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An Evaluation of the Impacts of Remote Working

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This evaluation has been carried out by the Labour Market and Skills Unit in the Department of Enterprise, Trade and Employment. The views presented in this paper do not necessarily represent the official views of the Department or Minister for Enterprise, Trade and Employment.

IGEES

Irish Government Economic and Evaluation Service

Executive Summary

- This document evaluates the impacts of remote working to the Irish economy and society, building on the goals set out in the National Remote Work Strategy. Mixed analytical methods are used, including Cost-Benefit Analysis for impacts that are easily quantifiable, and the analysis of trends and descriptive statistics for less quantifiable metrics.
- Overall, the evaluation finds that remote working is likely to have a positive impact on the Irish economy and society.
- The evaluation finds strong evidence that both businesses and employees have post-pandemic plans to increase the levels of remote working compared to pre-pandemic levels.
- The paper examines the impact remote work is likely to have on employees' productivity. While theoretical evidence is mixed, survey data indicates that, on average, management and employees alike expect remote working to improve productivity.
- It is likely to be the case that remote working boosts productivity in many occupations but reduces it in others. Because of this, individual firms and workers must make decisions as to whether they believe they are more productive working remotely.
- Evidence suggests that remote working should improve labour market outcomes for both people with disabilities and caring responsibilities. Remote work enables improved access to the workplace through greater flexibility in terms of time management, childcare and commuting options. It is important however that firms do not use remote working to avoid providing required workplace provisions for people with disabilities.
- Section 3.3 of this report assesses the impact that remote working will have on regional development and on the environment. The evaluation found evidence to suggest that housing demand in more rural regions outstripped that of cities, at least in 2021. The evaluation found there to be an inverse relationship between recent house price and rent growth, and population density.
- Emissions savings made from reduced transport usage are likely to exceed any extra household emissions, leading to net environmental gains from remote working. This paper estimates that remote working has the potential to save 164,407 tonnes of CO₂ a year, with an equivalent monetary saving of €7.6m. These potential benefits depend on a variety of factors, however, and the analysis assumed that there would be no secondary environmental effects such as remote workers taking more frequent, shorter trips during the day.
- The final impact assessed is remote work's effect on public and private finances. The evaluation finds that potential cost savings for employees could be large, with any increases in heating and electricity costs likely to be outweighed by a reduction in commuting costs.
- Estimated annual increases in heating and electricity costs for households are €79 and €30 respectively. Potential savings from reduced commuting are estimated to be €413 per remote worker. Remote workers can save an average of 93 hours per year through reduced commuting – with an equivalent monetary benefit of €1,103.
- Firms too can make significant cost savings if they downscale expensive city centre offices. Past IGEES studies indicate potential benefits for firms to be approximately €1,492 per

employee per year. This is on top of benefits accrued through improved employee productivity.

- It is still unknown at this time what the impact of remote working will be on the Exchequer. There are potential costs of €200m per year, although the majority of this is likely to come through a reduction in 'corrective' tax receipts, such as excise duties. It has not been possible to estimate all of the potential benefits or costs to the Exchequer.
- As for most remote workers and firms, benefits of remote working are likely to outweigh the costs; there is likely to be little market failure for the government to correct. While blanket spend to encourage remote working could lead to deadweight loss, targeted spending measures could improve remote working outcomes for specific cohorts (e.g., people with disabilities).
- It is advised that the impacts of remote working are monitored on an ongoing basis as more data and empirical evidence comes to light.

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Chapter 1: Introduction

1.1 Introduction

This chapter sets out the rationale for, objectives of, and methodology used in this evaluation. The purpose of this document is to evaluate the economic impacts of remote working to the Irish economy. An ex-ante evaluation of impacts such as this helps to secure improved value for money of public expenditure, as it provides a basis for more informed decisions to be made on priorities within and between initiatives/programmes. The Public Spending Code emphasises the importance of ensuring value for money of public investments as well as employing good review and evaluation practices at all stages of the expenditure life cycle.

1.2 Background to Remote Working

The COVID-19 pandemic forced millions of people around the world to switch from office working to remote working almost overnight. Despite the gradual easing of lockdown restrictions, the pandemic has created a 'new normal' working culture, whereby employees want more flexibility in terms of their working location and hours. A CSO 'Our Lives Online' pulse survey from November 2021 suggests that 88% of people in employment who are able to work remotely would like to continue to do so at least some of the time post-pandemic. Not only do employees want to increase their usage of remote working, but evidence to date shows that employers are willing to facilitate the change too. Within the Civil Service, for example, the National Remote Work Strategy outlines that remote work will be the norm for 20% of public sector employment, while the Blended Working Policy Framework, published in March 2022, provides an overarching framework for how Civil Service organisations can facilitate remote working. In the private sector, multinationals such as Google, Microsoft, and Siemens have announced they are willing to facilitate more remote working after the pandemic (Forbes, 2021). For some businesses, however, remote working may not be possible at all if staff are required to work in close proximity to onsite capital or provide face-to-face services.

The National Remote Work Strategy aims to ensure that the increase in remote work adoption changes Ireland for the better. Remote work reduces the need to commute to work, giving more time for family and leisure and leading to fewer commuting-related greenhouse gas emissions. Furthermore, new job opportunities could be available for people who want to live in rural Ireland, taking strain off the housing market in cities. This can increase footfall and spending in smaller towns and villages across Ireland. Remote work can also facilitate access to employment for people with disabilities or caring responsibilities by enabling greater flexibility and choice in terms of time management, commuting and childcare options. This can help to achieve the goals of other government strategies, including the Economic Recovery Plan, and Pathways to Work.

