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Bank for the Accounts of Companies Harmonized

OUTLOOK
8

Methodological notes on the economic impact of Covid-19 on European firms

(October 2020)

Abstract

Outlook #8, entitled "Methodological notes on the economic impact of Covid-19 on European firms", provides the methodological ground for the scenario analysis on the impact of the Covid-19 pandemic on European non-financial enterprises. The indicators proposed in this Outlook are based on the BACH template, and therefore are harmonized and suitable for international comparisons. Two sets of indicators are provided for this analysis. The first group corresponds to an estimate of the time firms are able to suspend their activity until incurring in losses or in risk of insolvency. These indicators allow the identification of the sectors that are more vulnerable to an activity suspension. The second group of indicators estimates the impact of the lockdown measures, for a given set of assumptions.

The BACH database provides only aggregated data, nonetheless the methodology provided also applies to individual data, if this information is available for the researchers.

Disclaimer

The BACH database is built with national samples with different characteristics and the results obtained might differ from other sources. More information regarding methodological limitations and national sample specificities can be found on the BACH website. The opinions of the authors of this document do not necessarily reflect those of the national central banks to which they belong or those of the ECCBSO.

FOREWORD

The European Committee of Central Balance-Sheet Data Offices (ECCBSO) is an informal body whose members consist of experts either from the Central Balance-Sheet Data Offices belonging to or associated with the National Central Banks of the European Community, or from National Statistical Institutes.

The Bank for the Accounts of Companies Harmonized Working Group (BACH WG) is one of ECCBSO's Working Groups. It was created within the foundation of developing and improving a European statistical database: the BACH database.

The BACH database provides comparable aggregated data (both economic and financial) based on the annual accounts of non-financial incorporated companies from European countries. Freely available, BACH includes data from 12 countries: Austria, Belgium, Czech Republic, Croatia, France, Germany, Italy, Luxembourg, Poland, Portugal, Slovakia and Spain.

We sincerely hope you can benefit from this analysis and we invite you to visit the BACH database and explore it as much as possible by making your own analysis. Do not hesitate to share your results with the BACH WG.

INTRODUCTION

The coronavirus outbreak in the end of 2019 rapidly spread around the world, leading to the adoption of containment measures in all European countries, in particular to a preventive lockdown that forced many European firms to reduce or suspend activity. By the time this Outlook was prepared, the containment measures are being progressively lifted, keeping the possibility of a new lockdown in the event of a second wave of the pandemic.

At the present moment, it is crucial for policymakers to evaluate the impact of the containment measures on firms' sustainability to prevent as much as possible a severe economic crisis after the pandemic. The BACH Working Group is in a special position to set the grounds for such an analysis, by proposing a harmonized methodology to identify the most vulnerable firms and measure the effect of public policies to mitigate the economic impact of the lockdown.

With this purpose in mind, this note proposes a set of indicators to estimate the impact of the lockdown on firms' losses and risk of insolvency, as well as the effect of public policies to protect employment, mostly through wage subsidies, which have been announced by some European governments. These indicators are based on a set of assumptions described in the methodology section, in particular concerning the activity contraction.

The BACH Database provides aggregate data to the general public. Nevertheless, the methodology proposed in this Outlook also includes indicators obtained with individual data, for those cases where researchers have access to microdata on non-financial corporations. The distribution of individual data is a valuable addition to this analysis, as aggregate figures hide firms' heterogeneity, in particular the situations of greater vulnerability. Individual data also allows the simulation of scenarios and, therefore, measure the effect of public assistance to firms and employees.

This Outlook intends to provide analysts with the methodological ground for this analysis rather than to provide concrete indicators. As the assumptions adopted may change as the situation progresses and new information is made available, the figures provided would soon be outdated. Instead, the methodology for a set of indicators that follow the BACH template for economic and financial variables is provided, allowing the BACH users to calculate these figures using the latest information available. The conclusions drawn must consider the characteristics of the BACH samples provided in the Userguide. Belgium, Croatia, Italy and Portugal have an exhaustive survey and are able to provide figures which are representative for the entire population. For the remaining countries the selected companies represent neither a complete survey, nor a statistically representative sample. For some countries, small firms and some activities are underrepresented.

