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Exploring the Impact of COVID-19 and Recovery Paths for the Economy

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Abstract: We provide a model-based update of the potential impact of the COVID-19 pandemic on the Irish economy, originally published in the Autumn 2020 Quarterly Economic Commentary. The update reflects more recent data, the evolution of the pandemic including the third wave of early 2021 and uses early indicators to anticipate the evolution of the economy in the short term. The analysis focusses on the same channels, mainly an internal shock with a considerable impact on the non-traded (domestic) sector, with reduced consumption, investment, employment and output. We also provide three new alternative paths for the Irish economy, which depend on many potential factors including the vaccine rollout, the need for continued public health measures and new lockdowns, the emergence of new virus strains and differences in the behavioural responses of economic agents.

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1 INTRODUCTION AND BACKGROUND

The COVID-19 pandemic has precipitated a massive global and domestic economic shock. For Ireland, COVID-19 poses the single largest challenge to the economy since the financial crisis. While the speed and scale of the negative shock associated with COVID-19 has been more severe, it seems that the economy has rebounded more rapidly relative to that observed during the financial crisis at times when public health restrictions have been eased (Allen-Coghlan and Varthalitis, 2020). However, failure to control the pandemic will inevitably slow and possibly curtail any economic recovery.

This paper updates previous analysis (contained in the Autumn 2020 Quarterly Economic Commentary) examining the potential impact of COVID-19 and possible recovery paths for the Irish economy. Since then, there has been a resurgence of the virus in December that led to a major third wave of cases, hospitalisations and deaths and the economy was in a strict lockdown from late December to June. The economic outlook is uncertain and depends on factors including the possibility of new waves of the virus, the emergence of new virus mutations, the stringency and duration of continued and/or new containment measures, the success of measures in controlling the spread of the virus, effective vaccines being rolled out and the behavioural response of consumers and firms when the economy reopens etc.

Our approach is to simulate the economic shock(s) associated with COVID-19 and to model potential recovery paths for the economy using a structural macroeconometric model, COSMO. The main channels the pandemic and the associated public health measures are affecting activity include production, employment, consumption, investment, and a weaker global environment. We calibrate the size of these shocks using recent data, indicators and drawing on research findings to develop alternative scenarios for the economy. In addition to these negative shocks, government measures including income supports, extra spending in health, and household and business support measures should lessen the most negative economic impacts of the pandemic.

In an *Upside* scenario, we assume that the public health restrictions are gradually relaxed in Q2, the rollout of effective vaccines is successful and there is a relatively rapid return to pre-lockdown levels of activity. In a *Downside* scenario, the recovery in the domestic economy is slower because of factors that could include new variants of the virus, the continuation of some public health restrictions and continued uncertainty. This scenario also includes scarring effects where some of the losses in domestic sectors are assumed to be permanent. In a *Repeated lockdowns* scenario, continued lockdowns are needed at intervals for disease suppression.

The remainder of the paper is as follows: Section 2 explores the international and domestic literature and data on the pandemic and focusses on the main channels through which the pandemic is affecting the Irish economy; Section 3 outlines the assumptions underpinning the scenarios and describes the results and Section 4 concludes.

2 EXISTING EVIDENCE

2.1. INTERNATIONAL EVIDENCE

The COVID-19 pandemic has triggered the most severe global economic recession in nearly a century and is causing enormous damage to people's health, employment and well-being. This has provoked advances in the literature on macroeconomic-epidemiological modelling to try to capture the global economic impact of the pandemic. Eichenbaum *et al*. (2020) were among the first to extend the canonical epidemiology model to study the interaction between economic decisions and epidemics. They predict a relatively slow recovery due to the large cost of abandoning containment too soon, although their model abstracted from forces such as hysteresis effects and the destruction of supply-side chains which may also influence the long-run performance of the economy (Bonadio *et al*., 2020).

Bodenstein *et al*. (2020) extend Eichenbaum *et al*. (2020) to a two-sector model featuring an essential sector that produces intermediate inputs not easily replaced by inputs from the non-essential sector. This model also suggests some scarring effects, as consumption never fully recovers due to a reduction in the capital stock, with some of the cost indirectly coming through industry linkages. They also attempt to provide a ballpark figure on the costs of waiting for a vaccine. Assuming a wait of 18 months, both the short and long term consequences of the pandemic will still depend on the restrictiveness of the measures introduced while the vaccine is developed and rolled out.

Krueger *et al*. (2020) also build on Eichenbaum *et al*. (2020) by distinguishing goods by the degree to which they can be consumed at home rather than in a social (and thus possibly contagious) context. The substitution of consumption would serve to mitigate the negative economic consequences of the pandemic once the economy reopens after a temporary lockdown. Despite the model predicting a much smaller economic loss in the short term (from people following the "Swedish model" where they decide how much they want to expose themselves, as opposed to a lockdown), there is a permanent loss of consumption and output. Kaplan *et al*. (2020) also show that even a short lockdown produces a slow recovery, with consumption taking five quarters to recover. For this, they integrated a model of virus spread into a macroeconomic model allowing for income and wealth

inequality, as well as occupational and sectoral heterogeneity. For all combinations of health and economic policies considered, the economic welfare costs of the pandemic are large and heterogeneous, with lower income workers bearing the brunt of the crisis.