However, despite there being clear benefits to remote working, there are also potential drawbacks. These include increased electricity and heating usage in homes, and that the increased uptake of remote work could negatively impact city centre businesses reliant on office workers. Academic literature to date has also found mixed results regarding remote work's impact on productivity, and some literature (Russell et al., 2009) has found that remote working can lead to work-life conflict due to blurred boundaries between work and home life.

The time period being examined for the evaluation is pre-pandemic levels of remote work (2015-2019) and current/future levels of remote work (2022-2025).

1.3 Rationale and Objectives for the Evaluation

1.3.1 Alignment with National Policy Objectives

This ex-ante evaluation of 'remote work' is being carried out for the following reasons:

- To assess the impacts to the Irish economy of remote working.
- To inform future policy development in the field of remote work.

The evaluation is being performed in line with the goals set out in the National Remote Work Strategy. Pillar Three of The National Remote Work Strategy states as a goal:

“Establish a centralised cross-departmental knowledge base on the costs and benefits associated with the increased adoption of remote working to understand impacts on areas such as, employment, transport, carbon emissions, broadband, and equality. (DETE, DRCD, DoT, DECC, DCEDIY, Q4 2021)”

This goal was partially achieved through the implementation of a cross-departmental Hive site. This document directly builds on the above goal and takes it one step further in that it evaluates these impacts. This evaluation also provides an evidence base for any future policy developments to encourage the use of remote working, or policies to mitigate any negative impacts.

The metrics which measure the impacts of remote working are presented in Table 2 in section 2.2. There are differing measures of success depending on whether remote working is evaluated from a business, societal, or employees' point of view.

1.3.2 Addressing Market Failures

Market failure is a general term describing situations in which market outcomes are not Pareto efficient (OECD). One example of market failure is when goods or services are not supplied in sufficient quantities by markets. Remote working potentially has positive externalities (environmental impact, reduced congestion etc.) across the economy, and so may not be 'supplied' in sufficient quantities without government intervention if individuals and employers do not take into account the economy-wide benefits when choosing to work remotely or not. However, as mentioned earlier, a survey undertaken by the CSO in November 2021 found that 88% of participants who are able to work remotely wanted to continue doing so after the crisis. Furthermore, a pre-pandemic study in the United States by Mas and Pallais (2017) found that study participants were willing to give up an average of 8% of their wages for the option to work from home. This suggests that there may be little need for government to actively incentivise workers to work remotely (Department of Finance, 2021). The available tax reliefs provide a signal to firms and workers that government encourages the use of remote working, however, and distributional effects of the tax policy are likely to be small. Furthermore, while there may be little need for blanket incentivisation, targeted spending measures could improve remote working outcomes for specific cohorts (e.g., people with disabilities).

This evaluation assesses remote work's impact on household costs, as remote working can lead to an increase in household costs such as heat and electricity but also lead to a reduction in commuting costs. If increased household costs were found to be prohibitive to remote working, government intervention, whether through tax incentives, or other means, could align individuals' incentives with that of society, and allow society to reap the benefits remote work can offer. This evaluation will therefore also assess whether policy development is needed to further encourage the use of remote work. Budget 2022 has already increased the amount of heat and electricity employees can claim while remote working. Employees can now claim an income tax deduction of 30% of the cost of vouched expenses for heat, electricity and broadband, an increase from 10% in previous years. It remains to be seen how effective these measures will be.

From an employers' perspective, a National Competitiveness and Productivity Council report indicates that the potential savings for businesses that may arise from remote working could be

large. The report states “a move away from large-scale headquarters in expensive city-centre locations not only provides cost savings for firms in terms of office rental or acquisition, but also potentially reduces related costs like electricity, lighting, heating, cleaning and catering.” Furthermore, remote working can reduce factor immobility and allow firms to expand more easily into new regions/markets. However, the report stressed that it is important for firms that any cost savings generated from reduced office expenditure are not eroded away by the costs of providing a remote working option to employees. If firms have the cost burden of managing both office and remote working spaces, they may be unwilling to facilitate the use of remote working for employees.

DETE recently published the results of a public consultation on a legal framework for employees to request remote work, with 84% of respondents indicating that employers should be obliged to have a remote work policy that the Workplace Relations Commission can inspect. Following this consultation and a review of international best practice, in January the Government approved the priority drafting of the Right to Request Remote Work Bill 2022. Pre-legislative scrutiny by the Joint Oireachtas Committee on Enterprise, Trade and Employment commenced in early February. The legislation will take a balanced approach, recognising that remote working is not suitable for everyone and every organisation.