1. VARIABLES AND ASSUMPTIONS

The **Bank for the Accounts of Companies Harmonized - BACH** is a database with aggregated and harmonized economic and financial information for non-financial firms from 12 European countries: Austria (AT), Belgium (BE), Croatia (HR), Czech Republic (CZ), France (FR), Germany (DE), Italy (IT), Luxembourg (LU), Poland (PL), Portugal (PT), Slovakia (SK) and Spain (ES).

The BACH Database is managed by the European Committee of Central Balance-Sheet Data Offices (ECCBSO). The ECCBSO is an informal body of experts from National Central Banks and National Statistical Institutes of Europe. Under the aegis of the ECCBSO, the BACH Working Group is responsible for maintaining and improving the BACH database.

The BACH Database is available free of charge at https://www.bach.banque-france.fr/?lang=en.

For some countries, microfirms and some activities are underrepresented. The disaggregation by NACE section and size reduces the effect of the sample composition on the results. The **BACH Userguide** available here provides a complete description of the samples.

Variables

The definitions adopted in this analysis follow the BACH methodology, described in the Userguide.

Small firms have a net turnover below €10.000.000, **medium firms** have a net turnover between €10.000.000 and €50.000.000, and firms are **large** otherwise.

Sales correspond to BACH variables I1 (Net turnover) + I41 (Operating subsidies and supplementary operating income).

Variable costs are defined as BACH variables I5 (Cost of goods sold, materials and consumables) + I6 (External supplies and services).

Fixed costs are defined as operating and interest costs except variable costs: BACH variables I7 (Staff costs) + I81 (Operating taxes and other operating expenses) + I10 (Interests on financial debt).

Operating margin corresponds to sales minus the variable costs. The operating margin, in percentage of sales, is assumed to be constant, i.e., variable costs have the same relative variation as sales.

Profit or loss is the difference between sales and variable and fixed costs as defined above.

Liquidity is defined as BACH variable A7 (cash and bank), and correspond to the liquid assets firms have available in the short-term to cover immediate expenses.

Gross value added is defined as BACH variables I1 (Net turnover) + I2 (Variation in stocks of finished goods and work in progress) + I3 (Capitalized production) + I41 (Operating subsidies and supplementary operating income) - I5 (Cost of goods sold, materials and consumables) - I6 (External supplies and services) - I81 (Operating taxes and other operating charges).

The **Sales breakeven (SB)** is the amount of sales necessary for a firm to have non-negative results, given the amount fixed costs. If sales are below this threshold, the operating margin (sales – variable costs) is not sufficient to cover the fixed costs, and thus the firm has a loss. The sales breakeven is calculated as:

$$SB = \frac{Fixed\ costs}{\frac{Sales - Variable\ costs}{Sales}}$$

Assumptions

The results obtained with this methodology are conditioned to the assumptions made on the variables, policy measures and activity drop by sector, as described below.

It should be noted that variable costs include potentially fixed costs as electricity and water supply, and fixed costs include potentially variable costs, as staff costs related to temporary workers. Though in some activities temporary employees have been dismissed, firms in general are not able to reduce the number of employees in the short-run. A scenario where staff costs are partially reduced is considered, to measure the impact of public measures to protect employment.

Financial and extraordinary income and expenses except interests are excluded from this analysis, assuming no impact of the pandemic on these variables. Income statement items with no cash-flow associated, such as amortization, depreciation and provisions, are also not considered. Taxes on profit are excluded as the expected value for this item given loss is zero. Therefore, the profit or loss considered corresponds to sales minus variable and fixed costs as defined in the previous section, which is not equivalent to the accounting net profit or loss of the period.

Firms' liquidity corresponds to the amount of cash and bank and excludes other liquid assets, as these are not identifiable for all countries in the database. The amounts of securities and debts to financial institutions to be paid in the short-run are not considered, assuming a moratoria on capital amortizations.