Kozlowski *et al*. (2020) suggest that even if a vaccine protects everyone in a year, the COVID-19 crisis will leave a mark on the US economy in the long run, producing a 3 to 4 per cent scar on GDP over 100 years due to its impact on uncertainty as firms' and consumers' beliefs adapt to account for the likelihood of future pandemics. Fuentes & Moder (2020) show that while financial crises are associated with a persistent downward shift in potential output, this is not the case for exogenous events such as epidemics, wars or the OPEC crisis. An initial contraction is followed by above-normal growth, bringing potential output back to its long-term trend path. Consistent with this, Fulcrum Macroeconomic Research (2020) calculated the scarring inferred from consensus forecasts for the COVID-19 pandemic to be smaller than that of the 2008 Financial crisis. The scarring effect of the pandemic varies between 3.9% for the US and 2.0% for China, with the other countries in between, with all estimated scars smaller than that of the Financial crisis. Drawing on this literature, a range of international and domestic institutions have some element of scarring contained in their medium-term economic forecasts, with Table 1 providing a selection of these.

TABLE 1 SELECTED ESTIMATES OF MEDIUM-TERM SCARRING TO GDP

International scarring estimates (per cent)	
UK	1.8 - 4
Italy	3
Germany	3
USA	3.4
Netherlands	3
Advanced Economies	1

Note: Estimates are measured relative to a pre-pandemic baseline.
Sources: Office for Budget Responsibility, Ufficio Parlamentare Di Bilancio, Stabilitatsrat, CPB Netherlands, Congressional Budget Office and IMF World Economic Outlook

The IMF April 2021 World Economic Outlook baseline assumes widespread vaccine availability in advanced economies by Summer 2021. In this case, World GDP is forecast to grow by 6.0 per cent in 2021 followed by 4.4 per cent in 2022, while growth in the Euro Area is forecast to be 4.4 per cent and 3.8 per cent, respectively. They also include an upside scenario under which faster vaccination rollouts lead to stronger recoveries in consumption and employment. Meanwhile their downside scenario places an emphasis on uncertainty, with possible delays in vaccine supply or less effective vaccinations due to new variants also considered, which could lead to further lockdowns in the future.

The OECD Economic Outlook (May 2021) also contains scenario analysis, with their baseline scenario assuming virus outbreaks remains contained. In comparison with the December 2020 report, the OECD has produced a more optimistic central scenario, bringing their projections closer to those of the IMF, with World GDP forecast to grow 5.8 (4.4) per cent in 2021 (2022), and 4.3 (4.4) per cent for the Euro Area. Their upside scenario also assumes a faster vaccination rollout boosting consumer and business confidence, with households' savings unwinding in the latter half of the year leading to higher consumption and investment. For their downside scenario, confidence is assumed to be dented if prospects of rapid vaccinations recede, while uncertainty and prolonged weak demand could lead to higher insolvencies and capital scrapping, with this reflected in financial markets and higher risk premia.

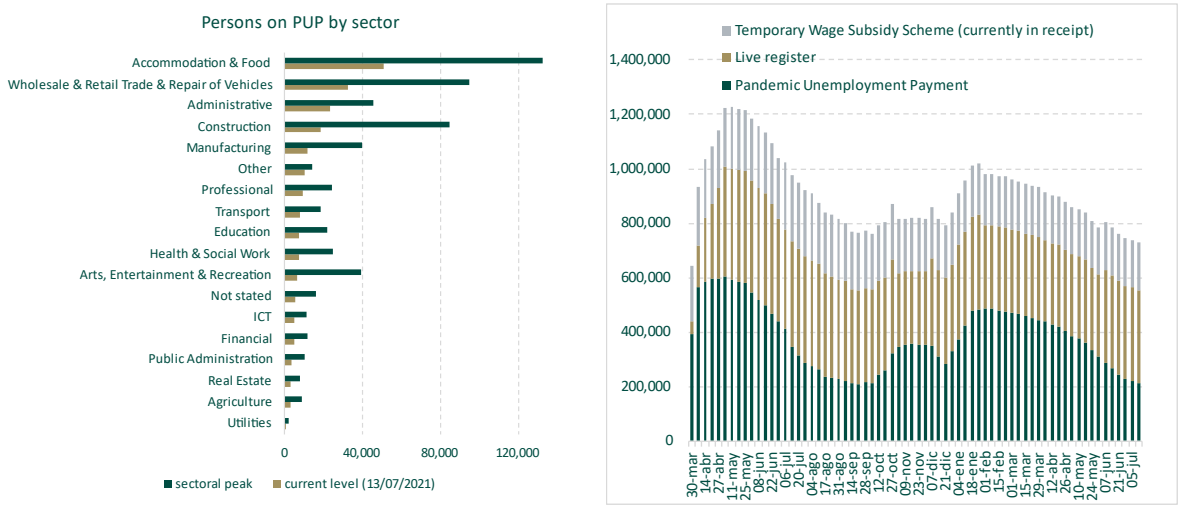
The mass rollout of vaccines in the UK led to an upward revision in growth forecasts for 2021 from 3.4 per cent to 5.7 per cent (NIESR, Spring 2021). Risks to the downside remain associated with the roll-out and effectiveness of vaccines, the emergence of new strains and their effect on the path of the virus, which may imply the continuation of lockdown measures for a longer period, suppressing domestic demand. However, successfully vaccinating enough of the population and the easing of social distancing rules presents an upside risk to their forecast in 2021.

2.2. DOMESTIC EVIDENCE

Labour market

The impact of the COVID-19 pandemic and the associated public health measures to help contain the spread of the virus can be clearly seen in its impact on the labour market. The pandemic has led to an unprecedented increase in unemployment, reaching a peak of over 28 percent (if all claimants of the Pandemic Unemployment Payment (PUP) are classified as unemployed), exceeding the previous record unemployment rate of over 17 per cent recorded on the Live Register in 1985. While this figure had fallen, numbers in receipt of income supports rose following the re-introduction of restrictions in late December 2020. The latest figures show around 730,000 people in receipt of some kind of income support of which c. 210,000 are in receipt of the PUP as of July 12th.

