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How lockdown causes a missing generation of start-ups and jobs

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The COVID-19 lockdown will have massive and long-lasting effects on employment worldwide. Shyngys Karimov and Joep Konings developed a job simulator to estimate the impact on employment growth in Belgium. In the short-term, they expect to see significant losses of employment coming mainly from mature incumbent firms. **In the long-term, the missing generation of start-ups during the lockdown will have a significant and growing effect of slowing down the employment growth, even a decade after the lockdown.**

Under relatively mild assumptions with only a decline of GDP in the first quarter of 2020 of 3.6% and a reduction in start-ups of 50% in Q1, **private employment collapses by 23,000 jobs**, mainly due to job destruction of 20,000 in incumbent firms. However, **a decade later there is still a gap of 8,000 jobs** compared to a scenario with no drop in start-ups, indicating that the **scarring effect of a lost generation of start-ups is permanent and long-lasting**. Since some of the start-ups tend to become high growth firms, a collapse in the start-up rate reduces the probability of having those in the future.

This suggests that **post lockdown policy should target entrepreneurship and young firms**, even more than usual. Obvious measures could include a reduction of corporate taxes, government bank guarantees for young firms and start-ups, special start-up subsidies, reductions of social security contributions for start-ups hiring workers and reduced regulation affecting start-ups.

For simulating different scenario's Karimov and Konings developed a job simulator.

INTRODUCTION

On March 18th of 2020 Belgium went in lockdown to contain the pandemic, which lasted until May 4th with the restrictions being relaxed gradually in four phases until June 8th. While these extraordinary measures helped to slow down the spread of the virus and to sustain health services at an acceptable level, they obviously affected the economy. The National Bank of Belgium estimates a decline of 3.6 percent in the first quarter of 2020 in terms of GDP. On an annual basis it is expected that GDP will decline by 7 percent (European Commission)

During the lockdown most of the measures to support business and entrepreneurship went to incumbent firms, ignoring start-ups to a large extent. However, a small group of these start-ups are high-growth firms that matter for innovation, creative destruction and productivity growth in the long-run (Decker, Haltiwanger, Jarmin, & Miranda, 2017). According to the estimates of UNIZO and Graydon, the entry of new firms in April of 2020 relative to April of 2019 decreased by 50 percent. Some of these potential entrants could have grown to become big and successful firms creating hundreds of future jobs.

Even though the lockdown is ending and the restrictions are being lifted slowly, the worldwide supply chains will continue to be disrupted for a while, preventing firms from resuming business as usual, which will trigger a recession for small and open economies, such as Belgium. Pugsley & Şahin (2019) show that the survival rate and the conditional employment growth rate of incumbent firms are highly sensitive to business cycle fluctuations. Moreover, Sedláček & Sterk (2017, 2020) show that the businesses starting up during a recession are less likely to grow

even after the recession. Therefore, the employment gap generated by the lockdown could be significant and long-lasting.

We assessed the impact of the great lockdown on jobs in Belgium using machine learning to forecast the evolution of aggregate employment under various economic scenarios. We consider two cases, the baseline and the lockdown, for the period of 2020-2030. The baseline case presents a counterfactual scenario without the great lockdown and COVID-19 pandemic. The lockdown case presents reality. Looking at the differences between the lockdown and baseline cases, we isolate the impact of the great lockdown on employment in Belgium. To do this we use data on employment from the social security registration, which covers all firms with paid employment. We only focused on employment in private firms and considered full-time equivalent employment.

The forecasting results suggest that the lockdown has two types of effects on employment in Belgium. We assume a decline of the start-up rate of 50 percent in the first quarter of 2020 and 20 percent less start-ups in the second quarter. We also assume a decline in GDP of 3.6 percent in the first quarter of 2020. These assumptions are rather positive. First, **in the short-term, private firms cut employment with 23 thousand jobs (full-time equivalent), of which about 3,500 jobs are due to less start-ups..** While these losses are temporary, it **takes about five to six years to recover them**. Second, there is an important long-term effect**: the missing generation of start-ups due to the lockdown which creates an employment gap of 8 thousand jobs a decade after the lockdown**. This gap is **expected to continue growing**. As to the sectors involved, we find that the majority of lost jobs are coming from services.

Of course, alternative hypotheses on start-up rates and GDP growth rates can be used for this simulation, which is why we put a **simulation program online**.

MODEL VALIDATION

Before we can forecast anything, we need to validate the forecasting accuracy of the model. To this end, we back test the model on the period from Q1 of 2008 to Q4 of 2018. We take the actual start-up rate and the GDP growth rate as given (exogenous), and predict the survival rate and the conditional employment growth rate using machine learning and exogenous variables.

To train the models for predicting the survival and conditional growth rates we use time series cross validation. Figure 1 illustrates this cross validation strategy. We start by training the model on the early data and test its accuracy on the data one quarter ahead of the training sample. After the training, the sample gets expanded by one quarter ahead and the cycle repeats until we reach 2018Q4. The use of cross validation ensures that the models are not overfitting to the data and can be used for out-of-sample prediction.