On the scenarios analysis, the methodology proposed allows the activity drop to differ by sector, as not all activities are affected, or are only partially affected, by the restrictions imposed. Additionally, the distribution of firms' activity during the year can be assumed linear (i.e., each month represents 1/12 of the annual activity) or varying according to the month. These assumptions significantly determine the conclusions and should be explicit when analyzing the results.

2. HOW LONG CAN FIRMS SUSPEND THEIR ACTIVITY?

The containment measures to prevent the dissemination of Covid-19 directly imposed an activity reduction or suspension for many firms. Other activities also suffered a reduction or suspension as a consequence of restrictions to the circulation of people and goods.

The activity suspension is problematic for firms because of the existence of fixed costs. Variable costs adjust to the activity flow, therefore are also reduced if the firms reduce their activity – but in the short-term, fixed costs must be supported by firms even if the activity is suspended. If the activity reduction is severe enough, firms may become insolvent as the cash inflow are insufficient to cover the fixed expenses.

This section provides some indicators of the capacity for firms to suspend activity for a certain period of time before facing losses and the risk of insolvency. These indicators may be calculated at the firm level or at an aggregate level, in this case providing the weighted mean for the firms considered in the sample.

Time with no activity until loss (TNAL)

Firms will be profitable if the operating margin (sales – variable costs) covers the fixed costs. Considering an annual time span, if firms face a period without activity, they will remain profitable as long as the operating margin is higher that the fixed costs.

The **Time with no activity until loss (TNAL)** is the number of days with no sales a firm is able to support without facing a loss at the end of the year. If a firm is forced to suspend activity for a longer period than its TNAL, then will not be able to cover the fixed costs.

To calculate the TNAL, it is necessary to know the proportion of *sales drop until loss* (SDL), which corresponds to the relative difference between the amount of sales and the sales breakeven:

$$SDL = \frac{Sales - SB}{Sales}$$

The TNAL converts the SDL in days, assuming a linear distribution of the activity during the year. It is calculated as:

$$TNAL = \begin{cases} 0 & if\ Sales - Variable\ costs - Fixed\ costs < 0 \\ 365 * SDL & otherwise \end{cases}$$

If a different assumption is considered for the activity distribution during the year, then the TNAL corresponds to the number of days from the beginning of the lockdown until the cumulated activity is equal to the SDL.

As TNAL depends on the costs' structure and the operating margins, firms will be more vulnerable to an activity suspension if fixed costs are heavier and if the operating margins are lower.

Time with no activity until financial pressure (TNAFP)

Most of the firms have a financial buffer that allows them to meet the financial obligations for some time in a situation of loss. Therefore, to know how long firms can suspend their activity, it is necessary to know the time it takes until the financial buffer is absorbed by the losses.

The **Time with no activity until financial pressure (TNAFP)** is the number of days with no sales a firm is able to support until the losses absorb all the firms' liquid assets. If the activity is suspended for a longer period than the TNAFP, the firms are in risk of insolvency.

To know the TNAFP, it is necessary to know the proportion of *sales drop until financial pressure* (SDFP), which is the sales drop firms are able to support until the firms' liquidity is consumed by the losses. It corresponds to the percentage drop in the sales to which the expected loss is equal to the liquidity:

$$-[(Sales - Variable\ costs) * (1 - SDFP) - Fixed\ costs] = Liquidity$$

Solving for SDFP:

$$SDFP = 1 - \frac{Fixed\ costs - Liquidity}{Sales - Variable\ costs}$$

The TNAFP converts the SDFP in days, assuming a linear distribution of the activity during the year. It is calculated as:

$$TNAFP = \begin{cases} 0 & if\ Sales - Variable\ costs - Fixed\ costs + Liquidity < 0 \\ 0 & if Sales - Variable\ costs < 0 \\ 0 & if Liquidity < 0 \\ 365 * \left[1 - \frac{Fixed\ costs - Liquidity}{Sales - Variable\ costs}\right] & otherwise \end{cases}$$

If a different assumption is considered for the activity distribution during the year, then the TNAFP corresponds to the number of days from the beginning of the lockdown until the cumulated activity is equal to the SDFP.