FIGURE 1 A) PUP RECIPIENTS BY SECTOR B) NUMBERS IN RECEIPT OF INCOME SUPPORT SCHEMES



Source: Department of Social Protection, Revenue.

The uneven impact of the pandemic on employment across sectors is clear from Figure 1. The strictest restrictions were in place during Spring 2020 and at this time the majority of 2019 Q4 employment in sectors such as Wholesale and Retail (63 per cent), Accommodation and Food Services (90 per cent) and Construction (81 per cent) were in receipt of income support through the TWSS or PUP, reflecting the widespread closure of these workplaces. The introduction of Level 5 restrictions in October 2020 and subsequently from late December, led to increases in the number of workers in receipt of the PUP although not to the same extent seen in Spring 2020. Customer facing industries such as Accommodation and Food Services and Retail, again saw the largest numbers in receipt of the PUP. All construction activity remained open during Level 5 restrictions in October and November 2020 lessening the labour market impact of this lockdown. Restrictions introduced in January 2021 led to the closure of all but certain essential construction activity. The figure also allows us to see the impact of the latest easing of restrictions by mid-July, with hard-hit sectors like Construction or Arts, Entertainment and Recreation almost fully recovered, while Accommodation and Food and Wholesale, Retail trade and Repair of vehicles still recording a significant number of workers in receipt of the PUP.

Over the medium term, the profiles of those who have lost their jobs will be crucial in influencing the labour market recovery. McGuinness and Kelly (2020) match administrative data on PUP recipients with data from the Labour Force Survey (LFS) and determine those at risk of long run unemployment. They find women and those in industries such as personal services, accommodation and food service and construction are among those most severely affected. The characteristics of those in receipt of income support is analysed by Byrne et al. (2020) who match sectoral

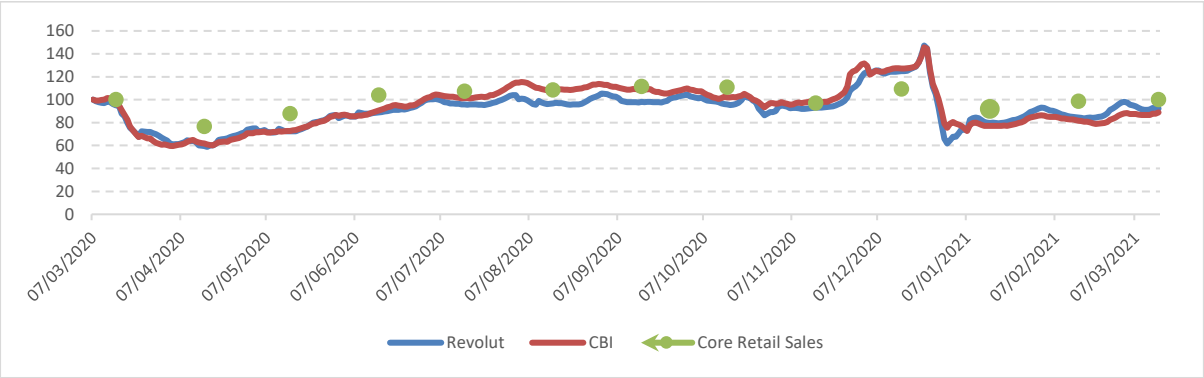
data on income support recipients to LFS data. In line with McGuinness and Kelly (2020) they find that those who have lost their jobs are disproportionately female, low-skilled and non-Irish. The relaxation of restrictions in a reverse order to their introduction, with certain industries such as Accommodation and Food Services who were restricted earliest being slowest to re-open means that a recovery in the labour market will take longer to reach these workers.

Looking at the potential for recovery in the labour market, Adrjan and Lydon (2020) examine high-frequency data from the recruitment website Indeed which closely matches data on job creation from the CSO. Unsurprisingly they find a sharp decline in Irish job postings of 32 per cent year-on-year during the first lockdown, with the drop particularly intense in customer service related roles. Similar analysis published by the Department of Finance (2021) from Indeed and the professional networking and recruitment website LinkedIn shows that the re-introduction of restrictions slowed the recovery in jobs postings and job changes, with both measures remaining below their pre-pandemic baseline level of activity. A survey on the impact of COVID-19 carried out by the CSO as part of the LFS found that approximately one in four (23%) PUP recipients in Q3 2020 did not expect to return to their previous job, having risen from 5% in Q2 (CSO, 2020). With the prolonged period of restriction stretching well into Q2 2021, more workers temporarily laid off during the pandemic may become long-term unemployed.

Consumption

Daily transactions data (provided to the Department of Finance from digital banking app Revolut) and Central Bank of Ireland card payment show a similar pattern. These data have provided an early indicator of how consumption has responded to the pandemic and public health restrictions. In the first wave of the pandemic in Spring 2020 from peak to trough, total expenditure from transactions reduced by c. 40 per cent. However, since this early April low, these measures indicated a steady recovery until the resurgence of the virus in Autumn and Winter 2020, when significant restrictions on activity were introduced. The relaxation of restrictions in December 2020 and seasonal shopping saw a significant rise in spending in the run up to Christmas. This was followed by a significant fall in spending with the reintroduction of Level 5 restrictions, with spending falling to 20 per cent below its baseline levels. There has been a moderate increase in spending since, particularly Core retail, close to their pre-pandemic trend in May 2021, although all the indicators remain below their pre-pandemic levels.

