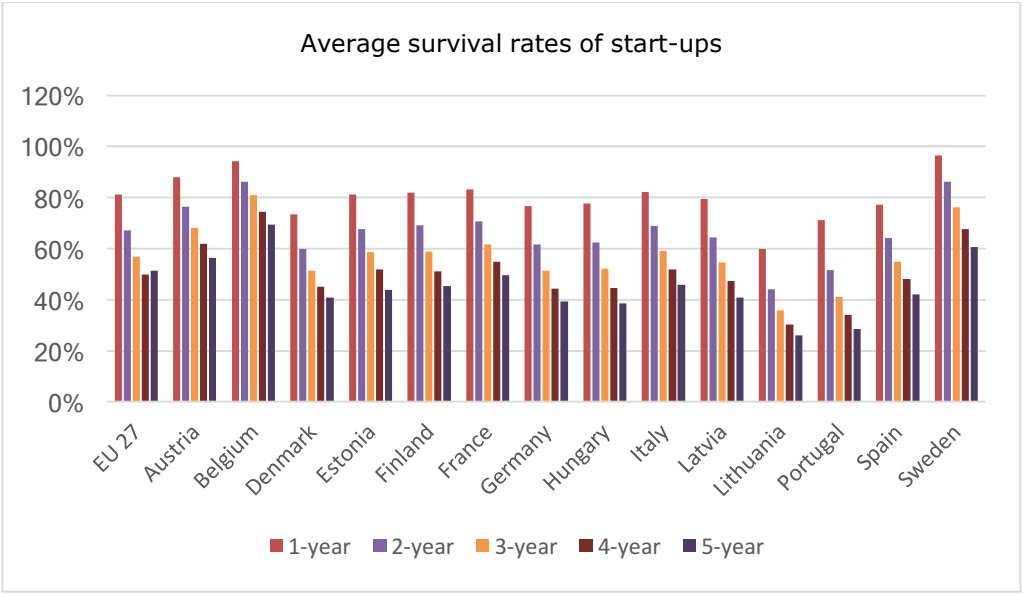

Figure A4. Y-o-y survival rate of start-ups

Source: JRC, Eurostat, Business Demography dataset, 2020.

Note(1): The Eurostat database provides the y-o-y survival rates for start-ups after one, two, three, four and five years of activities. The plotted percentages are the averages of the period from 2013 to 2017 for the EU 27, from 2008 to 2017 for Estonia, France, Latvia, from 2008 to 2018 for Austria, Belgium, Finland, France, Germany, Hungary, Italy, Lithuania, Portugal, Spain and Sweden and from 2009 to 2017 for Denmark.

Appendix II. Interpolation, extrapolation and creation of scenarios

In Eurostat for firms of age $a = \{0,1,2,3,4,5\}$ in year $t \in [2008\text{-}2017]$ is directly observable the number of firms $n_{a,t}$, firm size $s_{a,t}$ and the survival rate $1\text{-}x_{a,t}$. However, firms older than 5 are grouped together in Eurostat. Hence, it is necessary to interpolate information for each of the individual age categories. Two inputs to the calculator are the profiles of average size and the survival rates by age in the baseline scenario (i.e. without shock), for firms up to age 15. For firms up to age 5, we measure directly in the data as averages over the sample period. For older firms, we assume a functional form for both profiles and fit these to the available data. Specifically, for the exit rate we assume the following functional form:

$$x_a = \beta_0 + \beta_1 \left(\frac{\exp \beta_2}{1+\exp \beta_2}\right)^{\alpha-1}.$$

This implies a smooth profile, gradually decaying from an initial point $x_{a=1} = \beta_0 + \beta_1$ to a limit point $x_{a\to\infty} = \beta_0$. The parameter β_2 controls the speed of decay.

Regarding the average size profile we assume a simple linear form:

$$n_a = \gamma_0 + \gamma_1 a.$$

The functional forms for these two profiles capture well patterns documented using data sets for which exit rates can be computed for all age groups (such as the US Longitudinal Business Database, see e.g. Pugsley, Sedláček and Sterk (2017).