1.4 Report Structure

As previously mentioned, this evaluation aims to assess the impacts on the Irish economy of remote working, and to inform future policy development in the field of remote working. The structure of the report broadly follows that of the Forfás Framework for the Evaluation of Enterprise Supports (2011), which has been used as a starting point for other IGEES evaluations. Below is the report structure:

- Chapter 1 – This chapter explains the rationale behind the remote work evaluation and introduces the key objectives of the evaluation.
- Chapter 2 – This chapter describes how potential outcomes of remote working can be evaluated. Mixed analytical methods are proposed, including Cost-Benefit Analysis (CBA) for impacts that are easily quantifiable, and the analysis of trends and descriptive statistics for less quantifiable metrics. Methodological challenges and data sources are also explained in this section.
- Chapter 3 – This chapter evaluates the impacts of remote working. The outcomes are split into four categories: Labour Markets (including remote work incidence and labour market participation), Productivity, Rural Development and Environment, and Public and Private Finances. Data is visualised and evaluated, and more comprehensive literature reviews are performed.
- Chapter 4 – This chapter reports the conclusions of the evaluation and explores whether there is a need for policy development to reap the benefits and mitigate any negative impacts of remote working.

Chapter 2: Methodology

2.1 Summary of Evaluation Methodology

In this section, an appropriate evaluation methodology and analytical techniques are identified to assess remote work's impacts. Each outcome of interest is laid out in Table 1, and its indicators explained. The impacts evaluated in this report are not an exhaustive list of all impacts of remote working but were deemed to be the main impacts across the economy. Outcomes not evaluated in this report include transitional costs to firms and employees, such as the development of remote working HR policy, or initial remote software training costs, and some potential societal benefits that would be especially challenging to quantify, such as reduced road traffic accidents and traffic congestion.

Mixed analytical methods are proposed, including Cost-Benefit Analysis (CBA) for impacts that are easily quantifiable, and the analysis of trends and descriptive statistics for less quantifiable metrics. CBA provides a structured and transparent process to support objective decision making. This mixed analytical approach is the best approach for analysing the impacts of remote work, due to the nascent nature of the policy (lack of existing empirical evidence and data), and the difficulty in determining the causal effect of remote working for some metrics.

Table 1 below provides a summary of the methods proposed:

Table 1: Summary of methodologies used to assess impacts of remote working

Metric	Description	Data Sources	Methodology
1. Change in Incidence of Remote Work	It is expected that people will frequently work remotely post-pandemic.	Census, NUIG-WDC Survey, Indeed.com, Labour Force Survey (LFS), CSO Pulse Survey: Our Lives Online, NTA Survey	Descriptive statistics and trend analysis of data.
2. Change in Labour Market Participation (especially people with disabilities and caring responsibilities)	Remote work removes spatial and transportation barriers to working, as well as offering greater working flexibility.	Academic Literature, LFS, CSO Pulse Survey: Our Lives Online	Literature review, descriptive statistics.
3. Change in Employee Productivity	Remote working is likely to affect productivity through two main channels: worker efficiency, and cost reduction.	Academic Literature, NUIG-WDC Survey.	Literature review, descriptive statistics.
4. Regional and Rural Development	Remote working allows businesses and workers to move out of city centres to suburban, regional or rural areas where rents are cheaper. This may come at the expense of growth in city centres.	Academic Literature, GeoDirectory, Daft.ie, Myhome.ie, CSO Pulse Survey: Our Lives Online, CBI forecasting, Residential Property Price Index.	Literature review, descriptive statistics and trend analysis of data.

5. Change in levels of Environmental Pollution	Remote work reduces the need for commuting (reducing transport emissions), although is likely to increase household pollution (increased need for heating and electricity). It is still unclear the impact remote work will have on non-work-related trips, or trip distance.	Census 2016, National Transport Authority data (NTA), Sustainable Energy Authority Ireland (SEAI) data, CSO Pulse Survey: Our Lives Online, Academic Literature.	Cost-Benefit Analysis, literature review.
6. Change in Household Costs	Some households will save money by not commuting into work (fuel, tolls, public transport costs) but will spend more on household electricity and heating bills.	CSO, NTA, SEAI, Academic Literature.	Cost-Benefit Analysis.
7. Impact on Exchequer	Remote work will have an impact on public finances through several mechanisms (excise duties, taxation, spending implications).	CSO, NTA, SEAI, GeoDirectory, Daft.ie, Myhome.ie, Academic Literature.	Cost-Benefit Analysis, literature review.

2.2 Data Sources

To undertake the evaluation, various data sources were identified that could help assess the impact of remote work. These data sources are listed in the above table. A more detailed review of data sources which were used to assess the impact of remote working was completed by DETE, in line with action 3 of Pillar 2 in the Remote Work Strategy. As part of this action, a 'Metrics Data Evaluation' document was created. This document describes in detail the data sources that have assisted with this evaluation and outlines different data sources strengths and weaknesses.

A mix of quantitative and qualitative data has been used in the evaluation. Survey data from a wide range of sources including the CSO, NUIG-WDC, and the NTA predominantly have been used to establish a remote work baseline – to determine the incidence of remote work both prior to and post-pandemic. Other quantitative data used comes from an array of sources depending on the metric being evaluated. For example, data from Indeed.com has been useful in determining incidence rates of remote work across the population, and data from Daft.ie and Myhome.ie has been used to assess changing housing trends across the country. Academic publications and previous IGEES evaluations have also been used to inform this review, primarily to evaluate metrics where the causal impact of remote working is difficult to assess – such as productivity, or labour market participation impacts.

Overall, data availability was limited, so at times assumptions have been made when estimating potential effects. These methodological challenges are discussed in more detail in section 2.3 below. In order to conduct a more robust analysis, a deep mine of quantitative data is needed regarding the impacts of remote working. It is advised that the impacts of remote working are monitored on an ongoing basis as more data and empirical evidence comes to light. 'Future Data Sources' have been specified at the end of each section which can be used to assess future impacts.