FIGURE 2 INDICATORS OF CONSUMPTION OVER THE PANDEMIC



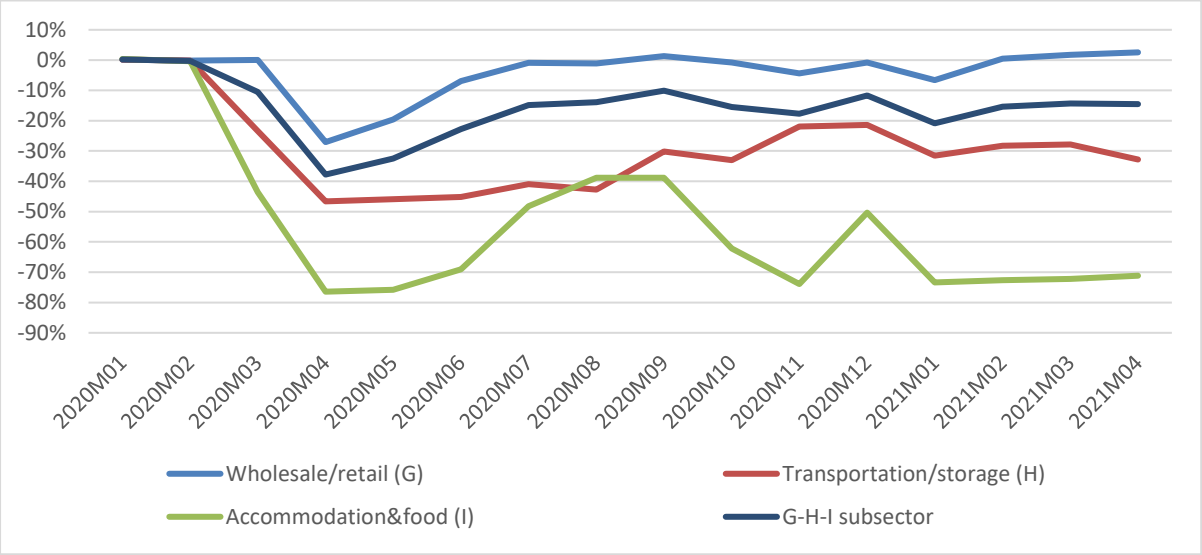
Sources: Revolut, CSO, Central Bank of Ireland.
Note: Revolut spending per user and Central Bank of Ireland daily debit card spending are reported as 7-day moving averages indexed to March 7 2020. Core retail sales are indexed to March 2020.

Although the Revolut data is available as 'spending per user', therefore accounting for growth in their user base over the period, card payments data comes with the caveat that there has been a move towards cashless payments since the onset of the pandemic. This means that any recovery based on card transaction data alone may be overstated. However, it can be used as a lower bound for the calibration of the initial shock and to provide a useful leading indicator of turning points for consumption.

FitzGerald (2020) suggests the fall in consumption in 2020 will lead to an increase in household savings rates across Europe. Taking a life-cycle model of savings and pointing to Ireland during the Second World War as a case where consumer spending was de facto rationed, it is argued that a consumer boom may follow the current crisis. The timing of any 'delayed stimulus' by consumers is however unclear and highly dependent on the public health situation with FitzGerald (2020) arguing that it may take place from 2022 when the public health emergency is 'fully' over, which may be significantly later than the lifting of initial lockdown measures. The high frequency payments data from Revolut and Central Bank of Ireland show signs of consumer spending increasing significantly following the lifting of restrictions on retail activity in December. However, whether any release of pent up demand with the unwinding of containment measures will match the extent and duration of foregone spending is unclear. Byrne *et al*. (2020) use responses to the Household Financial and Consumption Survey to estimate the marginal propensity to consume out of savings accumulated during the pandemic. They conclude that those most likely to have accumulated savings are also those with relatively low marginal propensities to consume, with any post-pandemic consumption boost lower than if saving were equally distributed among households. Flynn (2021) looks at the past experience of high savings rates during the operation of Special Savings Incentive Accounts in the mid-2000s, concluding that higher income groups are likely to 're-save' rather than consume excess savings built up during the pandemic.

Non-Traded Production

FIGURE 3 INDICATORS OF (NON-TRADED) SECTORAL PRODUCTION



Source: CSO Monthly Services Index

The non-traded sector in the COSMO model is the sum of all subsectors where less than 50% of final uses are exported. These domestic oriented industries have been particularly impacted since the onset of the pandemic and public health restrictions. This is especially evident in industries which largely depend on in-person services such as Accommodation and Food Services, which has remained largely closed for much of 2020 and 2021 to date. Barrero, Bloom and Davis (2020) note that as long as social distancing measures and concerns about infectious disease persist, the productive capacity of many in-person service businesses will be impaired. Any recovery in these industries requires inter alia the general unwinding of public health restrictions.

Other industries such as Wholesale and Retail, and Transportation and Storage have also seen large falls in activity, reflected in the CSO monthly services index (see Figure 3). There has however been some recovery in these industries despite recent restrictions suggesting that they may have adapted better during the pandemic. Retail businesses may for instance have moved more of their businesses online or to 'click and collect' services. This shift in activity is reflected in payment cards data, with significant increase in consumption taking place online during periods of restrictions (Department of Finance, 2020).

