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COVID-19 PANDEMIC AND SMES REVENUES IN IRELAND: WHAT'S THE GAP?

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ABSTRACT

The COVID-19 economic crisis has caused an unprecedented economic shock for the Irish SME sector. In this paper, we assess the financial resilience of Irish SMEs and explore the extent to which they have faced revenue shortfalls (where revenue falls below expenditure on a monthly basis) since the onset of the COVID-19 pandemic. We also undertake a forward-looking exercise which attempts to quantify SME revenue shortfalls to the end of 2020 under three scenarios. We found that between two-in-five micro firms and one-in-two small/medium-sized firms faced a revenue shortfall from March to June 2020. This accounted for a revenue shortfall of between €6 billion and €10 billion for the period. If firms' own cash resources bridge the gap, then between €2.2 billion and €4.3 billion remains unaccounted for. Looking forward to the end of 2020, scenario estimates for the gap are between €8 billion and €15 billion, depending on the epidemiological situation. Own fund usage can reduce this to between €4 billion and €8 billion, depending on the scenario.

1. INTRODUCTION

The COVID-19 pandemic represents the most severe economic shock to the Irish economy in living memory. The speed and scale of the disruption to economic and social life are outside any experience bar wartime. While dealing with the health implications of the pandemic was the highest priority, the economic cost of the restrictions is substantial. An early estimate of the potential scale of the shock forecast for 2020 is provided by McQuinn et al. (2020), who suggest the economy could contract by between 9 and 17 per cent depending on the epidemiological situation with respect to COVID-19.

The outlook for the economy as it exits the initial lockdown phase depends on continued suppression of the virus, which gives rise to considerable uncertainty on the scale of the economic impact and the necessary policy interventions.

[1] This work is part of a joint research programme on Taxation, the Macroeconomy and Banking between the ESRI, Department of Finance and Revenue Commissioners. We would like to thank everyone involved in the programme for helpful comments. In particular we would like to thank Eric Gargan, John Palmer and Fergal McCann for insightful comments. We would also like to thank the CSO and Chambers Ireland for provision of data. The views are those of the authors and not of the participating institutions.

With these uncertainties in mind, this paper attempts to estimate the scale of the revenue losses and liquidity shortfalls of the Irish small and medium enterprise (SME) sector. We do this both for the period of the stringent restrictions throughout the second quarter of 2020 and also across several outlook scenarios for the rest of the year.

The SME sector makes up the vast majority of firms operating in Ireland and employs over one million people (68.4 per cent of total employment) according to the CSO (2019). While much of the prospects for the sector over the coming months depend very much on epidemiological developments and the scale of the economic shock, the resilience of individual firms and the SME sector as a whole also depends on the financial position entering the crisis.

The paper therefore begins with a description of the performance of the SME sector before it entered the crisis period. To do this, we used detailed survey data on profitability, indebtedness, cash holdings and payment arrears across firms to gauge their potential resilience or vulnerability to a severe shock to their revenues. We particularly focused on the relationship between expenditure and turnover across SMEs and how much capacity did SMEs have to absorb shocks through their build-up of internal funds before the crisis hit. Following the description of the SME sector's performance entering the crisis, we calculated the potential impact in terms of revenue shortfalls over the lockdown period in the second quarter of 2020. We combined estimates of the range of turnover reductions from surveys carried out by the CSO and by Chambers Ireland with expenditure reductions coming from support schemes such as an illustrative wage subsidy (like the Temporary Wage Subsidy Scheme (TWSS) or the Employee Wage Subsidy Scheme (EWSS) which replaced it in July 2020) and reductions in other input costs. It must be noted that we did not try and directly model either of these exact wage subsidies in operation, as we do not have employee level data which would allow us to do a microsimulation exercise. Instead, we used an illustrative subsidy that is based on the average earnings per employee at the firm. We used this survey evidence on the extent of turnover and expenditure reductions to calibrate a number of scenarios for our detailed firm dataset. This allowed us to examine how widespread revenue gaps were across firms and how these compared to the reserves that firms had in place to cope with a negative shock. We also aggregated across firms to build up a total estimate of the revenue shortfall for the SME sector as a whole – both including and excluding the sector's own internal funds resources. The combination of granular data on cash holdings and the up-to-date input of turnover and expenditure shocks from the CSO allowed us to extend earlier work on liquidity for SMEs in the COVID-19 period (McGeever et al., 2020).

The estimates for the revenue shortfalls over the lockdown period have been extended to cover the full year 2020 under a range of different scenarios. Our central scenario is a gradual return to normal turnover for most firms by the end of the year with some ongoing public health measures (like physical distancing) continuing. A more optimistic scenario is for a rapid improvement in turnover throughout the third quarter, and a more pessimistic scenario has restrictions in place and has turnover improve somewhat in the third quarter of 2020 – but then stay at this level for the final quarter as well, although without returning to a full lockdown. These scenarios were used to calibrate the financial evolution of firms in the SME survey and results were then aggregated to give an overall indication of the range of potential shortfalls and the capacity of firms to survive them.

The results are subject to considerable uncertainty, particularly in the case of the forward-looking scenarios which depend to a large extent on health developments and the control of the pandemic. Our key results suggest that between 40-55 per cent of micro enterprises experienced a revenue shortfall for three months to mid-June 2020. The median revenue gap per month for these firms was between €3,000-€3,500. For small/medium-sized firms, between 43-60 per cent of these firms faced a revenue gap with a median size ranging from €30,000 to €40,000 per month. Approximately one-in three micro firms, and two-in-five small/medium-sized firms, did not have sufficient own resources to cover the three-month revenue gaps.

Our next step was to aggregate these figures to provide estimates of the revenue gap for those firms who experienced a loss. It must be clearly noted at the outset that such a process is complicated using survey data and can lead to considerable uncertainty around any point estimate. Furthermore, our revenue gaps only relate to SMEs with a turnover less than €50 million due to the survey design. Our estimates would probably underestimate the gap (potentially by some margin) if larger medium-sized firms were to be included. Aggregating our figures for the revenue gap provides an estimate of between €6 billion and €10 billion as a result of the pandemic for the second quarter of 2020. Some of this can be covered by SMEs' existing internal resources but, even assuming a full running down of SME cash resources, a revenue shortfall of between €2.2 billion and €4.3 billion remains. This is not to say that having SMEs use all internal funds in this way is desirable, particularly as it would have knock-on implications for their ability to invest and grow in any recovery phase, but it does show that some absorptive capacity existed within the sector prior to the shock.

The range of estimates for the full year effect is much wider given the importance of the health developments in determining the recovery path. In our base scenario,

assuming a steady recovery over the second half of the year, the shortfall in SME liquidity is between €8.1 billion and €12.3 billion, however this declines to between €3.9 billion and €6.7 billion if SMEs use their own reserves fully. In an optimistic scenario of a more rapid return to near normal turnover levels, this revenue gap is between €7.4 billion and €10.7 billion (when accounting for own resources the figures are between €3.6 billion and €5.7 billion). A slower recovery would increase the shortfall considerably to between €9.5 billion and €14.9 billion. Depending on the scenario, the gaps are approximately €4.8 billion and €8.25 billion when accounting for own funds, as firms have to bridge a longer period of low turnover, and as any internal resources that helped to cushion the initial impact are run down.

It should be noted that the estimates of gaps or shortfalls presented in this paper should not be seen as the required level of government support. Rather, they are estimates of the revenue gaps that firms will face under various economic scenarios. There is a very large range of options which can be drawn upon to bridge these gaps including the cash reserves that firms have on their balance sheet, drawdowns of existing loans, new lending from the private sector etc. Furthermore, if the economic shock persists many companies may not survive, and company closure will be one economic adjustment mechanism for firms with revenue gaps. State support (be it guarantees on loans, grants or equity transfers) will all be considerably important but will not on their own fully bridge the gaps suggested in this paper. Indeed, a large range of state supports have already been introduced, such as the enhanced credit guarantee scheme, lending facilities through the SBCI and a range of restart grants. These policies can act to address firms who have a revenue shortfall. However, the optimal policy response to the current crisis is beyond the scope of this paper but requires considerable detailed research and analysis over the coming months.

The rest of the document is structured as follows: Section 2 presents the financial position of SMEs prior to the pandemic; Section 3 outlines our estimates of the scale of the shock and liquidity gap; Section 4 attempts to provide an aggregation of the firm level gaps; Section 5 presents forward looking estimates out to the end of 2020, while Section 6 concludes.

2. FINANCIAL POSITION OF SMES PRIOR TO THE PANDEMIC

This section documents the structure of the SME sector and its financial position before the shock of the COVID-19 pandemic hit. The primary data source we used for the analysis of SMEs in this paper is the Credit Demand Survey (CDS), carried out twice a year by the Department of Finance. The survey is documented in detail in Gargan et al. (2018) and Martinez-Cillero et al. (forthcoming). It contains a wide

range of financial and credit indicators, which we briefly overview here. Table 1 shows averages of selected indicators of the financial situation of SMEs in Ireland in 2018, the latest year for which data are available in the CDS. We display this information by size[2] and sector categories. The chosen indicators show that 46 per cent of SMEs hold some external debt and, of these firms with debt, the average ratio of debt-to-turnover is 16 per cent. The share of firms with debt is quite noticeably higher amongst medium firms than micro and small firms, which may indicate that it is easier for firms to access finance once they reach a certain scale or that debt financing has played a role in investing to expand operations. The extent of the debt held as a percentage of turnover is also larger for the medium-sized firms. Across sectors, the share of firms with debt is highest in hotels and restaurants and manufacturing.