2.3 Methodological Challenges

There were several methodological challenges in this evaluation. The majority of challenges stem from the fact that remote work is a new policy field, and so there has been relatively little academic research on the subject, and there is a lack of data to assess some impacts empirically. Regression analysis and other econometric approaches have therefore been avoided, as a lack of reliable data would result in findings lacking robustness and consistency. Table 2 below summarises the methodological challenges relating to each remote work impact:

Table 2: Summary of methodological challenges in assessing the impacts of remote working

Metric	Methodological Challenges
1. Change in Incidence of Remote Work	The main challenges with assessing the incidence of remote working are establishing a pre-pandemic baseline and that it is still difficult to assess exactly what its popularity will be post-pandemic. Survey data gives an indication as to its incidence rate post-pandemic, although employees' wishes may not align to that of their employers. The largest challenge here however is establishing a rate of remote work pre-pandemic. There are limited data sources which explicitly assessed this, so a variety of sources have been used (Job Sites, Census, LFS, Hub Data) to give an indication as to its popularity. Throughout the Cost-Benefit Analysis section, an assumption that there will be 400,000 remote workers post-pandemic has been made – an increase of 210,000 compared to pre-pandemic levels. These estimates are explained in more detail later in the paper.
2. Change in Labour Market Participation (especially people with disabilities and caring responsibilities)	Assessing whether remote work has led to an increase in employment for both people with disabilities and caring responsibilities is challenging. There are many factors which would influence the level of employment of both groups over time, so attributing any increases in employment seen in LFS, GHS or Census survey data directly to remote work is not possible. Furthermore, the COVID-19 unemployment shock is an issue which, in the short term at least, led to higher levels of unemployment, making comparisons to pre-pandemic data challenging. Regression or econometric analysis is therefore not possible. Instead, a literature review of theoretical and empirical evidence to date has been performed.
3. Change in Employee Productivity	The impact of remote work on productivity is difficult to assess quantitatively due to the multitude of factors affecting productivity in different sectors at any time. Some of the supposed longer term productivity issues caused by remote work such as reduced innovation are especially difficult to measure. Survey data, such as the NUIG-WDC Remote Work Survey and Microsoft's hybrid working survey, can be used to give an indication of productivity impacts. One drawback of the NUIG-WDC survey is that the respondents to these surveys were self-selected which could bias results. Furthermore, respondents may conflate output with productivity as there is evidence that remote workers simultaneously report working longer hours and being more productive.
4. Regional and Rural Development	As with productivity, it is difficult to assess the true causal impact of remote work on general regional development (local economy spending, house prices etc.) due to the multitude of factors that affect development in an area at any given time. That being said, there is a wide range of data sources available to evaluate this impact in the short-term, particularly surrounding housing market trends, so quantitative analysis in the form of trend analysis and descriptive statistics is possible. Longer-term impacts such as increased housing supply, or increased consumption in local businesses are more challenging to assess, so data will have to be evaluated on an ongoing basis to assess this impact.

5. Change in levels of Environmental Pollution	This impact is evaluated using a cost-benefit analysis approach – assessing all environmental benefits on a comparative monetary scale. One challenge with doing this is that assumptions have to be made during the analysis, such as for levels of commuting reduction, the number of remote workers, or household electricity consumption, for example. As the analysis relies on assumptions rather than real world data, there will potentially be a wide margin of error with the estimates. Furthermore, especially with regard to commuting, it is unknown whether there will be any secondary environmental impacts of remote work, such as people choosing to live further away from their office or switching from using public transport to a car or bicycle if roads are quieter. The estimates will nevertheless provide a useful indication as to the effect remote work will have on the environment.
6. Change in Household Costs	The same challenges as above are present when evaluating the impact on household costs. Assumptions must be made surrounding average increases in heating, broadband and electricity usage, as well as commuting distances. Once again, these estimates will still provide a useful estimate as to how remote working will affect household costs, on average. They are especially useful for assessing whether government expenditure in the form of tax breaks for heating and electricity costs are necessary.
7. Impact on Exchequer	Remote work will have an impact on public finances through many mechanisms, some of which are relatively easy to estimate quantitatively – such as fuel excise duty losses – while others, such as increased income tax revenue, are not. This is because it is difficult to determine the exact causal effect of remote working on some metrics. A literature review is also performed to provide evidence as to the expected direction of effect when quantitative data is hard to come by.