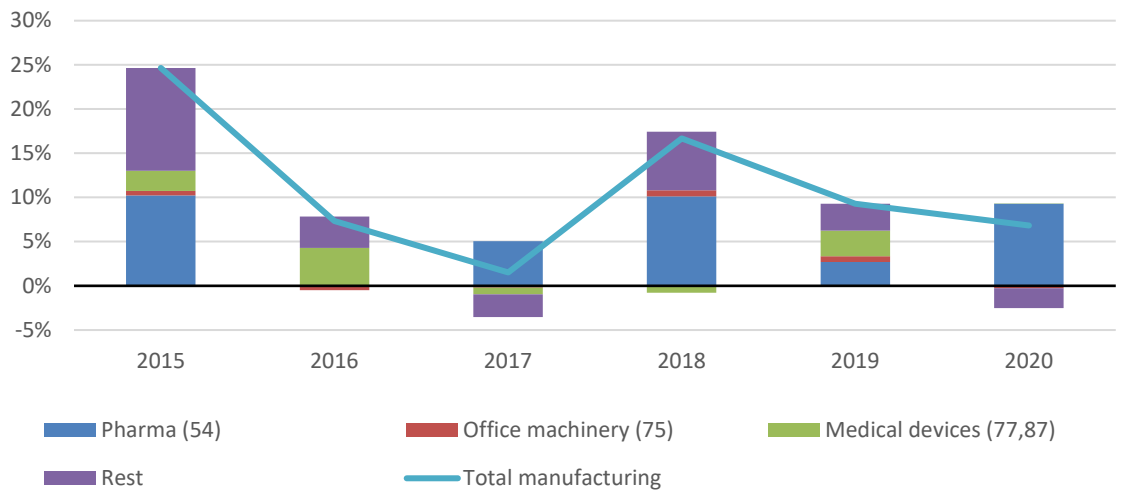
Activity in the construction industry has been similarly severely curtailed by the pandemic, with activity ceasing entirely during Q2 2020 and construction output falling by 32.6 per cent. These restrictions were subsequently relaxed but restrictions related to the pandemic have meant that efficiency was unlikely to be at pre-pandemic levels. During further restrictions in 2020 construction sites

remained open. Despite these restrictions, annual housing completions were only down 1.9 per cent on 2019 levels. Under restrictions in 2021, construction work with the exception of certain essential projects was halted for the entirety of Q1 and at least some portion of Q2. The effect of maintaining essential construction activity is reflected in PUP claimant data being well below its Spring 2020 peak, however social distancing measures and heightened uncertainty may slow any recovery (Allen-Coghlan *et al*., 2020).

External sector

Although the economy has suffered a considerable domestic shock affecting key aggregates such as consumption and output in the non-traded (domestic sectors), significant parts of the traded or export sector have been relatively much less impacted. There was a very limited slowdown in exports in 2020 with year-on-year growth of 6.2% (vs 10.5% in 2019). Manufacturing exports in particular have held up well – driven mainly by medicinal and pharmaceutical products (see Figure 4). The Irish economy's export orientation and the sectoral composition of exports seems to be alleviating the worst effects of the crisis (O'Toole, 2020). This may also be an important factor for the recovery as it was previously in the recovery from the financial crisis (see, for example McQuinn and Varthalitis, 2018).

FIGURE 4 SECTORAL CONTRIBUTIONS TO MANUFACTURING EXPORT GROWTH (PERCENTAGE POINTS)



Source: CSO External Trade Statistics

A slower than expected global recovery due to COVID-19 is a downside risk for the economy through the trade channel.

Summary of fiscal measures

A large number of fiscal support measures have been introduced to help support incomes and businesses, which will influence the recovery path of the economy.

Three major sets of fiscal supports were announced by Government during 2020. Firstly, during March and April 2020 as lockdown measures were implemented a range of income supports such as the PUP and TWSS were introduced. Temporary businesses supports, such as tax warehousing, loan guarantees and 'restart' grants were introduced for businesses. Following the lifting of many containment measures, the July Jobs Stimulus extended many existing income and businesses support schemes as well as measures aimed at boosting domestic demand. Thirdly, Budget 2021 further extended the fiscal measures, which were further expanded with the introduction of the Covid Restrictions Support Scheme (CRSS). This provides support to businesses which have either been prohibited from operating or are trading at significantly reduced levels as a result of the imposition of restrictions.

TABLE 2 FISCAL POLICY RESPONSE, € BILLION

International scarring estimates (per cent)	2020	2021
Transfers	9.4	6.0
Govt. Consumption	3.8	2.7
Other	3.1	4.6

Source: Department of Finance and authors' calculations.

The fiscal policy response to the pandemic has been calibrated from Department of Finance (2020a, 2020b) and adjusted to reflect the expected length of the lockdown. Individual policy measures are subsequently aggregated to COSMO spending categories and quarterly profiles are applied. Table 2 shows the breakdown of the government support measures in terms of transfers (income support schemes), government consumption (additional spending on health etc.) and other (includes business support schemes etc.)

3. SCENARIOS

3.1. APPROACH

Our approach is to replicate the COVID-19 shocks in our macro-econometric model COSMO and to examine a series of alternative adjustment paths for the economy. We use data to calibrate the behaviour of the Irish economy for 2020 and indicators to calibrate the early part of 2021, but thereafter we require assumptions to explore the recovery. We examine three potential recovery paths for the economy in the short and medium run, that also include possible long run implications like scarring. The purpose is to describe possible best and worst outcomes. All scenarios are compared to a no-pandemic baseline. This baseline includes a FTA between the UK and EU being in place by the beginning of 2021 and captures the historical and recent evolution of the Irish economy, with a medium-run GDP growth rate close to 3.5% and an unemployment rate around 6 per cent.

The three scenarios can be characterised as follows:

Upside scenario. In this scenario, tight restrictions limiting economic activity remain in place until June 2021. The vaccine rollout is successful and reaches a significant share of population during 2021Q3, allowing economic activity to return to normal by 2021Q4. The internal economy recovers to around 90% of its no-pandemic baseline by the end of 2021 and returns to baseline by late 2022. Non-traded output follows this pattern, but employment in the sector takes an extra year to return to its pre-pandemic baseline level. Consumption is almost back to its baseline level by the end of 2021, remains close to such levels until employment returns to baseline and then overshoots its pre-pandemic projection, as explained below. Investment is almost back to baseline levels by late 2021, but remains below the no-pandemic baseline over the short-term. The external environment follows the 2020 NIESR projection (Hurst et al. 2020), assuming a full recovery of world demand for Irish exports by 2021. The COVID scenarios in Hurst et al. (2020) include reduced consumer spending, an increase in business uncertainty, a reduction in hours of work due to illness and a temporary lockdown of economies. The assumption of a quick recovery for Irish exports is consistent with the behaviour of the external sector in previous crises and early indicators of activity in the sector.