To estimate the parameters of these profiles we use a minimum distance estimator, targeting the following outcomes which we can observe in the data: (i) the average exit rate by age, for firms up to age 5, (ii) average size of firms by age, for firms up to age 5, (iii) the average exit rate among all firms, and (iv) average size among all firms. Note that given a profile for the exit rate by age, one can compute the firm age distribution, and then the average exit rate by weighting the exit rates by age with the firm shares in each age bin. Then, given the age distribution and the average size profile by age, one can compute average size across all firms. The estimation is implemented in MatLab.

In order to extrapolate the necessary data between 2017 and 2019, we assume that firm size by age and exit rates by age (up to age 15), and the number of start-ups, all linearly converge to their 2008-2017averages:

$$x_{a,2017+\tau} = x_{a,2017} + \frac{\tau}{2}\left(\bar{x}_a - x_{a,2017}\right),$$

$$s_{a,2017+\tau} = s_{a,2017} + \frac{\tau}{2}\left(\bar{s}_a - s_{a,2017}\right),$$

$$n_{0,2017+\tau} = n_{0,2017} + \frac{\tau}{2}\left(\bar{n}_0 - n_{0,2017}\right).$$

for τ = 1, 2 and a = 1, 2,…, 15, and where $\bar{x}_a$, $\bar{s}_a$, and $\bar{n}_0$ denote the 2008 to 2017 averages of age specific exit rates, firm sizes and the number of start-ups, respectively. Using the above, we can then recover the number of firms for the ages of 1 to 15 as $n_{a,t} = n_{a-1,t-1}\left(1 - x_{a,t}\right)$, *for a* = 1, 2, …, 15 and t = 2018, 2019.

In order to compute aggregate employment, it is also necessary to assume a particular time-path for employment of 16+ year old firms. However, because 16+ year old firms

are unaffected by our scenarios, the particular time-path is quantitatively unimportant for the results which are reported in deviations from the assumed trend. For this reason, we simply assume that employment in 16+ year old firms stays fixed at its 2017 level.

Having the above information, we are ready to conduct scenarios starting in 2020 and running through to 2030. We consider three types of margins: (i) changes in the number of start-ups, (ii) changes in growth potential and (iii) changes in survival rates. To be concrete, for a given scenario, let us denote the initial percentage decrease in the number of start-ups, the growth potential of start-ups and the survival rate of young firms by $\zeta_j \in (0,1)$ where j = {n, s, x}, respectively. Let us further denote the duration of these effects by $\tau_j > 0$, where j = {n, s, x}, respectively. The given scenarios are then given by:

$$n_{0,2019+t} = n_{0,2019}(1-\zeta_n), \qquad \text{for } t = 1, \dots, \tau_n,$$

$$s_{a,2019+t+a} = s_{a,2019}(1-\zeta_s), \qquad \text{for } t = 1, \dots, \tau_s \text{ and } a = 0, 1, 2, \dots, 15,$$

$$x_{a,2019+t} = x_{a,2019}(1-\zeta_x), \qquad \text{for } t = 1, \dots, \tau_x \text{ and } a = 1, 2, \dots, 15.$$

The calculator can also accommodate bounce-back scenarios. These are always defined as certain values above the 2008-2017 averages of the number of start-ups, average sizes and survival rates of young firms. Recall that all these margins converge precisely to the respective 2008-2017 averages by 2019.

Specifically, let us denote the percentage increase (above the respective long-run average) in the bounce-back scenario related to the number of start-ups, the growth potential of young firms and their survival rates by χ_j , where j = {n, s, x}, respectively. Furthermore, let us denote the length of the bounce-back period by τ_j, where j = {n, s, x}, respectively. The given bounce-back scenarios are then given by

$$n_{0,2019+\tau_n+t} = n_{0,2019}(1-\chi_n), \qquad \text{for } t = 1, \dots, \tau_n,$$

$$s_{a,2019+\tau_s+t+a} = s_{a,2019}(1-\chi_s), \qquad \text{for } t = 1, \dots, \tau_s \text{ and } a = 0, 1, 2, \dots, 15,$$

$$x_{a,2019+\tau_x+t} = x_{a,2019}(1-\chi_x), \qquad \text{for } t = 1, \dots, \tau_x \text{ and } a = 1, 2, \dots, 15.$$

Appendix II. Adjusting for general equilibrium effects

The calculator *per se* is an accounting tool that abstracts from potential general equilibrium effects. To capture the partial reallocation of labour towards surviving firm, the calculator is embedded in a canonical model with firm heterogeneity. In what follow, we briefly describe the model economy and it contribution to the calculator.