Chapter 3: Evaluating Remote Work

3.1 Impact on Labour Markets

3.1.1 Incidence of Remote Work

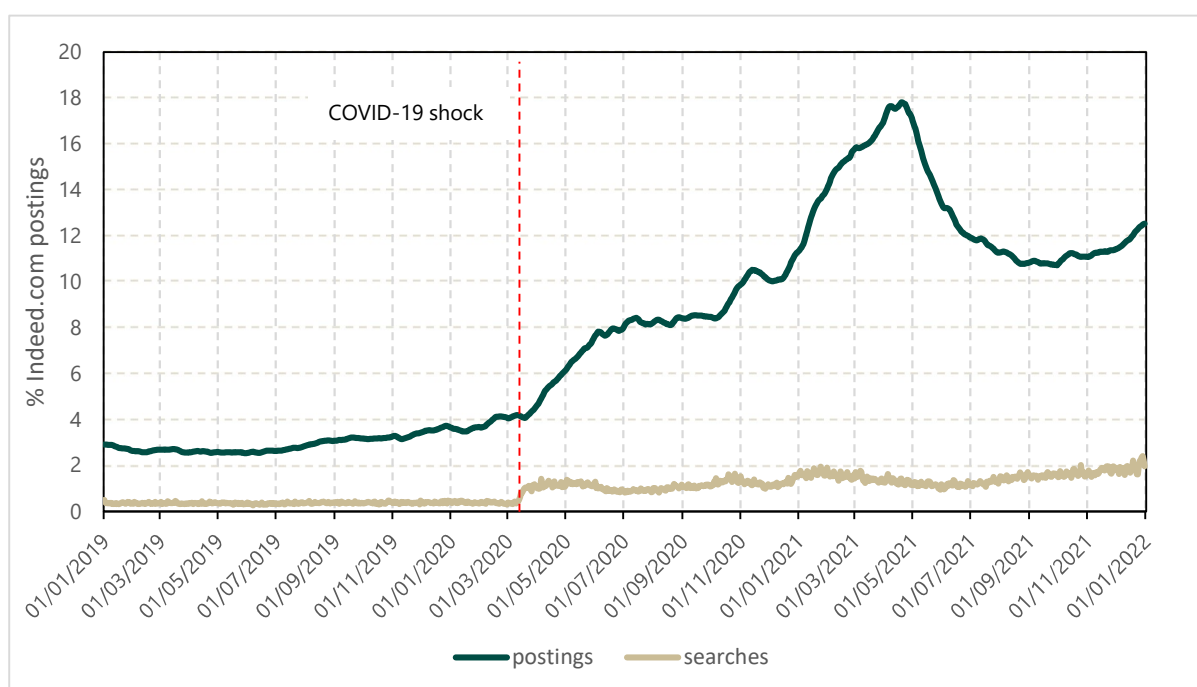
Before being able to assess the impact of remote working, a baseline must be established as to the incidence of remote work, both pre- and post-pandemic.

Pre-pandemic

Clear pre-pandemic data on the prevalence of remote work in Ireland is limited. The National Competitiveness and Productivity Council report “Ireland’s Competitiveness Challenge 2020” states that there was evidence before the COVID-19 crisis that 14% of employees in Ireland worked from home in some capacity. This is supported by an ESRI (2020) report which finds that pre-pandemic, 13.2% of employees worked remotely. Meanwhile, in 2018 the CSO undertook a pilot survey of 15,000 homes to inform the 2021 Census. The results of this pilot found that 18% of respondents worked from home, with 35% of those choosing to work from home just 1 day a week.

DETE have collaborated with Indeed.com, a popular job postings website, to establish trends in the popularity of remote work over time. While one cannot draw direct economy-wide conclusions from their data, as not all jobs are advertised on Indeed.com, and some firms may not necessarily include ‘remote terms’ in their listings even if offering flexible working, it nevertheless gives a useful indication as to the popularity of remote work at any given time. One advantage of this data source is that data is granulated by day, so changing trends in remote work’s popularity are captured immediately.

Figure 1: Percentage of Indeed.com job postings and searches containing remote work terms Jan 2019-Dec 2021 (Indeed.com)



Looking at Figure 1, pre-pandemic, the percentage of job postings on Indeed.com that mentioned remote work was low but on a gradual upward trend. In one year, the percentage of 'remote work' job postings rose from 3% of all jobs in January 2019 to approximately 4% in January 2020. The sudden introduction of lockdown restrictions led to an explosion in remote work interest with job postings mentioning remote work accounting for 12.5% of total postings in December 2021. This is a fall from a high of 18% in February 2021 however, likely due to the gradual easing of lockdown restrictions.

In terms of industry specific data, Indeed.com data reveals that the occupations with the greatest increase in remote work postings from January 2020 to August 2021 were Software Development (20 ppts), Arts & Entertainment (19 ppts), and Media and Communications (19ppts). On the other hand, Hospitality & Tourism (0ppts), Food Preparation & Service (0ppts), and Industrial Engineering (0ppts) were the occupations with the lowest increase in remote jobs advertised over the period. These data serve as a reminder that while some occupations are well-suited to the adoption of remote work, certain industries will be unable to cater for it.