Downside scenario. This scenario assumes a slow recovery of the internal economy. Output and employment in the non-traded sector is assumed to be 5% below the no-pandemic baseline by the end of 2024. The 5% difference to baseline is assumed to be of a permanent nature due to scarring effects. The weakness of the internal economy is motivated by continued uncertainty due to the potential threat of new variants, a slower vaccine rollout etc. The uncertainty also causes investment to recover slowly and remain at relatively low levels. Similarly, consumption recovers slowly, only returning to the no-pandemic baseline after 4-5 years. The continued weakness of the economy requires extended government support in the form of transfers, producing larger fiscal deficits. The external environment is the same as in the *Upside* scenario.

Repeated lockdowns scenario. In this scenario, repeated lockdowns are needed to contain the spread of the virus and potential new variants. To implement this in the model, we assume lockdowns are introduced every 3 quarters on a lockdown-recovery-plateau cycle: every lockdown is 75% as bad as the previous one and the next quarter sees a 2/3s recovery[1]. This pattern of shocks is applied to non-traded production and employment, consumption and investment. The return to the baseline level of output and employment occurs one year later than in the *Upside* scenario. As with the *Downside* scenario, extended fiscal support is required.

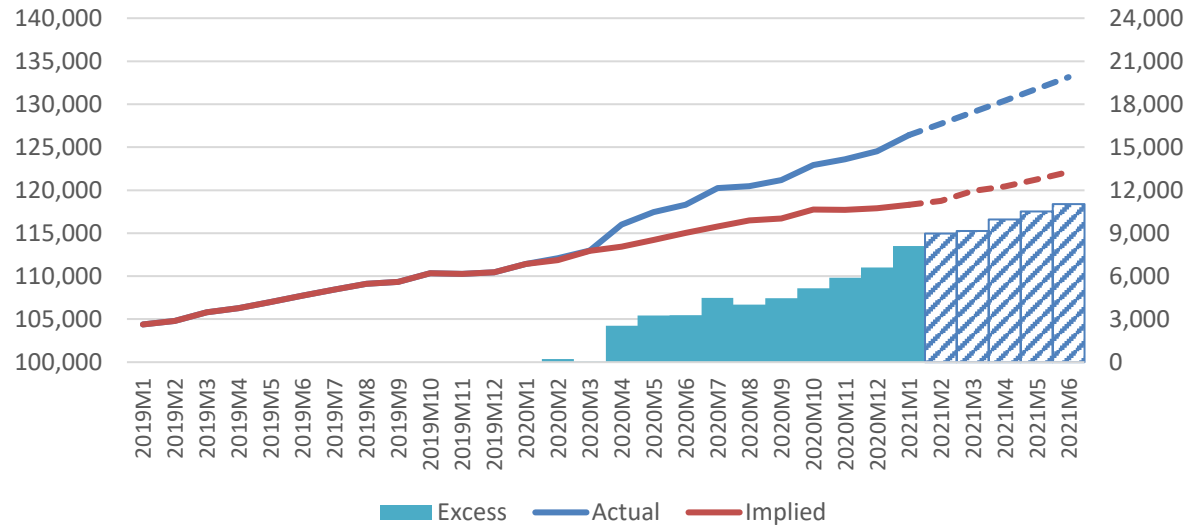
[1] For example, if a lockdown produced a 40% loss with respect to baseline, the next lockdown will produce a 30% loss and the following quarter the loss will be of a 10 per cent.

Repeated lockdowns produce scarring, assumed to be half as bad than the downside scenario. The external environment is the same as in the *Upside* scenario.

The scarring in the *Downside* scenario of a permanent 5% loss of non-traded output is at the lower end of the distribution of international estimates for scarring from the pandemic (discussed in the previous section in terms of losses to GDP). The pandemic has had a very uneven impact across sectors and the non-traded sector has been hit particularly hard. There are several potential channels through which the short-term disruption due to the pandemic could turn into long-term lower output levels and growth rates. High levels of unemployment can lead to hysteresis or deskilling, reducing future employment and wage prospects. Similarly, the loss of education due to school closures can translate into lower human capital and starting wages, with potential longer lasting effects. Potential output can be affected by lower investment due to uncertainty during the pandemic, producing slower economic growth in the future. Households could potentially increase their precautionary savings, reducing their consumption levels relative to before the pandemic; in turn, prolonged depressed demand can hurt productivity by reducing the incentives to introduce innovations.

One important factor for projecting the future path of the economy is the destination of the "excess deposits" accumulated during the pandemic. As can be seen in Figure 5, assuming tight public health restrictions end in June 2021, Irish households would have accumulated close to 11,000€M more in deposits than in an alternative situation where deposits had continued to grow at their 2019 levels, denoted by "implied" in the figure. These excess deposits have formed as a combination of increased precautionary savings, reduced opportunities for consumption, lower investment due to higher uncertainty and government intervention aimed at providing income support.

FIGURE 5 DEPOSITS: ACTUAL, IMPLIED (LEFT AXIS) AND EXCESS (RIGHT AXIS), € MILLIONS



Source: Central Bank of Ireland, authors' calculations

In the *Upside* scenario, COSMO endogenously generates overshooting in personal consumption, a level of consumption above the no-pandemic baseline, starting in 2023 following the economic recovery in late 2022. In COSMO, following the permanent income hypothesis, consumption is also a function of wealth, including deposits. Consequently, once the economy has recovered, the extra savings accumulated during the pandemic generates additional consumption. This overshooting in consumption has been kept below the excess deposits figure calculated above in the upside scenario, and has been further contained in the downside and repeated lockdowns scenarios. However, it is important to note that additional consumption is only one of many possible destinations of those extra deposits. They could also be used for imports (in the form of tourism expenditure), debt down-payments, remain as extra precautionary savings or "rainy day funds" or be used for mortgage deposits etc.