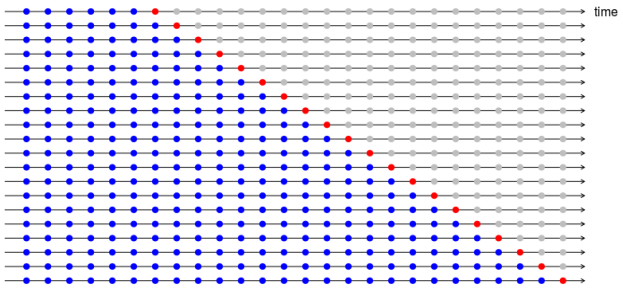

Figure 1: The cross validation strategy for training the machine learning model. The blue circles indicate the data to be used for training the model and the red circle indicates the data for testing the accuracy of the model.

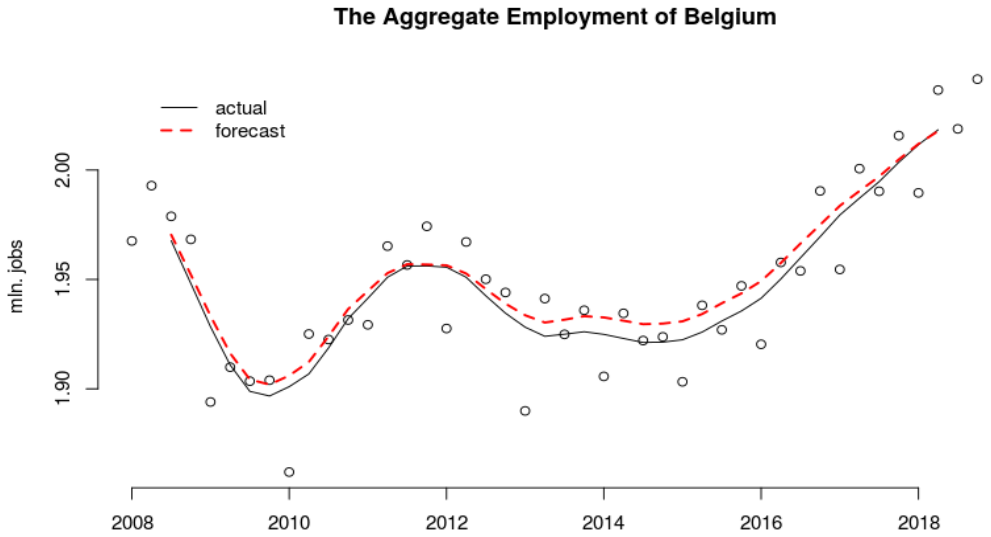

Figure 2: The actual and forecasted employment of Belgium for the period from 2008Q1 to 2018Q4. The empty circles plot the raw data. The black solid line plot the trend component of the raw data. The red dashed line plots the trend component of the forecasted employment.

To forecast the employment we start from the initial employment of 2008Q1 and compute the employment in the next quarter using the predicted values of the survival and conditional growth rates for that quarter. We repeat this cycle sequentially forecasting the employment until 2018Q4. In an ideal situation, the forecasted employment should exactly follow the actual employment.

Figure 2 plots the actual and forecasted employment. The red dashed line closely follows the black solid line confirming the high forecasting accuracy of the model. To quantify this accuracy, on average the margin of error is +/- 270 jobs. Similar accuracy is maintained within age groups and sectors. Therefore, we have established the forecasting ability of the model.

FORECASTING EMPLOYMENT

Once we establish the forecasting accuracy of the model, we use this model to estimate the impact of the lockdown on the employment of Belgium. To this end, we develop a scenario of how the start-up rate and the growth rate of GDP are affected during and after the lockdown.

The impact is modelled relative to a baseline case, as if there was no lockdown of the economy. In the baseline case we assume that the start-up rate remained at its pre-lockdown level with seasonal fluctuations. Similarly, we assume that the growth rate of GDP remained at its pre-lockdown level with seasonal fluctuations and random noise component estimated from the data. In the lockdown case we assume that the start-up rate declined by 50, 20 and 10 per-