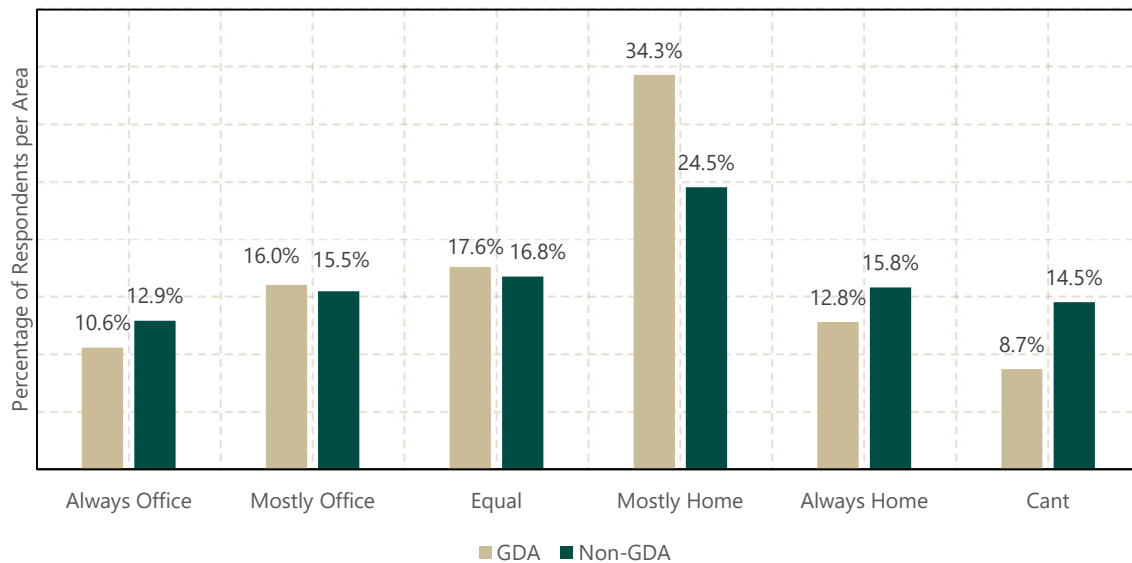
Post-pandemic

At the time of writing, restrictions brought in to curb the COVID-19 pandemic had not yet been fully lifted, so it is challenging to determine what exactly the future of work (and with that, remote working) will look like post-pandemic. Levels of remote working across an economy over time will depend on both macro and micro factors. Survey data is the most appropriate data source to use to assess what the future remote working landscape will look like. The National University of Ireland, Galway (NUIG), and Western Development Commission (WDC) have performed three 'remote work' surveys during the pandemic, asking employees and managers alike about their preferences and expectations of remote work post-pandemic. The April 2021 edition of the survey attracted 6,442 respondents, a sizable sample, however a drawback of the survey was that respondents were self-selected. Only people with a particular interest in remote working are likely to answer the survey which means the results will not be externally valid to the whole population. However, in the absence of other data, the NUIG-WDC surveys are critical to understanding the remote work landscape in Ireland. The April 2021 edition of the survey found 95% of respondents wanted to work remotely at least some of the time post-pandemic, an increase of 12 percentage points from the April 2020 edition. This growth could be due to an increased awareness of the benefits of remote working, and the fact workers have now learnt to overcome technological challenges they faced with remote working initially.

The National Transport Authority (NTA) also commissioned surveys in 2021 to examine the desire to work from home post-pandemic. The advantage of their surveys was that respondents were not self-selected (i.e. were random samples) so results are more representative of the population. One survey was conducted at a national level (Non GDA), and another focused on people living in the Greater Dublin Area (GDA). The GDA consists of the four Dublin local authorities as well as Meath, Kildare and Wicklow. It is important to note that the NTA surveys, presented below, estimate an absolute upper bound for working from home. This is because the surveys asked about people's desire to work from home (i.e. people could work where they pleased and were not restricted).

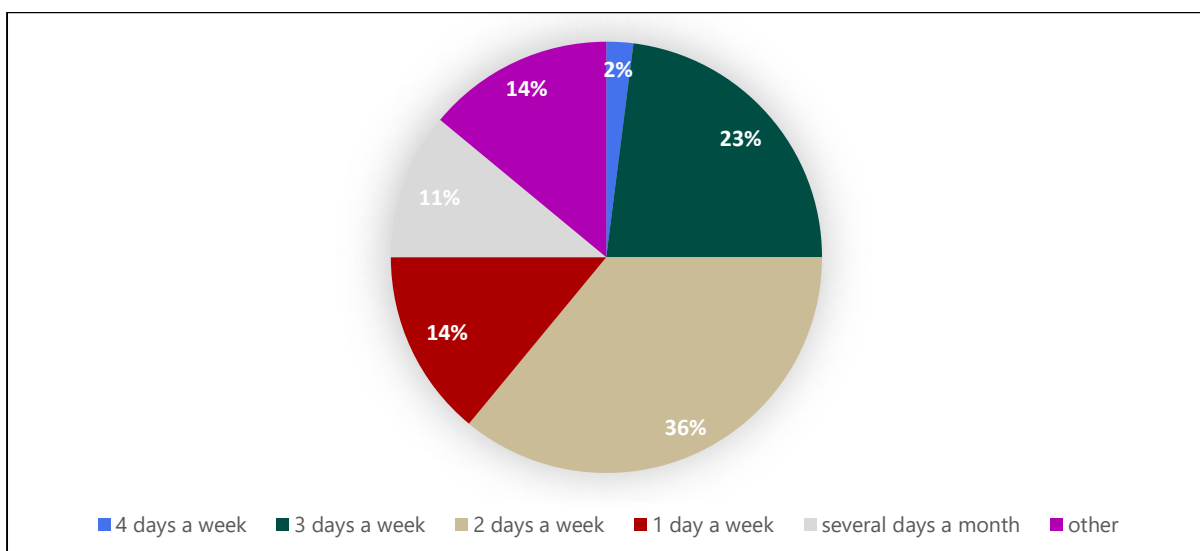
Figure 2 shows that, like with the NUIG-WDC survey, the majority of respondents would like to work from home at least some of the time. The most common preferred work from home frequency for 'white collar workers' was 'mostly from home' – in other words, greater than 2.5 days but less than 5 days per week.