The TNAFP depends on the TNAL (and, as a consequence, depends on the share of fixed costs and the operating margins), but also on the cash and bank deposits held by the firms. Firms are more vulnerable if the TNAL is lower or if the financial buffer is lower.

3. HOW MANY FIRMS, EMPLOYEES AND GVA ARE AT RISK IN THE CURRENT SITUATION?

The previous section analyses how long can firms sustain without activity, keeping all the conditions unchanged, namely the fixed costs.

Nevertheless, different activity drops are expected by economic activity, as most activities were affected by the restrictions to the circulation of people and goods, but did not completely suspended activity. In particular, services to the population (such as electricity and water supply and communication services) and "working at home" activities (as consulting and other technical activities) were still being performed. Therefore, a distinctive activity drop by sector is a more realistic approach to estimate the impact of the lockdown.

In a simplistic approach, activity may be considered linear during the year. Alternatively, it may be considered the share of each calendar month in the annual activity, if that information is available.

The first part of this section provides the impact of the lockdown on the gross value added. This indicator may be calculated at the firm level or at the aggregate level. In the second part of this section, the indicators provided are calculated at the firm level, and provide the proportion of firms at risk of

insolvency. In the base scenario, only the activity drop by sector is considered, keeping all fixed costs unchanged. An alternative scenario is also defined, as public measures have been announced to grant liquidity to firms, these measures and the amounts involved diverging from country to country. Given the importance of staff costs in firms' expenses structure and the role on employment protection, the wage subsidies, which were adopted by most of the countries, are also analyzed in the end of this section.

Expected impact on gross value added

Using aggregated data, this section proposes the methodology to estimate the impact of the lockdown on the firms' gross value added (GVA), assuming sector-specific activity drops. For this purpose, all BACH items considered in the GVA formula (as provided in Section 2) are assumed to drop in the same proportion as the sectorial activity, except I81 – Operating taxes and other operating income, which is considered fixed.

The expected impact on the GVA for a given duration of the lockdown corresponds to the difference between the GVA and the expected GVA assuming the corresponding activity drop:

$$Expected\ impact\ (GVA) = GVA - \left[(I1 + I2 + I3 + I41 - I5 - I6)\left(1 - activity\ drop * \frac{nr\ days}{365}\right) - I81\right]$$

Where I1, I2, I3, I41, I5, I6 and I81 are BACH items as defined in the previous section and in the BACH Userguide. This scenario assumes a linear distribution of the firms' activity during the year. If other assumptions are made concerning the distribution of the activity per month, then the proportion $nr\ days/365$ must be replaced by the proportion of activity lost during the lockdown.

Firms at risk of insolvency

Using microdata that users may have available, this section provides the methodology for a simulation of the firms at risk of insolvency for a given duration of the lockdown (variable $nr\ days$) . These firms are the ones whose losses that arise from the drop of activity due to the lockdown absorb all the cash and bank deposits.

In the **base scenario**, only an activity drop is considered, keeping all other variables unchanged. Firms at risk of insolvency are the ones that meet the condition:

$$(Sales - variable\ costs) * \left(1 - activity\ drop * \frac{nr\ days}{365}\right) - fixed\ costs + liquidity \leq 0$$

Where the number of days correspond to the duration of the lockdown. This scenario assumes a linear distribution of the firms' activity during the year. If other assumptions are made concerning the distribution of the activity per month, then the proportion $nr\ days/365$ must be replaced by the proportion of activity lost during the lockdown.

The **proportion of firms at risk of insolvency** for a given number of days of lockdown corresponds to the number of firms that fulfill the condition above in percentage of the total number of firms in the sample.