Seven-in-ten firms made a profit, a share that is slightly higher amongst small and medium firms relative to micro firms but not substantially so. The percentage of profitable SMEs is slightly lower for the sub-sample of firms which have debt. The ratio of debt-to-turnover is steady across most sectors with the exception of hotels and restaurants where the ratio is considerably higher than average at 42 per cent. The share of firms making a profit is lowest in this sector at 58 per cent and the share of firms that have missed a payment on debts is highest. This is a serious concern in the context of vulnerability to the COVID-19 shock as the hospitality sector has been subject to the most stringent restrictions and is likely to have to deal with limitations on activity due to social distancing requirements for the longest. On the demand side, households are also likely to be more restrained in their activity to engage with this sector while the threat of infection continues to remain in the community.

[2] Throughout this report, size categories are defined in terms of number of employees. *Micro* firms employ between 0-9 people, *Small* firms employ between 10-49 people, and *Medium* firms employ between 50-249 people.

TABLE 1 AVERAGE FINANCIAL INDICATORS BY FIRM CATEGORY

	% Firms with Debt	% Debt/ Turnover	% Firms, Made Profit	% Firms with Debt, Made Profit	% Firms, Missed Repayment
Total	46.0	15.6	69.4	67.6	4.5
Size categories					
Micro	40.8	14.0	65.5	60.8	6.3
Small	46.7	14.1	71.6	68.1	3.4
Medium	55.9	25.7	72.5	77.1	3.0
Sector categories					
Manufacturing	50.8	12.5	68.4	63.1	4.6
Construction & Real estate	42.9	12.5	60.3	59.1	3.7
Wholesale & Retail	45.6	12.4	71.3	68.8	5.1
Hotels & Restaurants	54.1	41.6	58.3	56.1	6.1
Professional, Scientific and Technical	42.5	13.5	77.3	76.6	4.8
Other	43.4	22.2	72.9	74.8	2.3

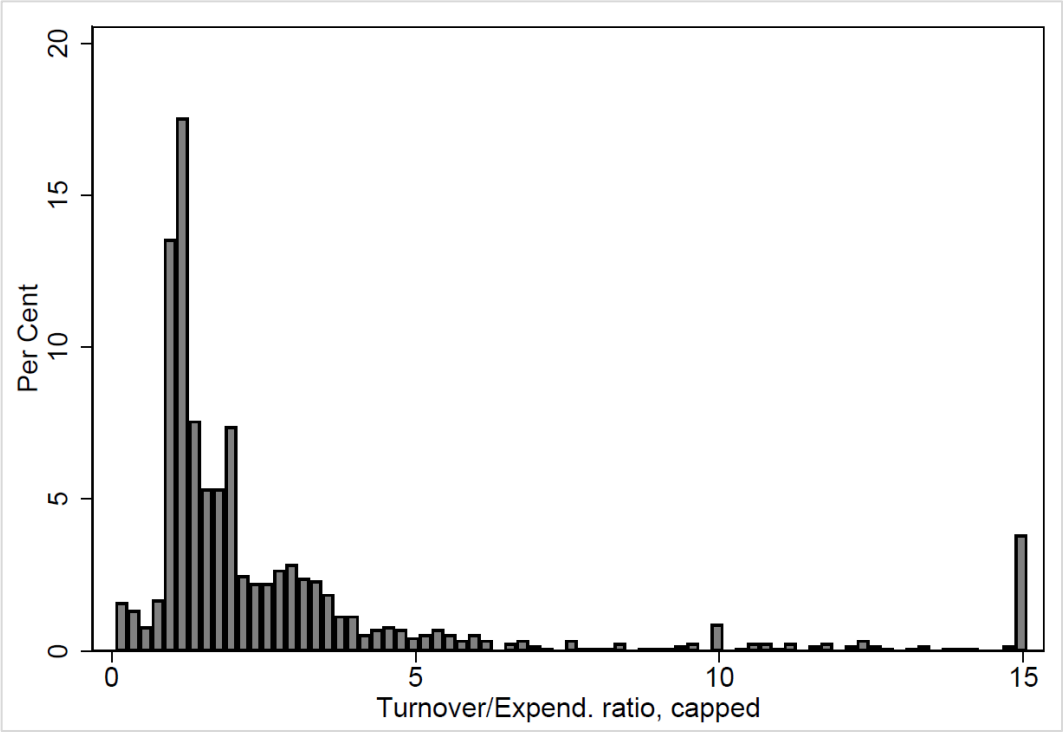
Source: Authors' analysis of Department of Finance Survey Data.
Note: The Debt/Turnover ratio distribution is capped at 5. The mean Debt/Turnover ratio is calculated using only firms with debt. Debt numbers include those whose debt has been imputed and therefore can differ to previous (or different metrics) estimated using this specific survey. For more information please contact the authors for clarification.

We next looked at the relationship between expenditure and turnover across SMEs and how much capacity SMEs have available to absorb shocks in terms of internal funds.[3] In order to explore the relation between annual turnover and annual expenditure we built a ratio as *total annual turnover/total annual expenditure*. An additional ratio built as the share of *total annual cash and cash equivalents to total annual expenditure* was also computed. The latter ratio indicates the overall capacity of SMEs to deal with potential income shocks by covering their annual expenditure using their available cash reserves alone.

The histograms in Figure 1 and Figure 2 show the total distribution of each ratio while the subsequent tables show the medians across firm groups. The histograms show that both ratios are extremely skewed, which is why the median is used in the tables following as the better representation of the standard firm experience. However, in later aggregations, we switched to using means to capture the fact that large revenue and liquidity gaps, even in a small number of firms, affect the overall sector requirements.

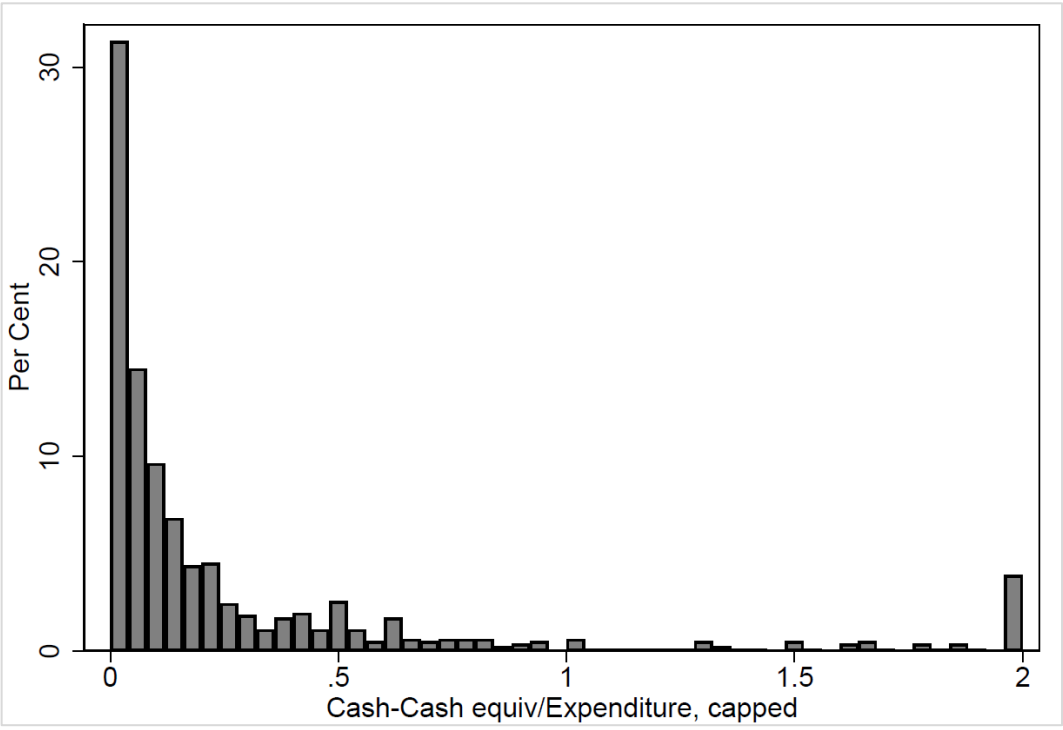
[3] Outliers have been removed in all continuous variables used to obtain the statistics presented (i.e. turnover, debt, cash and cash equivalents and expenditure). Observations are considered an outlier if they are above of the upper/lower 1 per cent of the distributions.

FIGURE 1 RATIO OF TURNOVER TO EXPENDITURE



Source: Authors' analysis of Department of Finance Survey Data.
Note: Upper end of the distribution is capped at 15. Bin width is 0.2.