Figure 2: Preferred frequencies of working from home post-pandemic – Greater Dublin Area (GDA, N=586) vs National Results (Non-GDA, N=310) (NTA Remote Working Surveys, 2021)



The above data suggests that employees wish to work predominantly from home post-pandemic. In reality however, the extent to which employees work from home will depend on employers' wishes too. The NUIG and WDC conducted a survey specifically aimed at people with management responsibilities in firms (n=2,184) to gauge decision-makers' expectations of remote work prevalence post-pandemic, rather than all employees'. Figure 3 below indicates that the most prevalent expected blended working approach post-pandemic is to work onsite at least 2 days a week (36% responded this). Just 2% of managers said they expected workers to be in the office at least 4 days a week, indicating remote working is going to become a permanent feature of the workplace for most firms.

Figure 3: Minimum number of expected days on site post-pandemic (NUIG/WDC Team Manager National Survey, April 2021)



Survey results from Dublin Chamber reach similar conclusions, with 81% of companies (as of Q4 2021) having plans to enable increased remote or flexible working post COVID-19. The Chamber recommends that future remote and flexible working policy is developed in light of the majority view in favour of a hybrid model of working from home and in the office (Dublin Chamber Business Outlook Survey, 2021).

Future Data Availability

- **Census 2022:** Census 2022 (as per the 2018 pilot) will include a question measuring the number of days people work from home on a weekly basis. Census data can be used to build a picture of who is remote working and to what extent, in what occupations/sectors (SOC/NACE codes) and where they are doing it (and if/how they are travelling to work- though this could be missed if travelling to a hub).
- **National Household Travel Survey 2022:** The NTA will be undertaking this survey in 2022 and will include some questions regarding working from home. This survey is usually collected every 5 years. This survey will also be useful when estimating transport-related impacts.
- **Revenue data on remote work tax reliefs:** The data can provide useful insights into incidence of remote work, as well as the demographic profile of remote workers. However, there is a four-year window for claiming tax reliefs so a considerable amount of time may elapse before accurate data emerges for a given year.
- **DETE Annual Employment Survey:** Future editions of DETE's Annual Employment Survey will include specific questions relating to number of staff working remotely, and the locations of remote workers. The next edition of the survey is expected to be published in February 2022.
- **General Household Survey (GHS) Work-related Leave and Flexibility module:** This survey will be a useful tool for capturing and analysing a wide range of data on remote work and remote workers according to demographic, locational, and occupational factors. It is unclear whether the module will be a one-off or will be repeated.
- **WDC-NUIG Survey:** The third annual WDC-NUIG remote work survey will be conducted in April 2022, providing for trend analysis on the key indicators captured in previous surveys.

3.1.2 Increased Labour Market Participation

Increased labour market participation, particularly of people with disabilities, or caring responsibilities, is another key outcome of interest to be tracked in the National Remote Work Strategy. Increased labour market participation can result in higher economic activity and associated increased income tax revenue for government and reduced spending on unemployment payments and income supports. Female labour market participation rates in Ireland have increased by 3.5 percentage points since the start of the pandemic (CSO, 2021), and are now at a record high, however assessing the exact causal effect of remote working on labour market participation is challenging. The literature review below summarises existing evidence on the topic and provides an indication as to the possible effect remote working would have.

Impact on people with disabilities

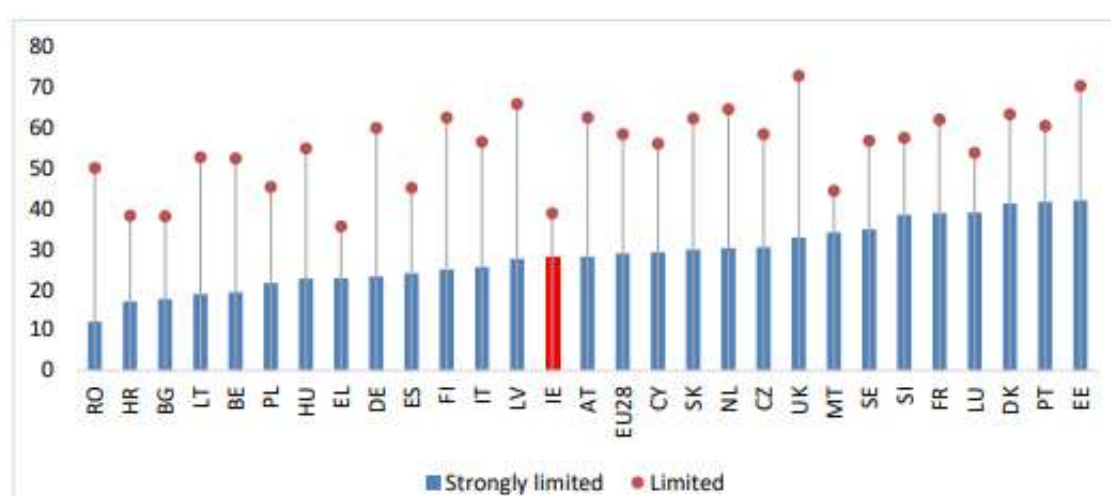
In Ireland, 36% of the population with a disability are in work (EU-SILC, 2018) and the disability gap is 35% (difference between employment rates of people with and without disabilities). LFS data indicates that employment levels of people without disabilities grew by 11.8% over the period 2010-2017, compared to a 5.7% growth rate of people with disabilities.