The **proportion of employees at risk** for a given number of days of lockdown corresponds to the number of employees working in the firms at risk of insolvency in percentage of the total number of employees in the sample.

The **proportion of gross value added at risk** for a given number of days of lockdown corresponds to the gross value added generated by the firms at risk of insolvency in percentage of the total gross value added in the sample.

It is also considered a **scenario where staff costs are partially reduced**. In some countries, specific measures to protect firms and employees allowed a reduction of staff costs for firms, as these costs were subsidized. In this exercise, it is considered a reduction of staff costs per worker without activity, which means the reduction is applied in the same proportion as the activity drop: for activities with 50% drop, only half of labor costs are potentially reduced. In this scenario, firms at risk of insolvency are the ones that meet the condition:

$$Op.margin * \left(1 - act.drop * \frac{nrdays}{365}\right) - staffcosts * \left(1 - act.drop * \frac{nrdays}{365} * wage\ subs.\right) - otherfix.costs + liq. \leq 0$$

Where the operating margin is the amount of sales minus the variable costs and the wage subsidies is the proportion of staff costs that is reduced with the public measures to protect employment. As in the base scenario, the number of days correspond to the duration of the lockdown. This scenario assumes a linear distribution of the firms' activity during the year. If other assumptions are made concerning the distribution of the activity per month, then the proportion $nr\ days/365$ must be replaced by the proportion of activity lost during the lockdown.

Scenarios on the impact of Covid-19 on European firms – April 2020

The BACH Working Group performed an analysis of the impact of Covid-19 on European firms, using the BACH Database available on April 2020. For some countries, microdata was available to calculate the individual distributions for some indicators. The microdata used in this analysis excluded firms with fixed costs below 1.000€, to avoid anomalous results, along with firms with missing data for the variables considered in this note. Also, firm's activity was assumed to be linear, each month representing 1/12 of the annual activity. For the simulation of the lockdown scenarios, it was assumed a **15% activity drop** for NACE sections A (Agriculture, forestry and fishing), B (Mining and quarrying), D (Electricity, gas, steam and air conditioning supply), J (Information and communication) and P (Education). It was assumed a **40% activity drop** for NACE sections C (Manufacturing), E (Water supply; sewerage, waste management), F (Construction), M (Professional, scientific and technical), N (Administrative and support service) and Q (Human health and social work). It was assumed a **70% activity drop** in NACE Sections G (Wholesale and retail trade; repair of motor vehicles), I (Accommodation and food service), H (Transportation and storage), L (Real estate) and S (Other services). NACE Section R (Arts, entertainment and recreation) was assumed to have a **100% activity drop**.

The results obtained in this analysis show that in most of the countries **firms will face losses after 100 to 120 days (3 to 4 months) of inactivity**, on average, but have a liquidity buffer available that allows them to hold for longer periods without being insolvent. Estimates point that **firms are able to hold around 220 to 300 days of inactivity (7 to 10 months) before insolvency**, on average.

Nevertheless, the aggregate figures may not representative of all firms, as most of the firms are not able to maintain losses without being insolvent for such long periods. Using the individual data available, **the median firm in the countries analyzed will face losses after 1 to 3 months of inactivity and become insolvent after 4 to 5 months of inactivity**. Small firms and some activities, such as Accommodation and food services and Manufacturing, are more vulnerable to activity suspensions.

The simulation of the lockdown scenario shows an estimated **4% drop in the firms' gross value added by month of lockdown**. The proportion of **firms at risk in the first month of lockdown is expected to increase by 1pp to 4pp**. These firms represent 3pp to 10pp of non-financial firms' employees. If the lockdown has a duration of 3 months, firms at risk of insolvency represent up to 31% of all firms and up to 38% of the employment.

If wages are subsidized by 60% per worker without activity, the increase in the proportion of firms and employees at risk is reduced at least by half, for all times of duration of the lockdown. The impact of wage subsidies by sector differs from country to country, but in general small firms benefit more from the subsidies. Rescued firms have on average less employees and generate less gross value added than the remaining firms at risk.

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