FIGURE 2 RATIO OF CASH AND CASH EQUIVALENTS TO EXPENDITURE



Source: Authors' analysis of Department of Finance Survey Data.
Note: Upper end of the distribution is capped at 2. Bin width is 0.4.

The median values of the *total annual turnover/total annual expenditure* and *total annual cash and cash equivalents-to-total annual expenditure* ratios are presented in Table 2 and Table 3 respectively. Table 2 also includes the percentage of firms for which annual turnover was higher than annual expenditure in 2018, the most recent year of available data. Turnover was 60 per cent higher than expenditure for the SME sector overall and approximately 90 per cent of firms had turnover greater than expenditure. The difference in this ratio between firms with debt and those without debt is fairly modest, with firms with no debt having a slightly higher ratio of turnover to expenditure but also being slightly more likely to have turnover not exceeding expenditure. Across firm sizes, micro firms have greater ratios of turnover to expenditure and are also marginally more likely to have turnover exceed expenditure.

TABLE 2 MEDIAN TURNOVER/EXPENDITURE RATIO, BY CATEGORIES

	Turnover/Annual Expenditure			% Firms Turnover > Expenditure		
	All	Debt	No debt	All	Debt	No debt
Total	1.59	1.56	1.65	89.9	92.5	88.5
Size categories						
Micro	1.88	1.75	2.00	91.4	93.6	90.2
Small	1.45	1.45	1.50	88.7	90.9	87.4
Medium	1.33	1.36	1.25	88.9	93.4	84.3
Sector categories						
Manufacturing	1.50	1.56	1.33	84.3	79.9	88.8
Construction & Real estate	1.67	1.43	1.87	93.6	96.4	92.7
Wholesale & Retail	1.79	1.75	2.00	90.2	96.1	87.6
Hotels & Restaurants	1.80	1.83	1.79	92.1	93.4	89.8
Prof. & Scientific & Technical	1.52	1.45	1.80	91.8	94.0	90.6
Other	1.33	1.38	1.33	87.6	92.3	83.9

Source: Authors' analysis of Department of Finance Survey Data.
Note: The upper end of the distributions of the Turnover/Annual expenditure ratio is capped at 15.

A key indicator of financial resilience that we used to indicate ability to absorb shocks was the extent of cash and cash equivalents held by SMEs. Table 3 shows how much cash SMEs hold relative to their annual expenditure. The median firm holds enough cash or equivalent to cover 10 per cent of their annual expenditure. Firms with outstanding debt understandably hold less in cash reserves, at 6 per cent of annual expenditure compared to 18 per cent for firms without debt to be serviced. Micro firms tend to hold greater cash (which may be a reflection of their more limited access to external financing) than small and medium firms. In contrast to their higher levels of vulnerability shown in the earlier tables, the hotel and

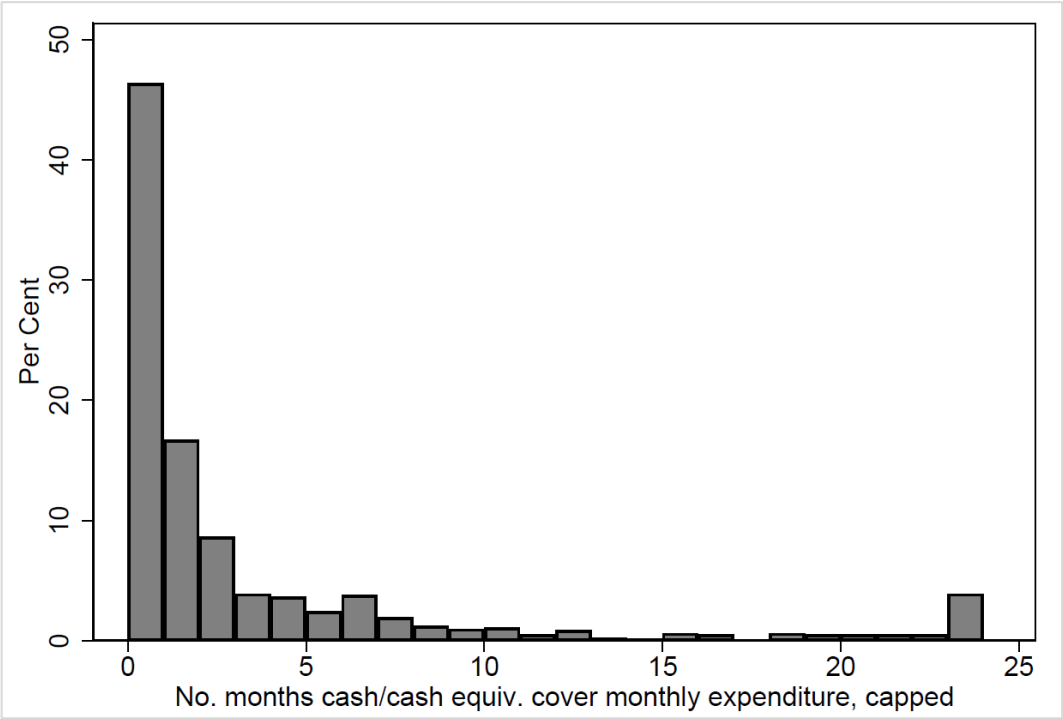
restaurant sector does have a more substantive buffer of cash and cash equivalents relative to turnover than most other sectors.

TABLE 3 MEDIAN CASH/EXPENDITURE RATIO, BY CATEGORY

	Cash-Cash equiv./Annual expenditure		
	All	**Debt**	**No debt**
Total	0.10	0.06	0.18
Size categories			
Micro	0.13	0.07	0.22
Small	0.10	0.06	0.18
Medium	0.10	0.06	0.15
Sector categories			
Manufacturing	0.10	0.06	0.13
Construction & Real estate	0.10	0.06	0.12
Wholesale & Retail	0.09	0.05	0.18
Hotels & Restaurants	0.14	0.06	0.42
Prof. & Scientific & Technical	0.15	0.10	0.22
Other	0.07	0.05	0.13

Source: Authors' analysis of Department of Finance Survey Data.
Note: The upper end of the distribution of the Cash-Cash equivalent/Annual expenditure ratio is capped at 2.

FIGURE 3 NUMBER OF MONTHS THAT CASH AND CASH EQUIVALENTS CAN COVER EXPENDITURE



Source: Authors' analysis of Department of Finance Survey Data.
Note: Bin width is 1. Capped at 24 months.

Another way of representing the shock absorption capacity of firms, in a more tangible sense, is to calculate the number of months that the cash reserves of a firm can cover their regular expenses. This is done by dividing the cash and cash equivalent amount by average monthly expenditure.[4] The total distribution of the number of months is displayed in the histogram in Figure 3, again showing a very strong level of skewedness across firms. The percentage of firms that do not have enough cash reserves to cover even a month of their monthly expenditures in 2018 is shown in Table 4. This table also provides the percentage of SMEs that reported having zero cash reserves. Close to half of SMEs have cash reserves that fall short of a single month's average expenditure. Unsurprisingly, the median number of months cash that SMEs have which can cover monthly total expenditure is just above one. In addition, 4 per cent report no cash reserves available at all. Medium firms have slightly less cash cushions than smaller firms relative to their expenditure levels.

TABLE 4 MEASURES OF CASH RESERVES, TOTAL AND BY CATEGORY

	% Firms, Cover <1 Month Expenditure	% Firms, Zero Cash	No. Months Cash can Cover Expenditure (Median)
Total	45.4	4.1	1.25
Size categories			
Micro	42.6	4.6	1.50
Small	46.6	4.9	1.20
Medium	48.7	1.6	1.15
Sector categories			
Manufacturing	49.3	6.6	1.15
Construction & Real estate	47.8	4.5	1.17
Wholesale & Retail	47.4	3.1	1.08
Hotels & Restaurants	35.3	2.0	1.71
Prof. & Scientific & Technical	34.1	5.0	1.75
Other	54.8	4.5	0.80

Source: Authors' analysis of Department of Finance Survey Data.

3. ESTIMATING THE EXTENT OF THE SHOCK AND REVENUE SHORTFALLS

Having provided an overview of the health of SME finances entering the current crisis, this section examines the extent of the shock and how it might impact firms. In particular, our aim is to give an estimate of the typical revenue shortfall or gap firms may be facing and the size of this on an aggregate scale. We define revenue shortfall (gap) as the case whereby revenues drop below required expenditure on

[4] To obtain monthly expenditure we divided total annual expenditure provided in the CDS by 12. We recognised that this even annual assumption will not be reflective of the seasonality of many SMEs' actual activity.

a monthly basis during the pandemic.[5] We therefore structured our scenarios to calculate how many firms have revenue fall below expenditure in each shock scenario and how much of this shortfall can be covered with their existing cash resources. From a policy perspective, we were also interested in how these aggregate across the entire SME sector, although the idiosyncratic nature of firm exposure and vulnerability along with the skewed distribution of SME financial structures demonstrated in the previous section gives considerable uncertainty bands around any aggregate values.