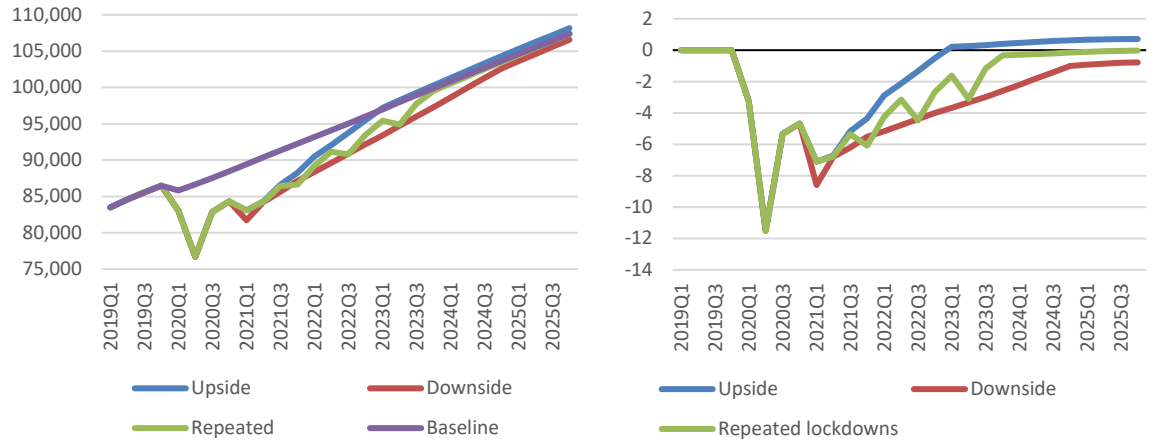
3.2. SCENARIO RESULTS

Figure 6 shows the evolution of GDP under the three scenarios. For each scenario, our counterfactual is a no-pandemic baseline so each of the alternative scenarios can be compared to this baseline to provide estimates of the potential impact of the COVID-19 shocks. The figure also shows the economic impact of the lockdowns implemented to control the spread of the virus in 2020 and 2021. The recovery to levels close to the no-pandemic baseline is achieved by late 2022 in the *Upside* scenario, by late 2023 in the *Repeated lockdowns* scenario and by late 2024 in the *Downside* scenario.

However, owing to scarring effects, GDP at the end of 2025 in the *Repeated*

lockdowns and *Downside* scenarios is below that of the *Upside* scenario; close to 1.5% below in the latter and 0.8% in the former. This scarring effect is assumed to be permanent. The evolution of GDP in the *Repeated lockdowns* scenario follows a path in between those of the *Upside* and *Downside* scenarios, but dips close to the *Downside* scenario every time a new lockdown is introduced. In the *Upside* scenario, the GDP level in the medium run moves above the pre-pandemic baseline. This results from some internal adjustment in the model (lower wage growth in the short run than in the no-pandemic baseline), producing a relative improvement in competitiveness for the Irish economy that benefits the traded sector in the medium run, resulting in some overshooting of GDP.

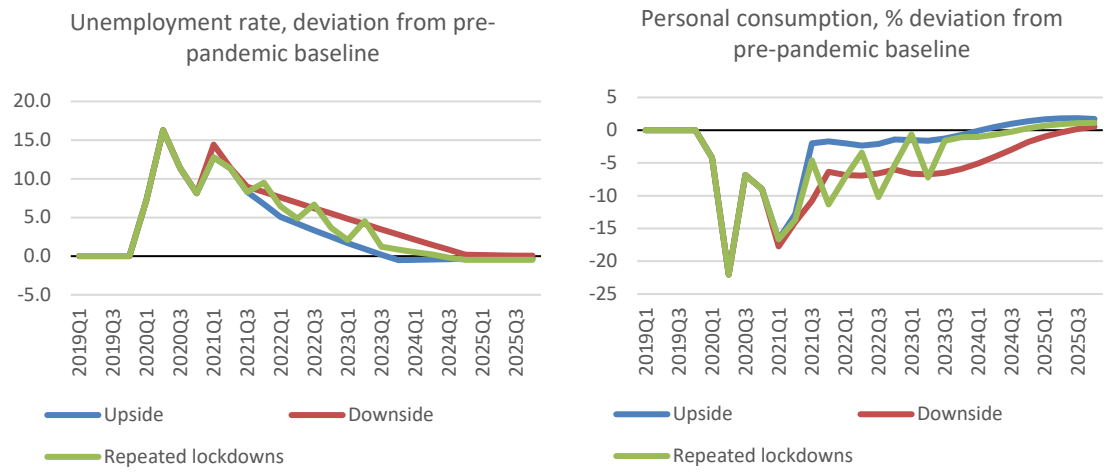
FIGURE 6 A) REAL GDP € MILLIONS B) REAL GDP, % DEVIATION FROM NO-PANDEMIC BASELINE



Source: Authors' calculations

Figure 7 shows the evolution of the unemployment rate and personal consumption compared to the no-pandemic baseline for all three scenarios. The trajectory of the unemployment rate follows a dynamic similar to that described for GDP, with the different speeds of recovery for each scenario and the impact of the repeated lockdowns clearly visible. One important difference, however, is that the labour market recovery in the *Upside* scenario is a bit slower in 2022 and the unemployment rate does not return to the no-pandemic baseline until 2023.