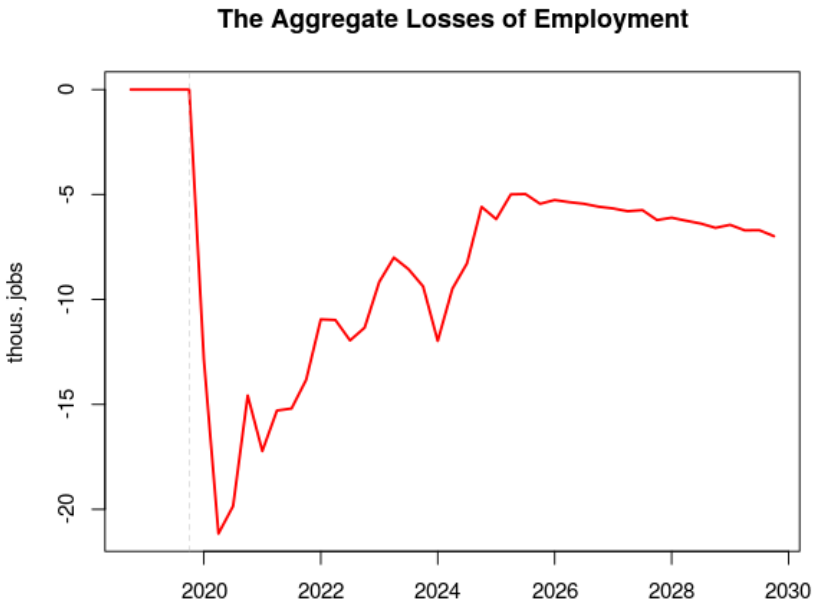

Figure 2: forecasted employment loss because of lockdown (compared to a baseline situation with no lockdown). Taking into account both lower GDP and less start-ups.

cent in Q1, Q2 and Q3 of 2020, respectively, relative to the baseline case.[1] We use the estimates of the National Bank of Belgium that the GDP of Belgium decreased by 3.6 percent in 2020Q1. The remaining GDP growth rates are left identical as in the baseline case. For both, the baseline and lockdown cases, we forecast the evolution of aggregate employment for the period from 2019Q1 to 2029Q4 and plot the difference between the two in Figure 3. We see a sharp decline in employment peaking at the end of 2020 reaching roughly around 20 thousand jobs. This gap starts to shrink with time reaching 5 thousand jobs in 2026, but starts to grow again afterwards reaching 8 thousand jobs in 2030 and seems to continue growing. The gap is growing because of the missing generation of start-ups. The impact is very persistent and gradually grows over time. To offset it, we would need much more entry after the lockdown, but given the uncertainty and restrictions in place, this is not possible for the time being.

To illustrate the role of the missing generations of start-ups, we plot in Figure 4 the same simulation under the assumptions of a decline in GDP, but in which the start-up rate of new firms remains the same. Although the total job loss in the short run is still substantial, employment reaches back its pre-crisis level already after 5 years. This is due to the resilience of incumbent firms to bounce back after the shock.

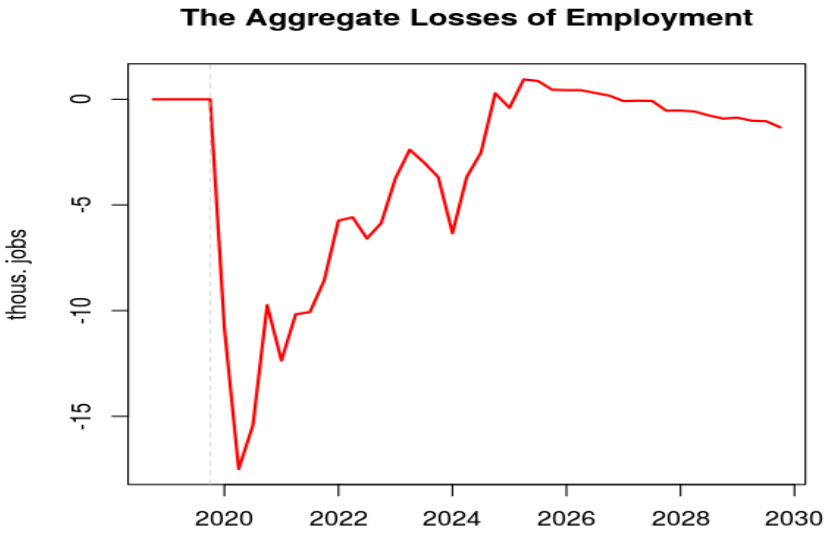

Figure 1: The forecasted employment loss because of lockdown (compared to a baseline situation with no lockdown). Taking into account both lower GDP and less start-ups.

[1] According to UNIZO, the start-up rate in April of 2020 declined by 50 percent relative to the start-up rate in April 2019.

POLICY IMPLICATIONS

It is clear that the lockdown has had a major impact on the economy, which will result in massive job losses. The size of this loss depends on how the economy rebounces and on how entrepreneurship is being affected. In the current simulation we obtain a total job loss of 23,000 in the short run, but a decade later an employment gap of 8,000 jobs remains. This is mainly due to a missing generation of start-ups having permanent effects. **Because there are less start-ups there is a lower chance of one or more (dominant) high growth firms to emerge**.

The policy implications are clear. Most of the support measures have been targeted towards supporting existing companies. While it is probably a good thing to save healthy companies, it comes at a cost of providing a soft budget constraint to inefficient companies who should have left the market under normal circumstances. Hence the process of creative destruction has been disturbed which is likely going to have an impact on productivity growth, which was already low.

Since **creative destruction is mainly driven by new start-ups and young companies, policy should not forget to target and stimulate entrepreneurship and young firms**. Obvious measures could include a reduction of corporate taxes, government bank guarantees for young firms and start-ups, special start-up subsidies, reductions of social security contributions for start-ups hiring workers and reduced regulation affecting start-ups.

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