In order to test how SMEs in our survey data would react to the extent of the shock posed by COVID-19, we set up a basic simulation exercise. In this section, we focused on the 'lockdown' period and presented estimates for the second quarter of 2020 (running from mid-March to mid-June in our simulation), which we calibrated using two different surveys of firms' experiences. We then looked at extending the simulation to cover a range of scenarios for the economy over the second half of 2020.

Our overall strategy was to take the SME structure and financial position from the 2018 survey return and subject them to the following simulated shocks and then examine how this affected the financial position of the firms in the survey. The steps are summarised here and are described in more detail in the rest of the section:

1. Applied a turnover shock to firms calibrated by survey evidence from the CSO and Chambers Ireland. Shocks differ across sectors but were applied randomly across firms within a sector.
2. Applied a reduction to personnel costs to firms utilising a wage subsidy scheme (such as the TWSS/EWSS). We used CSO data on how many firms used the TWSS scheme and calculated firm-level usage based on employment levels collected in the CDS survey and other CSO data on the share of personnel to total costs in SMEs, in order to apply the relevant salary thresholds.
3. Applied a reduction in non-personnel expenditure based on CSO survey responses to questions on non-personnel expenditure changes due to COVID-19 reductions in activity.[6]

[5] Expenditure in this case is both fixed and variable expenditure and we allow this to decline (as well as revenue adjustments) in line with the falls in expenditure for both non-personnel and personnel costs as outlined in the recent CSO survey. While we do not specifically model issues like loan repayment breaks or rate deferments, if such items are part of the firm's reported expenditure in the survey, we allow these to change in line with how firms report their non-personnel expenditure has changed since the pandemic began.

[6] An important limitation of this analysis was that we could not distinguish between permanent expenditure foregone (because the business was not operating and did not need to use intermediate inputs for example), and expenditure reductions that are delayed (such as debt payment breaks) that firms will need to repay later.

4. Calculated how many firms these shocks applied to, how many had turnover fall below expenditure and how large this gap was for the median and mean firms.
5. Provided an illustrative example by multiplying by the total number of firms from the CSO business demography data, to aggregate the average revenue shortfall to a SME total estimate for the whole economy.

Turnover shock simulation:

The first step was to simulate reductions in firm 2018 turnover reported in the CDS. We used two different sources to do this, the first based on the results of the Business Impact of COVID-19 Survey, carried out by the CSO,[7] and a second version based on adapting the CSO results to take into account a survey by Chambers Ireland of their members' experience. We drew on the CSO survey as our baseline dataset as it was the most comprehensive survey conducted to date and is repeated for each month April, May and June providing both reductions in turnover and expenditure by sector. This allowed us to create a shock for the three months April-June which is the average of the reported shocks.

The reason for using the Chambers Ireland survey was that the CSO noted their estimates are likely to be affected by sample selection, whereby firms that were closed during the lockdown may not have answered the survey. This, therefore, would make their scenario more benign than was the case. The Chambers Ireland survey data for April showed a more extreme shock than the CSO's and we used these relativities to adjust the sample for a more severe scenario, as it is likely that a more extreme shock would capture firms who were closed.

Table 5 displays the results on the percentages of SMEs that reported their expected impact of COVID-19 restrictions on turnover averaged over the relevant CSO survey waves and varying by broad sector. As the survey requested firms to indicate bands of turnover reduction, we based the simulations on the midpoint percentage of each turnover bracket (as displayed in column 2). We allocated the turnover reductions randomly across the firms in the survey by sector. There were no data to date to ascertain which firms in the sectors had been most affected. This means that 13 per cent of firms in industry were randomly chosen to have a turnover reduction of 87.5 per cent for example.

Table 6 gives a similar picture for the response when CSO data are adjusted downwards by the relatively more negative survey responses from the Chambers Ireland data. We found that the worst affected sector in terms of turnover

[7] https://www.cso.ie/en/releasesandpublications/er/bic19/businessimpactofcovid-19survey16marchto19april2020.

reduction was in accommodation and food, where the most stringent lockdown restrictions applied. Construction was also particularly heavily affected. For other sectors, the extent of the reduction in turnover was extensive but more varied across the percentage bands with only accommodation and food having all firms lose turnover. Other sectors, while encountering many substantial reductions in activity, still show some firms with normal levels of turnover and in some cases with turnover increases. This is particularly the case for the wholesale and retail trade where some of the loss of the accommodation and food sector demand is likely to have been deflected to.

TABLE 5 BASELINE SCENARIO USING CSO SURVEY OF IMPACT OF COVID-19 MEASURES ON SMES TURNOVER, BY SECTOR (Q2, 2020), PERCENTAGE OF RESPONDING ENTERPRISES

Survey bands of reduced turnover	Simulated reduction %	Industry	Construct.	Wholesale & Retail	Accom. & Food	Other
75-100% < normal	87.5	13	41	18	79	20
50-74% < normal	62.5	16	19	16	15	10
25-49% < normal	37.5	26	21	21	6	17
10-24% < normal	17.0	17	10	11	0	19
Normal turnover		21	9	17	0	29
More than normal		7	0	17	0	5

Source: CSO data provided to authors for shares across sectors.

TABLE 6 MORE SEVERE SCENARIO ADJUSTING CSO DATA IN LINE WITH – CSO ADJUSTED SURVEY OF IMPACT OF COVID-19 MEASURES ON SMES TURNOVER, BY NACE SECTOR (Q2 2020), PERCENTAGE OF RESPONDING ENTERPRISES

Survey bands of reduced turnover	Simulated reduction %	Industry	Construct.	Wholesale & Retail	Accom. & Food	Other
75-100% < normal	87.5	22	50	27	87	29
50-74% < normal	62.5	32	35	32	13	27
25-49% < normal	37.5	24	15	18	0	14
10-24% < normal	17.0	13	0	7	0	14
Normal turnover		7	0	3	0	15
More than normal		2	0	13	0	1

Source: Authors' analysis using CSO and Chambers Ireland data. The Chambers Ireland data are only used to re-allocate the CSO data i.e. the Chambers Ireland data show a larger shock than the CSO. All CSO figures are then grossed down by these factors in aggregate while the sectoral relativities are held constant.

Expenditure reductions

Striking demand reductions are evident across all sectors in the previous tables, reflecting the dramatic extent of the shock across all types of firm. To estimate how firms were able to absorb (or not) this level of turnover reduction, we allowed for a calculation of a fall in expenditure during this period. We applied various expenditure falls which varied for personnel and non-personnel costs. Although

the CDS has overall expenditure data per firm, it does not have information on the types of expenditure (e.g. labour cost, materials, purchases, rent, mortgage etc). Therefore, we used CSO aggregate data to calculate a sector and size specific share of personnel costs of SME expenditure and applied this to the total expenditure in the CDS.

Personnel costs

Two different personnel expenditure reduction channels were calculated. The first came from the explicit subsidisation of wages via a subsidy such as that which is available through the TWSS/EWSS schemes. These schemes were brought in to enable firms to retain employees despite the reduction to turnover.[8] After obtaining monthly personnel expenditure per employee, we constructed an estimate of eligibility for an illustrative subsidy which was built to proxy the TWSS/EWSS introduced as part of the COVID-19 measure. It was not possible for us to explicitly model these schemes as we did not have employee level data that would provide us with their employment status (such as part time, full time etc.), or their wage level. To illustrate the impacts, we instead used a proxy scheme, which was based on the average employee wage per firm in our data. The implementation of this illustrative scheme across firms in the survey involved several steps.[9]

- We calculated the 70 per cent cap of the personnel costs per employee for the scheme.
- We limited this figure to a maximum of €1,640 each month for each employee when 70 per cent of costs go over that amount.
- We applied usage of our illustrative scheme to firms based on sector-specific percentages of firms which availed from the TWSS, according to CSO survey data as displayed in Table 7.

TABLE 7 CSO SURVEY OF IMPACT OF COVID-19 MEASURES ON SMES BY NACE SECTOR (Q2 2020), PERCENTAGE OF RESPONDING ENTERPRISES

	Industry	Construction	Wholesale & Retail	Accom. & Food
Availed of Revenue COVID-19 TWSS	52.2	65.7	59.1	54.9

Source: Authors' analysis of Department of Finance Survey Data.

8 Details of the TWSS structure, eligibility and usage statistics are available from the Revenue Commissioner website https://www.revenue.ie/en/Home.aspx.

9 The TWSS scheme relies on a worker's previous wages and, as we do not have these data, we used an illustrative example which was based on average per employee subsidy. As we adjusted the rest of the personnel costs in line with the total reductions that firms themselves have indicated they achieved, this should capture issues such as top-ups above the TWSS. We did not model any tax implications for workers, for example PRSI, USC or income tax. Rather, we worked on a total gross wage bill per firm basis.