FIGURE 7 A) UNEMPLOYMENT RATE B) CONSUMPTION – RELATIVE TO NO-PANDEMIC BASELINE



Source: Authors' calculations

On consumption, the *Upside* scenario approaches the no-pandemic baseline as soon as early 2022, consistent with the waning of the pandemic and a successful vaccine rollout completed in the second half of 2021. The path of consumption for the other two scenarios is similarly in line with the projected conditions in those scenarios, with the impact of continued public health measures in the *Repeated lockdowns* scenario and with consumption remaining depressed due to the ongoing uncertainty in the *Downside* scenario. In the *Upside* scenario, following the recovery of the labour market by late 2023, consumption overshoots its pre-baseline scenario; this overshooting is a consequence of both the economy itself going above baseline, as mentioned above, and the partial unwinding of the "excess" deposits accumulated during the pandemic.

TABLE 3 IMPACT OF THE DIFFERENT COVID-19 SCENARIOS, DEVIATION FROM BASELINE

	2021	2022	2023	2024-30
Upside scenario				
Per Cent Deviation from no-pandemic baseline:				
GDP	-5.8	-1.7	0.3	0.6
GVA, Traded sector	-1.8	-1.2	-0.8	-0.2
GVA, Non-traded sector	-18.1	-6.2	0.0	0.0
Consumption	-8.2	-2.0	-1.3	0.4
Employment	-14.2	-5.4	-0.4	1.3
Exports	-2.1	-1.4	-0.9	-0.2
Investment	-21.9	-4.5	-2.8	2.8
Deviation from no-pandemic baseline:				
Unemployment rate	9.8	3.8	0.6	-0.3
General gov balance, % GDP	-5.7	-2.1	-1.7	-1.5
Downside scenario				
Per Cent Deviation from no-pandemic baseline:				

GDP	-6.8	-4.6	-3.1	-0.9
GVA, Traded sector	-1.8	-1.2	-0.8	-0.2
GVA, Non-traded sector	-20.4	-15.2	-10.9	-5.2
Consumption	-12.2	-6.6	-6.4	-1.0
Employment	-15.6	-9.3	-5.1	0.6
Exports	-2.1	-1.4	-0.9	-0.2
Investment	-31.0	-27.0	-22.8	-6.0
Deviation from no-pandemic baseline:				
Unemployment rate	10.8	6.5	3.8	0.0
General gov balance, % GDP	-6.1	-2.8	-2.4	-1.4
Repeated lockdowns scenario				
Per Cent Deviation from no-pandemic baseline:				
GDP	-6.3	-3.6	-1.6	-0.1
GVA, Traded sector	-1.8	-1.2	-0.8	-0.2
GVA, Non-traded sector	-19.0	-11.8	-6.2	-2.5
Consumption	-11.5	-6.5	-2.6	-0.5
Employment	-15.2	-7.7	-2.8	1.4
Exports	-2.1	-1.4	-0.9	-0.2
Investment	-29.1	-17.4	-10.8	-0.2
Deviation from no-pandemic baseline:				
Unemployment rate	10.5	5.4	2.2	-0.5
General gov balance, % GDP	-6.0	-2.6	-2.0	-1.5

Source: Authors' calculations.

Finally, Table 3 presents an overview of the impact (shown as deviations from the no-pandemic baseline) of COVID-19 across the scenarios for key economic indicators. For all scenarios, the impact of the pandemic is much more intense in the non-traded than in the traded sector. As explained in Section 2, the external sector in Ireland has both helped to reduce the negative impact of the economic shock and to bolster the recovery. On investment, its trajectory in the different scenarios is determined both by overall economic activity and also the uncertainty facing firms which is larger in the more negative scenarios. In the *Upside* scenario, only 2021 sees a strong fall with respect to the no-pandemic baseline, whereas the fall in the following year is more muted and eventually over the medium run there is some overshooting once the economy recovers. In contrast, both the *Downside* and *Repeated lockdowns* scenarios have depressed levels of investment over the following years as uncertainty persists. The deterioration of the economy can also be observed in the fiscal position of the Government. The more pessimistic scenarios register larger deficits, as a consequence of a weaker economy that generates less tax revenue and requires larger fiscal transfers. In all scenarios, some of the additional government expenditure introduced during the pandemic is assumed to be permanent, so the government deficit is higher in the medium term.

4 CONCLUSIONS

The ongoing pandemic and the public health measures needed to contain the virus led to substantial economic losses in 2020 which will persist for some time in 2021 while the economy remained in a strict lockdown. The exact timing and especially the speed of the recovery is hard to determine as it depends on factors including the successful and timely rollout of effective vaccines, the emergence of new mutations of the virus, the behaviour of consumers and firms once restrictions are lifted, the progress of the global economy to deal with the virus etc.

In this paper, we update previous analysis of the potential impact of COVID-19 to take account of new data and findings from the literature and we generate three scenarios which represent a range of potential adjustment paths over the short to medium term. These include an *Upside* scenario where tight restrictions are eased in the coming months, the vaccine rollout is successful and economic activity returns to its pre-pandemic trend by the end of 2022. In the *Downside* scenario, the recovery in the domestic economy is slower due to potential new variants of the virus, the need to continue with some public health measures which will keep activity below where it otherwise and some amount of uncertainty persists which affects investment decisions by firms etc. This scenario also incorporates some scarring effects whereby some of the losses in output and employment in domestic sectors are assumed to be permanent. In this scenario, it is late 2024 before the economy recovers its pre-pandemic trend, in terms of level and projected growth rate. In a *Repeated lockdowns* scenario, the trajectory of the economy is between the other two scenarios. It is important to stress that none of these scenarios are likely to capture the future trajectory of the economy, these are illustrative of what could happen on the basis of certain assumptions and in many respects capture the best and worst outcomes.

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