In the model, there is a measure *M* of heterogeneous firms.[33] Let the production function of firm *i* be given by:

[33] Although the model is dynamic, it can be described entirely in static terms, hence we omit time subscripts.

$$y_i = z_i n_i^{\alpha}$$

where y_i is the firm's output, n_i its employment level, z_i is the firm's productivity level, and $\alpha \in (0,1)$ is the elasticity of production with respect to labour input.[34] The wage per employee is taken as given by firms, and denoted by *w*. The firm chooses its level of employment in order to maximize profits, given by $\pi_i(n) = z_i n_i^{\alpha} - w n_i$. This implies

the following familiar solution for labor demand by firm *i*:

$$n_i = (z_i)^{\frac{1}{1-\alpha}} \left(\frac{w}{\alpha}\right)^{\frac{1}{\alpha-1}}$$

Aggregating over all firms, aggregate labor demand is given by:

$$\mathrm{N} = M \left(\frac{w}{\alpha}\right)^{\frac{1}{\alpha-1}} \int z^{\frac{1}{1-\alpha}} dF(z)$$

where $\chi \equiv \int z^{\frac{1}{1-\alpha}} dF(z)$, with F is the CDF of the productivity distribution. Taking logs and differentiating (keeping idiosyncratic productivities constant), we can decompose changes in aggregate labour demand as:

$$d \ln N = \left(d \ln M + d \ln \chi + \frac{1}{\alpha - 1} ln\ w \right) \qquad (1)$$

The first two terms reflect changes in, respectively, the number of firms and their growth potential (productivity), whereas the third term captures equilibrium effects due to wage conditions.[35] Equation (1) can be understood as an aggregate labour demand curve, which is shifted by the number of firms and their growth potential. To close the model, we need to specify how labour supply is determined. We assume there is a representative household with Greenwood-Hercowitz-Huffmann preferences. Specifically, the household's level of utility is given by:

$$\mathrm{U}(C, N) = \left(C - \mu \frac{N^{1+k}}{1+k} \right)^{1-\sigma}$$

where *C* denotes consumption and $\kappa, \mu, \sigma > 0$ are preference parameters. The household chooses *C* and *N* to maximize utility, subject to a budget constraint given by $C = wN + \Pi$, where Π are aggregate firm profits. Utility maximization implies the following labour supply curve: $\mu N^{\kappa} = w$. Taking logs and differentiating gives the labour supply schedule:

$$d \ln N = \frac{1}{\kappa} ln\ w \qquad (2)$$

[34] We abstract from capital for simplicity. Augmenting the model with capital would not change any of our results.

[35] Other sources of equilibrium dampening could derive from endogenous entry and exit, which we abstract from here.

Combining the labour demand and supply schedules, Equations (1) and (2), we can solve for the equilibrium level of aggregate employment:

$$d \ln N = \psi \, (d \ln M + d \ln \chi) \qquad (3)$$

Equation (3) expresses aggregate employment (in deviation from some baseline trend) as a function of the number of firms and their growth potential. The latter two are outputs from the calculator, while $\psi = \frac{1}{1-k\varepsilon_{nw}} \in (0,1)$ is the equilibrium dampening effect, where $\varepsilon_{nw} = \frac{1}{\alpha-1}$ is the wage elasticity of labour demand and $1/k$ is the Frisch elasticity of labour supply. Based on these two parameters and the output from the calculator, we can thus compute the equilibrium change in aggregate employment from Equation (3). Using elasticities consistent with the literature and with the values adopted by the European Commission QUEST and RHOMOLO models, we set the labour supply elasticity, $1/k$, at 0.25 and the labour demand elasticity, ε_{nw}, at -0.1. These elasticities result in a dampening effect of 29%.

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