These percentages are applied to correspond with the firms which suffered the worse turnover shocks based on the two scenarios outlined above. This gave us the closest match to the actual share of SMEs that used the TWSS, as reported in the CSO COVID-19 impact surveys. In this regard, we do not explicitly model the assumption in the actual TWSS that firms have to have had at least a 25 per cent reduction in turnover, rather we allow sufficient firms to receive the subsidy under the proportions in Table 7. In practice, nearly all the firms in our data that receive a subsidy had a turnover shock greater than 25 per cent.

The second channel again exploited the CSO survey. As firms have laid off workers and cut the wages of existing workers, as well as used the TWSS, we reduced the wage bill after TWSS by the proportions suggested in the personnel cost reductions provided in the CSO survey. Results are displayed in Table 8, by sector. The bands on expenditure reduction were broader than those asked relating to turnover. However, we applied the largest expenditure reductions to firms again on a random basis using the random split applied to the turnover scenarios, in order to assign higher unsubsidised personnel expenditure reductions to firms worse affected by the turnover reductions.

While it is mentioned above, it must be reiterated here that our analysis is not meant as a microsimulation of the impacts of the TWSS scheme. As this scheme is applied based on each employee's existing wage, we cannot use such a basis as we do not have individual employee-level data. Instead, our method provided an illustrative subsidy which is meant to somewhat mirror the TWSS. Our reduction in personnel costs then was a combination of an illustrative subsidy and then a decline in the rest of costs in line with the survey responses. In this manner, whether firms laid off workers or dropped the wages of existing workers did not matter for our analysis as we purely relied on firms indicated responses to how much their wage bill has fallen.

TABLE 8 CSO SURVEY OF IMPACT OF COVID-19 MEASURES ON SMES PERSONNEL EXPENDITURE, BY NACE SECTOR (Q2, 2020), PERCENTAGE OF RESPONDING ENTERPRISES

Survey bands of reduced personnel costs	Simulated reduction %	Industry	Construct.	Wholesale & Retail	Accom. & Food	Other
50-100% < normal	75	4.9	11.4	13.9	64.4	6.6
0-50% < normal	25	24.5	14.3	25.3	15.6	22.4
No change or higher expenditure		57.1	45.7	51.0	20.0	60.1

Source: CSO.
Note: This excludes the share of firms who reported 'Don't Know', so percentages do not add to 100 in all cases.

Non-personnel costs

Finally, we simulated two non-personnel reduction scenarios based on CSO published survey data, as displayed in Table 9. Since the expenditure information available in the CDS did not provide any details regarding the proportion of expenditure devoted to fixed costs (such as rent), or variable costs (such as purchases), we applied two reduction bands based on CSO survey data to account for the likely reductions in some of these expenditure items as a result of the slow down or cease in trading activity (see Table 9). We applied the non-personnel expenditure reductions to firms on a random basis using the random split applied to the turnover scenarios, in order to assign larger expenditure reductions to firms more affected by the turnover shocks.

TABLE 9 REDUCTIONS BASED ON CSO SURVEY OF IMPACT OF COVID-19 MEASURES ON SMES NON-PERSONNEL EXPENDITURE, BY NACE SECTOR (Q2, 2020), PERCENTAGE OF RESPONDING ENTERPRISES

Survey bands of reduced non-personnel costs	Simulated reduction %	Industry	Construct.	Wholesale & Retail	Accom. & Food	Other
50-100% < normal	75	11.4	7.2	5.5	48.9	18.0
0-50% < normal	25	11.4	7.2	18.8	24.4	24.0
No change or higher expenditure		59.8	50.7	63.7	22.2	43.8

Source: CSO.

After applying the various reductions to the different items outlined above, firms in the CDS experienced the turnover and expenditure reductions outlined in Table 10 under each scenario (information on the percentage reductions by sector can be found in Appendix 1). Average turnover reductions were higher in the more severe calibration, as it is to be expected. Turnover reductions in this scenario were over 10 percentage points higher. Personnel expenditure was reduced by almost half on average, and total expenditure was reduced by almost one-fifth.

TABLE 10 MEAN PERCENATGE REDUCTION (THREE MONTHS)

	Turnover (baseline CSO calibration)	Turnover (severe calibration)	Expenditure personnel	Expenditure non-personnel	Expenditure total
Total	42.4	56.6	46.4	16.9	22.0
Size categories					
Micro	40.4	55.1	46.0	13.9	18.0
Small	41.6	56.4	46.1	16.2	23.3
Medium	47.0	59.3	47.8	23.5	28.4

Source: Authors' analysis of Department of Finance Survey Data.

Estimated average revenue gap

Having applied the reductions in turnover, personnel expenditure and non-personnel expenditure across the firms in the data, we then calculated the percentage of firms who have expenditure greater than turnover and the median and mean amounts of this revenue shortfall. There are four sets of results presented in Table 11 on these calculations. This table displays the selected statistics by size categories. A table displaying the same statistics by sector categories instead can be found in Appendix 1. The top panel shows the results where the shocks are based on the CSO survey data. The bottom panel shows the results based on the more severe turnover shocks (i.e. calibrated based on the Chambers Ireland data). The personnel and non-personnel expenditure reductions were applied in the same way in both cases. For each of the two calibrations, we reported first the raw impact of the shock as the share of firms where revenue has fallen below expenditure and the size of the shortfalls. Secondly, we provided a figure for the share of firms who faced a revenue shortfall and who did not have sufficient internal cash resources to cover the gap for three months.

In the baseline CSO calibration (top panel of Table 11), we estimated that approximately 39 per cent of micro firms and 43 per cent of small and medium firms had shocks large enough for expenditure to exceed turnover in the three-month period of COVID-19 restrictions. If we base our estimates on the more severe scenario, these numbers increase to 55 per cent of micro firms and 60 per cent of small and medium firms. The size of the estimated shortfall in each month for the median micro firm is €3,000 in the CSO calibration and €3,500 in the severe calibration. Reflecting the highly skewed nature of the size and financial performances of firms (as shown in Section 2), the size of the revenue gap is much larger for the mean firm; more than three times as large in the case of micro firms, where the mean gap is €10,800 in the baseline CSO calibration and €12,600 in the severe calibration. The size of the shortfalls in both calibrations are larger for small and medium firms, with a median gap of €28,000 in the baseline CSO calibration and €38,000 in the severe scenario. The mean gaps are again approximately three times as large as the median.

TABLE 11 PERCENTAGE OF AFFECTED SMES AND GAP SIZE (GAP = REVENUE SHORTFALL)

	Baseline CSO calibration		
	% Firms Expenditure > Turnover	**Median gap (Monthly)**	**Mean gap (Monthly)**
Without use of firm cash			
Micro	39%	3,062	10,789
Small/Medium	43%	28,125	91,291
	% Firms Gap > Cash	**Median Gap (3 Months)**	**Mean Gap (3 Months)**
Including use of cash			
Micro	28%	14,902	39,644
Small/Medium	39%	78,460	290,715
	Severe calibration[10]		
	% Firms Expenditure > Turnover	**Median Gap (Monthly)**	**Mean Gap (Monthly)**
Without use of firm cash			
Micro	55%	3,573	12,610
Small/Medium	60%	38,250	124,949
	% Firms Gap > Cash	**Median Gap (3 Months)**	**Mean Gap (3 Months)**
Including use of cash			
Micro	32%	24,881	47,873
Small/Medium	41%	114,915	389,616

Source: Authors' analysis of Department of Finance Survey Data.

The next question is how much of these gaps remain if firms absorb some of the shortfall with their existing cash resources. We did this calculation by taking the firm-level gap just described and then subtracting the reported cash and cash equivalents. In the lower panel of Table 11, we report how many firms still have expenditure greater than turnover shortfalls after using their cash resources and how large this remaining shortfall is. In the CSO calibration, 28 per cent of micro firms and 39 per cent of small and medium firms still have a shortfall. The more severe scenario percentages reduce by more, bringing them closer to the baseline CSO numbers at 32 per cent of micro firms and 41 per cent of small and medium firms. We also re-calculated the median and mean revenue shortfall for the firms that were not able to cover the shortfall through their cash resources. In both calibrations, the size of the shortfall for firms that were not able to cover themselves out of cash resources was much larger than the initially calculated gaps. This is because it was primarily firms with smaller shortfalls that were able to cover themselves with internal resources and taking those firms out of the calculation leaves us with the firms that have more severe shortfalls.

[10] Calibrated using the differences between the CSO and Chambers Ireland survey shocks.

4. ESTIMATING A TOTAL REVENUE GAP

The next step was to attempt to calculate an aggregate amount for the shortfall in revenues in the total SME sector based on the firm-specific gaps estimated in Table 11. This exercise was important in terms of policy interest in the overall level of exposure to the COVID-19 pandemic amongst SMEs. A degree of caution was needed however, as the design of the survey works best in calculations based on proportions and was not intended for aggregation of monetary amounts. Indeed, the survey only captures firms with turnover less than €50 million by design. This therefore would bias downwards any estimates for the SME sector as a whole if a strict employee definition (based on less than 250 employees) were to be used. As there are limited national data on total SME turnover and expenditure (for the sample of firms less than €50 million for which our survey represents), the aggregation was based on numbers of active SMEs in the CSO sectoral business demography data. Further details regarding the CSO table were used to obtain the number of active firms, as well as a detailed sectoral overview provided in Appendix 2. As many of the financial variables are very skewed, this aggregation approach should be treated as a broad guide to relative magnitudes rather than as precise point estimates.

The approach to aggregation for each of the calibration scenarios can be summarised as:

A. Take proportion of firms who have a 'revenue gap' (turnover less than expenditure);

B. Calculate mean level of gap for these firms for the three-month period;

C. Get number of affected firms based on CSO business demography data (see Appendix 2).

The aggregate gap is given by inputs (A x C) x B. As with the firm-level calculations, we performed the aggregation exercise both for calibrations based on baseline CSO and severe scenarios. We applied the aggregation for the total revenue gap as a result of the pandemic and also the gap that cannot be covered by existing cash resources of the affected firms. The totals for each case are presented in Table 12, along with the totals for micro firms and for small and medium firms separately.

TABLE 12 AGGREGATED MEAN REVENUE GAP FOR THREEE-MONTH PERIOD (€ BILLION)

	Baseline CSO calibration	Severe calibration
No cash adjustment included (€ billion)		
Micro	3.27	5.32
Small/Medium	2.63	5.01
Total	5.89	10.34
Adjusting for firm cash holdings (€ billion)		
Micro	1.11	2.13
Small/Medium	1.10	2.15
Total	2.21	4.28

Source: Authors' analysis of Department of Finance Survey Data.

The scale of the shock to the SME sector of the pandemic is evident in these calculations, even given the caveats regarding their precision. The raw impact on SMEs in the top panel of Table 12 is estimated to be between €5.9 billion (in the CSO-calibrated shock) and €10.34 billion (in the severe calibration). In both cases, the split in the aggregate amounts are close to 50:50 between micro firms and the small and medium group (although of course there are many more firms affected in the micro group but with lower average shortfalls due to their smaller scale).

The cash holdings of the SME sector can absorb some but not all of these revenue shortfalls. The lower panel of Table 12 shows the remaining gap after all internal resources have been exhausted. This still leaves a revenue shortfall of between €2.21 billion and €4.3 billion depending on the shock calibration used. Again, the impact is roughly evenly split across the two broad size categories of firms. These impacts relate solely to the three-month period of restrictions on activity in the second quarter of 2020. The next section looks at a range of potential paths for the economy and SME sector for the second half of 2020 and how these revenue gaps may evolve.

5. RECOVERY PATHS AND SME REVENUE GAPS

The path of the economy over the second half of 2020 is highly uncertain with health developments the key driver and considerable risks around any scenarios. This section is therefore highly speculative, but we feel it should be useful to present a range of scenarios that give some broad parameters as to how different economic paths would impact on the SME sector.

In line with McQuinn et al. (2020) we presented three broad scenarios:

- Base scenario: Gradual recovery with ongoing public health measures (e.g. physical distancing);

- Optimistic scenario: More rapid recovery towards normal turnover levels;
- Pessimistic scenario: Initial opening up but no further recovery.

The way in which we implemented the scenarios in terms of turnover evolution for firms is shown in Table 13. For the annual estimates, we assumed that in the first quarter of the year firms operated normally. In the second quarter, we applied the turnover reductions described in the previous sections calibrated to either the CSO or Chambers Ireland surveys. Table 13 shows these in the 'Q2' column for the CSO calibration and the approach is identical for the Chambers Ireland (i.e. more severe) shocks.

The scenarios begin in Q3 where all firms experienced a step improvement in turnover and then recovery paths diverge in Q4. In the base scenario, we applied a steady improvement in firm turnover but one that is relatively slow. We did this by moving firms gradually up through the turnover reduction categories by one step in each quarter. This means that the 13 per cent of firms that were hit with an 87.5 per cent reduction to turnover in Q2 (the midpoint of the 75-100 range), have turnover that is 62.5 per cent below normal in Q3 and 37.5 per cent below normal in Q4. In this base scenario, 71 per cent of firms were back at normal turnover levels by Q4.

In the optimistic scenario, we allowed a greater bounce back from the lifting of restrictions, with firms moving up one step in the turnover shock categories in Q3 and then two steps in Q4. This meant that the firms which were worst affected from the lockdown period had turnover that was 62.5 per cent lower than normal in Q3 and 17 per cent lower than normal in Q4. In this scenario, 45 per cent of firms returned to near normal turnover levels in Q3 (as in the base scenario) and now 87 per cent were back at normal levels by Q4.

The pessimistic scenario has some recovery in Q3, at the same level as in the base case. However, the recovery then stalls (for example if restrictions were re-imposed), and in Q4 firms remained as they were in Q3, i.e. at far below normal turnover. This results in only 45 per cent of firms being modelled as back to normal turnover levels by Q4. Note that our optimistic and pessimistic scenarios did not take the form of extreme 'best' and 'worst' case outcomes, with the optimistic scenario leaving some firms still below pre-COVID-19 turnover levels by the end of the year and the pessimistic scenario did not envisage a return to the level of turnover reductions during the lockdown phase.

TABLE 13 TURNOVER EVOLUTION IN RECOVERY SCENARIOS (BASELINE CSO CALIBRATION), PERCENTAGE OF RESPONDING ENTERPRISES (ALL SMES)

Survey bands of reduced turnover	Q2	Q3	Q4
BASE SCENARIO			
75-100% < normal	23		
50-74% < normal	15	23	
25-49% < normal	20	15	23
10-24% < normal	14	20	15
Normal turnover or greater	28	42	62
OPTIMISTIC SCENARIO			
75-100% < normal	23		
	15	23	
25-49% < normal	20	15	
	14	20	23
Normal turnover or greater	28	42	77
PESSIMISTIC SCENARIO			
75-100% < normal	23		
50-74% < normal	15	23	23
25-49% < normal	20	15	15
10-24% < normal	14	20	20
Normal turnover or greater	28	42	42

Source: Authors' analysis of Department of Finance Survey Data.

As turnover improves, we assume that firm expenditure also begins to increase (hence the scenarios are not simply scaled up versions of the one quarter estimates in the previous section). In terms of the illustrative wage subsidy scheme, we assumed that firms no longer qualify for the subsidy once they moved into the turnover category where turnover is 10-24 per cent below normal which approximates the qualification threshold for the scheme. For firms where turnover remained below this level, we assumed a subsidy scheme remained in place and applied this reduction in personnel expenditure across both remaining quarters for qualifying firms. Non-personnel expenditure was assumed to increase broadly in line with the recovery in turnover. Table 14 displays the average reductions in turnover and expenditure items for each scenario and each recovery simulation (sector-specific information in this regard can be found in a Table in Appendix 3).

TABLE 14 MEAN PERCENTAGE REDUCTION (Q2 TO Q4)

	Turnover (baseline CSO calibration)	Turnover (severe calibration)	Expenditure non-personnel	Expenditure total
BASE SCENARIO				
Total	27.3	37.0	9.7	10.2
Size categories				
Micro	25.7	36.0	7.7	8.1
Small	26.3	36.7	9.3	10.9
Medium	30.6	39.3	14.3	13.8
OPTIMISTIC SCENARIO				
Total	24.3	32.9	8.6	8.6
Size categories				
Micro	23.2	32.1	6.9	6.9
Small	23.8	32.7	8.2	9.2
Medium	27.5	34.9	12.6	11.4
PESSIMISTIC SCENARIO				
Total	31.3	42.8	11.1	11.4
Size categories				
Micro	29.9	41.7	8.7	9.1
Small	30.6	42.6	10.6	12.2
Medium	35.3	45.3	16.5	15.2

Source: Authors' analysis of Department of Finance Survey Data.

For each of the scenarios, we applied turnover (and associated expenditure) evolutions as above using the CSO-calibrated shares of firms in each turnover reduction bracket and did the same for the shares reported by Chambers Ireland. For each scenario, we applied the initial shock of Q2 and then grew forward turnover and expenditure across the remaining quarters of 2020. We then calculated how many firms had expenditure fall below turnover for the entire period and by how much. As before, we also examined how much of the shortfall remained after firms had used their cash resources to cover as much of the gap as they could. Table 15 shows the results for the CSO calibrated turnover reductions and Table 16 shows those based on Chambers Ireland. These two tables display the selected statistics by size categories. Tables displaying the same statistics by sector categories instead can be found in Appendix 3.

In our base case of steady growth, 21 per cent of micro firms and 25 per cent of small and medium firms had a revenue shortfall over the full nine-month period in the CSO calibration, (if you recall these percentages were 39 per cent and 43 per cent respectively for the Q2 shock in Table 9). The size of the gap spread evenly across the months are quite similar to the lockdown estimate for micro firms (both in terms of median and mean). The gaps are lower in magnitude for small and

medium firms with a median of €20,000 per month in this base case compared to €28,000 a month for the Q2 scenario in Table 11. Due to the distribution of SMEs being highly skewed (i.e. there is a very large number of micro firms compared to medium firms, for example) the medians and means presented display large differences. It is clear to the reader that this would have implications when performing the aggregation exercise presented below (based on means). Therefore, as noted in the previous section, the aggregate results should be treated as a broad guide to relative magnitudes rather than as precise point estimates.

TABLE 15 PERCENTAGE OF AFFECTED SMES AND GAP SIZE UNDER ALTERNATIVE HEALTH SCENARIOS (BASELINE CSO CALIBRATION)

	% Firms with Expenditure > Turnover	Median Gap (Monthly)	Mean Gap (Monthly)
No cash adjustment			
BASE SCENARIO			
Micro	0.21	3,859	9,222
Small/Medium	0.25	20,934	71,620
OPTIMISTIC			
Micro	0.21	3,237	8,357
Small/Medium	0.26	16,935	65,720
PESSIMISTIC SCENARIO			
Micro	0.23	3,333	9,673
Small/Medium	0.29	19,731	74,166
	% Firms with Gap > Cash	**Median Gap (Nine Months)**	**Mean Gap (Nine Months)**
Adjusting for firm cash holdings			
BASE SCENARIO			
Micro	0.41	30,399	79,042
Small/Medium	0.47	243,734	781,306
OPTIMISTIC SCENARIO			
Micro	0.39	21,453	76,040
Small/Medium	0.46	204,823	753,284
PESSIMISTIC SCENARIO			
Micro	0.40	36,430	94,862
Small/Medium	0.46	272,909	827,524

Source: Authors' analysis of Department of Finance Survey Data.

A return to growth is therefore crucial in restoring SME health, although this relatively slow path in our base case leaves a substantial portion of firms with expenditure below turnover and an accumulating gap to be covered. As our optimistic and pessimistic scenarios diverge only towards the end of the year, we did not find that they dramatically changed the shares of firms that have revenue shortfalls, although the size of the monthly gap was affected more noticeably. This

is particularly the case when cash holdings were considered as more firms exhausted their reserves and were no longer able to bridge the revenue shortfall.

TABLE 16 PER CENT OF AFFECTED SMES AND GAP SIZE UNDER ALTERNATIVE HEALTH SCENARIOS (SEVERE CALIBRATION)

	% Firms with Expenditure > Turnover	Median Gap (Monthly)	Mean Gap (Monthly)
	No cash adjustment		
BASE SCENARIO			
Micro	0.27	4,412	10,272
Small/Medium	0.34	30,343	85,822
OPTIMISTIC			
Micro	0.26	3,371	9,174
Small/Medium	0.34	25,750	75,163
PESSIMISTIC SCENARIO			
Micro	0.30	4,723	11,030
Small/Medium	0.40	31,771	91,958
	% Firms with Gap > Cash	**Median Gap (Nine Months)**	**Mean Gap (Nine Months)**
	Adjusting for firm cash holdings		
BASE			
Micro	0.43	59,349	108,533
Small/Medium	0.55	264,032	827,882
OPTIMISTIC SCENARIO			
Micro	0.41	46,031	98,625
Small/Medium	0.52	202,281	743,404
PESSIMISTIC SCENARIO			
Micro	0.42	56,468	120,592
Small/Medium	0.54	333,686	907,545

Source: Authors' analysis of Department of Finance Survey Data.

The final step was to examine how these different paths for the rest of 2020 aggregate into an overall SME revenue and liquidity shortfall. This was done in the same way as for the single quarter aggregation described earlier and the results presented in Table 17. The total revenue shortfall (i.e. not considering any cash reserves that could be used to cover it) is €8.1 billion in our base case using the CSO-calibrated shock and €12.3 billion using the more severe calibration. Adjusting for cash reserves, the base scenario gives a liquidity shortfall of between €3.9 billion and €6.7 billion. In the more optimistic scenario, these revenue gaps are smaller (with a range of between €7.4 billion and €10.8 billion), as are the liquidity gaps. The gaps in the pessimistic scenario are correspondingly larger with the liquidity shortfall coming in between €4.8 billion and €8.3 billion.

TABLE 17 AGGREGATE MEAN GAP FOR 2020 UNDER ALTERNATIVE HEALTH SCENARIOS (€ BILLION)

	Base	Optimistic	Pessimistic
No cash adjustment (€ billion)			
Baseline CSO calibration	8.12	7.44	9.56
Severe calibration	12.32	10.75	14.92
Adjusting for cash holdings (€ billion)			
Baseline CSO calibration	3.87	3.60	4.80
Severe calibration	6.7	5.69	8.25

Source: Authors' analysis of Department of Finance Survey Data.

6. CONCLUSIONS

In addition to the unknown path of the virus itself, which will determine much of the recovery outcomes, several other caveats applied to the analysis. The first set of limitations arose from the nature of the survey data we used to calibrate our scenarios and generate our picture of firm finances. Individual firms and sectors had different exposures to the shocks, different cost profiles and different underlying financial positions making one size fits all policy recommendations from the analysis difficult since the CDS can only generate an average picture. Implementing ongoing social distancing measures are quite different for small hospitality businesses than for office settings and these types of costs are not fully reflected in the scenarios presented. In addition, the total annual expenditure figure provided in the CDS may not provide a totally accurate representation of real firm expenditure, as there could be issues with how firms interpret this concept when asked. Therefore, some uncertainty in the revenue gap estimates presented could arise from the use of this variable. Indeed, the profit margin figures implied by the CDS are quite high, which may overestimate the extent to which firms have buffers available. Future work on this topic could benefit from using other sources of more accurate balance sheet data for Irish SMEs.

Second, in all of our scenarios we included estimates of the extent to which the SME sector's own internal resources could cover some of the shortfall. However, running down all internal funds is not an Optimistic outcome either for an individual firm or for the sector as a whole. While it helps to cushion the current blow, the longer-term outlook for the sector's growth could be severely hampered in terms of limiting investment. Other work using the CDS by Martinez-Cillero et al. (forthcoming), shows many SMEs engaging in investment activities only when they had substantial internal resources available to finance it. The experience of the financial crisis may have left some scarring in terms of willingness to take on external debt, a consideration that is important both for the implementation of policies addressing the current crisis and for longer-term implications of having to meet the cost of the pandemic.

A third limitation is that we can only examine the impact on active firms and base this on their turnover levels prior to the crisis. The overall cost therefore does not include damage from lost potential growth opportunities, delayed or cancelled expansion plans or from potential entrepreneurs deciding not to enter the SME market in the current environment.

Finally, our assumptions on expenditure reductions are implemented for each quarter but do not make any distinction between permanently foregone expenditure (e.g. inputs not needed due to lower activity levels) and expenditure that has been deferred but remains a liability to the firm (e.g. debt payment breaks or tax deferrals). A more in-depth investigation into expenditure categories that is not available in our current dataset would be needed to decompose expenditure further and gauge how much of the deferred expenditure may be a constraint on firm finances even as turnover recovers.

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APPENDIX 1 SIMULATED DESCRIPTIVE STATISTICS, BY SECTOR

TABLE A1.1 MEAN PERCENTAGE REDUCTION (THREE MONTHS)

	Turnover (baseline CSO calibration) %	Turnover (severe calibration) %	Expenditure personnel	Expenditure non-personnel	Expenditure total
Manufacturing	34.2	50.4	38.5	11.2	15.5
Construction	57.6	71.4	47.2	7.3	18.9
Wholesale & Retail	36.6	51.5	48.1	8.7	12.4
Hotels & Restaurants	80.5	84.3	64.5	43.7	52.4
Other	34.1	50.6	41.3	20.3	24.1

Source: Authors' analysis of Department of Finance Survey Data.

TABLE A1.2 PERCENTAGE OF AFFECTED SMES AND GAP SIZE

	Baseline CSO Calibration		
	% Firms with Expenditure > Turnover	Median Gap (Monthly)	Mean Gap (Monthly)
Without use of firm cash			
Manufacturing	0.39	19,604	63,920
Construction	0.58	16,483	53,897
Wholesale & Retail	0.38	17,221	56,267
Hotels & Restaurants	0.61	18,337	59,852
Other	0.32	16,516	54,004
	% Firms with Gap > Cash	**Median Gap (Three Months)**	**Mean Gap (Three Months)**
Including use of cash			
Manufacturing	0.34	56,850	205,351
Construction	0.44	48,937	174,088
Wholesale & Retail	0.39	50,808	181,483
Hotels & Restaurants	0.24	53,639	192,664
Other	0.30	49,022	174,424
	Severe Calibration[11]		
	% Firms with Expenditure > Turnover	**Median Gap (Monthly)**	**Mean Gap (Monthly)**
Without use of firm cash			
Manufacturing	0.64	26,460	86,754
Construction	0.73	22,142	72,766
Wholesale & Retail	0.54	23,163	76,075
Hotels & Restaurants	0.62	24,707	81,077
Other	0.52	22,188	72,917
	% Firms with Gap > Cash	**Median Gap (Three Months)**	**Mean Gap (Three Months)**
Including use of cash			
Manufacturing	0.34	84,304	273,424
Construction	0.45	73,093	230,871
Wholesale & Retail	0.43	75,745	240,936
Hotels & Restaurants	0.29	79,754	256,154
Other	0.32	73,213	231,328

Source: Authors' analysis of Department of Finance Survey Data.

[11] Calibrated using the differences between the CSO and Chambers Ireland survey shocks.

APPENDIX 2 NUMBER OF ACTIVE SMES IN IRELAND

The NACE Rev. 2 sector-specific number of active enterprises used for the aggregation performed in this analysis is one of the business demography statistics published by the CSO.[12] The detailed sector disaggregation provided in the CSO table allows us to map the number of active firms to the detailed sector breakdown in the CDS.

Table A2.1 shows how SMEs are distributed across sectors, displaying CSO business demography data on the number of active enterprises in each sector and the shares accounted for by each size category. In all sectors, we find a preponderance of micro firms, varying from 80 per cent in the hotels and restaurant sector, which has one of the greatest shares of small firms, to a level of 97 per cent in construction and real estate. Construction and real estate sectors have the greatest number of micro firms in absolute terms as well, at over 70,000 of the total 311,000 SMEs. Other substantial clusters are in transport, storage and communications and in the professional and technical sector. There is also a large number of firms classified as 'other', showing the diversity of activities in which SMEs are active.

TABLE A2.1 NUMBER OF ACTIVE ENTERPRISES BY EMPLOYMENT SIZE AND SECTOR

	Number of firms			Sector share (%)		
	Micro	Small	Medium	Micro	Small	Medium
Manufacturing	14,085	1,500	511	87.5	9.3	3.2
Construction & Real Estate (F, L)	70,270	1,949	193	97.0	2.7	0.3
Wholesales & Retail	42,170	5,581	747	87.0	11.5	1.5
Transportation & Storage (H)	24,613	957	139	95.7	3.7	0.5
Information & Communication (J)	14,777	897	230	92.9	5.6	1.4
Hotels & Restaurants (I)	15,328	3,212	621	80.0	16.8	3.2
Prof., Scientific & Technical (M)	41,531	1,790	222	95.4	4.1	0.5
Admin. & Support (N)	17,366	970	297	93.2	5.2	1.6
Health & Social Work (G)	18,213	2,147	525	87.2	10.3	2.5
Other (B, D, E, K-642, P, R, S)	53,324	2,892	418	94.2	5.1	0.7
Total	311,677	21,895	3,903	92.4	6.5	1.2

Source: Authors' analysis of Department of Finance Survey Data.
Note: Based on CSO 2017 data. Rows of sector shares add to 100 per cent.

[12] https://statbank.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=BRA11&PLanguage=0.

APPENDIX 3 SIMULATED DESCRIPTIVE STATISTICS, RECOVERY SCENARIOS, BY SECTOR

TABLE A3.1 MEAN PERCENTAGE REDUCTION (Q2 TO Q4)

	Turnover (baseline CSO calibration)	Turnover (severe calibration)	Expenditure non-personnel	Expenditure total
BASE SCENARIO				
Manufacturing	20	31	6.5	6.7
Construction	38	48	4.3	10.6
Wholesale & Retail	23	33	4.2	5.0
Hotels & Restaurants	56	60	27.1	27.4
Other	21	32	11.8	10.7
OPTIMISTIC SCENARIO				
Manufacturing	18.4	28.0	5.7	6.0
Construction	33.7	42.3	3.8	8.3
Wholesale & Retail	20.5	29.4	3.8	4.4
Hotels & Restaurants	49.9	52.8	23.7	21.9
Other	19.2	28.9	10.5	9.2
PESSIMISTIC SCENARIO				
Manufacturing	23.9	36.7	7.4	7.8
Construction	43.5	55.1	4.9	11.7
Wholesale & Retail	26.7	38.6	4.6	5.5
Hotels & Restaurants	64.0	67.7	31.3	29.7
Other	24.5	37.6	13.6	12.1

Source: Authors' analysis of Department of Finance Survey Data.

TABLE A3.2 PERCENTAGE OF AFFECTED SMES AND GAP SIZE UNDER ALTERNATIVE HEALTH SCENARIOS (BASELINE CSO CALIBRATION)

	% Firms with Expenditure > Turnover	Median Gap (Monthly)	Mean Gap (Monthly)
No cash adjustment			
BASE SCENARIO			
Manufacturing	0.23	15,128	50,405
Construction	0.33	13,002	42,635
Wholesale & Retail	0.24	13,505	44,473
Hotels & Restaurants	0.24	14,265	47,252
Other	0.19	13,025	42,719
OPTIMISTIC SCENARIO			
Manufacturing	0.23	12,278	46,216
Construction	0.30	10,572	39,074
Wholesale & Retail	0.23	10,976	40,763
Hotels & Restaurants	0.29	11,586	43,318
Other	0.20	10,591	39,150
PESSIMISTIC SCENARIO			
Manufacturing	0.25	14,156	52,238
Construction	0.38	12,114	44,208
Wholesale & Retail	0.26	12,597	46,107
Hotels & Restaurants	0.31	13,327	48,979
Other	0.21	12,136	44,294
	% Firms with Gap > Cash	**Median Gap (9 Months)**	**Mean Gap (9 Months)**
Adjusting for firm cash holdings			
BASE SCENARIO			
Manufacturing	0.38	171,200	542,536
Construction	0.46	144,637	455,093
Wholesale & Retail	0.50	150,920	475,775
Hotels & Restaurants	0.45	160,420	507,049
Other	0.41	144,922	456,032
OPTIMISTIC SCENARIO			
Manufacturing	0.33	142,477	523,021
Construction	0.50	119,645	438,693
Wholesale & Retail	0.48	125,045	458,639
Hotels & Restaurants	0.43	133,211	488,798
Other	0.39	119,890	439,599
PESSIMISTIC SCENARIO			
Manufacturing	0.38	192,506	578,419
Construction	0.45	163,061	487,191
Wholesale & Retail	0.48	170,026	508,769
Hotels & Restaurants	0.43	180,556	541,396
Other	0.41	163,377	488,171

Source: Authors' analysis of Department of Finance Survey Data.

TABLE A3.3 PERCENTAGE OF AFFECTED SMES AND GAP SIZE UNDER ALTERNATIVE HEALTH SCENARIOS (SEVERE CALIBRATION)

	% Firms with Expenditure > Turnover	Median Gap (Monthly)	Mean Gap (Monthly)
	No cash adjustment		
BASE SCENARIO			
Manufacturing	0.27	21,526	60,135
Construction	0.38	18,298	50,728
Wholesale & Retail	0.31	19,061	52,953
Hotels & Restaurants	0.28	20,216	56,317
Other	0.30	18,332	50,829
OPTIMISTIC SCENARIO			
Manufacturing	0.28	18,141	52,726
Construction	0.35	15,355	44,510
Wholesale & Retail	0.29	16,014	46,453
Hotels & Restaurants	0.32	17,010	49,392
Other	0.30	15,385	44,598
PESSIMISTIC SCENARIO			
Manufacturing	0.32	22,575	64,442
Construction	0.42	19,207	54,365
Wholesale & Retail	0.35	20,003	56,749
Hotels & Restaurants	0.34	21,208	60,353
Other	0.33	19,243	54,474
	% Firms with Gap > Cash	**Median Gap (Nine Months)**	**Mean Gap (Nine Months)**
	Adjusting for firm cash holdings		
BASE SCENARIO			
Manufacturing	0.59	194,440	583,303
Construction	0.49	168,953	493,733
Wholesale & Retail	0.53	174,981	514,918
Hotels & Restaurants	0.47	184,096	546,953
Other	0.46	169,227	494,695
OPTIMISTIC SCENARIO			
Manufacturing	0.53	149,156	524,179
Construction	0.50	129,701	443,894
Wholesale & Retail	0.51	134,302	462,883
Hotels & Restaurants	0.45	141,261	491,597
Other	0.43	129,910	444,756
PESSIMISTIC SCENARIO			
Manufacturing	0.53	239,432	639,981
Construction	0.47	204,914	541,993
Wholesale & Retail	0.52	213,078	565,170
Hotels & Restaurants	0.48	225,424	600,214
Other	0.47	205,285	543,046

Source: Authors' analysis of Department of Finance Survey Data.

APPENDIX 4 MAIN DATA SOURCES

Source	Description
Credit Demand Survey (CDS)	Firm level microdata from the Department of Finance Credit Demand Survey. Used as the analytical basis for the report. The data cover the period 2018.
CSO Business Impact of COVID-19 Survey	This monthly survey was instituted by the CSO following the pandemic. We use these data for the months of April, May and June which are three separate survey returns. We averaged these across the three months. The data on turnover decline by sector as well as personnel and non-personnel cost declines come from these data. The share of firms using the TWSS also come from these survey returns.
Chambers Ireland Survey Data	We used the percentage decline in turnover from the April Chambers Ireland survey as our adverse turnover shock scenario. It is an overall figure not broken down by sector.

Source: Authors' analysis of Department of Finance Survey Data.