Ireland has the fourth lowest employment rate for people with disabilities in the EU, some way off first-placed Estonia (63%). One potential reason for this is that Irish people are less likely to report

that they have a disability compared to people in other countries (8% in Ireland, compared to EU average of 18%). If the threshold for self-reporting a disability in Ireland is higher than in other countries, those who do report one are therefore more likely to have a severe disability, so are less likely to be in work.

However, unlike most European countries, there is very little difference in Ireland in the employment rate by severity of disability (Figure 4). This suggests that in Ireland the barriers to work could be related to factors other than the severity of disability (Kelly and Maitre, 2021). The government has announced significant policy improvements in recent years to tackle some of these barriers to employment for people with disabilities, such as increasing the medical card earnings disregard from €120 to €427 per week (Department of Health, 2018). This enables people in receipt of a Disability Allowance payment to have greater earnings capacity and still retain their medical card.

Figure 4: Employment rate (%) (Y axis) by disability status across EU28 (EU-SILC, 2018)



The explosion in popularity of remote working as a result of the COVID-19 pandemic provides a unique opportunity for people with disabilities to join the workforce. A CSO 'Our Lives Online' Pulse survey in November 2021 found that 69% of people with long standing health problems not in employment would consider taking up a job if it could be done remotely. This provides strong evidence that remote working can improve labour market participation rates for this group.

Pre-pandemic studies, such as those by Liden (2014), Chung and Van der Horst (2018), Sostero et al. (2020), and Schur et al. (2020), all also provide evidence that remote working could provide more employment opportunities for both people with disabilities and caring responsibilities.

Firstly, Linden (2014) explains that remote working can facilitate employment for people with disabilities by removing architectural and transportation barriers for those with physical, sensory, and cognitive limitations, as well as relieving fatigue, stamina, and pain-related barriers to traditional full-time work as employees are more able to control their own schedules. Furthermore, remote working allows access to medically related personal care services during the workday.

Schur et al. (2020) meanwhile use three pre-COVID datasets to explore patterns in home-based work for workers with and without disabilities in the USA. The study finds that workers with disabilities were more likely to work from home pre-pandemic compared to workers without a disability (5.7% to 4.6%). In terms of wages, regression analysis found that the disability pay gap is slightly larger amongst home workers (-13.5%) than among non-home workers (-10.4%). While these gaps are small, they are statistically significant at the 0.1% level, suggesting that more than just offering remote working must be done to tackle pay gaps for people with disabilities. In terms of the potential of disabled workers to do more work from home, on average their current jobs offer

less potential than non-disabled workers. This is due to disabled workers being disproportionately more likely to work in blue collar or service occupations that don't always lend themselves to working from home. Despite this, the study finds that 34% of jobs disabled people currently do could be done from home. Policymakers should ensure however that people with disabilities have access to training programmes that equip them with the skills they need to work remotely – particularly those who have been out of the labour force for quite some time.

One potential barrier to people with disabilities gaining remote employment is their lower access to internet connection than people without disabilities. Across Europe, on average, only 64.3% of people with disabilities aged 16 + have an internet connection compared to 87.9% of people without disabilities (European Commission, 2021). Ireland though has better household internet connectivity rates than the European average, with 91% of people having access to an internet connection (CSO, 2019), and approximately 73% of people with disabilities living in private households having access (Census, 2016). This figure is likely to have increased since 2016, partly due to the COVID-19 pandemic necessitating people to get access to work from home. Remote working could therefore result in higher cost burdens for people with disabilities if they only bought access to broadband to work from home and did not have it previously. A targeted approach in giving additional support to people with disabilities and low incomes could be considered, as 'start-up' costs such as broadband may present a barrier to those entering the workforce with low incomes. It should be noted that many low-income earners are outside the income tax net, so existing interventions in the form of tax reliefs may not remove the barriers or assist those entering the workforce with low incomes.

Another potential challenge surrounds the communication tools which remote work relies so heavily on. People who turn off their video are relegated to a static icon on a blank video frame with only their name appearing while those who are deaf and speak silently through a sign language interpreter never show up in interfaces that use active speaker detection to choose which video streams to display (Tang, 2021). As well as harming morale of staff with disabilities, it could also have consequences on promotional opportunities if people with disabilities are kept out of sight, and therefore out of mind. It is important that firms do not attempt to use remote working as a way to avoid offering required workplace provisions for people with disabilities, as this could deepen employment inequalities further. The responsibility to provide a suitable working environment for all people, including those with disabilities is firmly on employers.

The Employment Equality Acts (1998 and 2004) outlaw discrimination against people with disabilities and require employers to take reasonable steps to accommodate the needs of employees and prospective employees with disabilities where they can do the job if so accommodated. 'Reasonable accommodation' may typically consist of modification to work tasks, to start and finish times, changes to the workplace or workstation, or the provision of assistive technology. 'Reasonable' means that the provision of such changes does not constitute a disproportionate burden to the employer. In assessing if the cost is disproportionate, employers should include the value of the grants available from bodies such as the Department of Social Protection (DSP). Under its Reasonable Accommodation Fund Grants, DSP can help jobseekers, existing employees, and employers to take appropriate measures to help a person with a disability to access, improve or retain their employment.

Impact on people with caring responsibilities

In terms of remote work's impact on people with caring responsibilities, CSO 'Our Lives Online' data indicates that 75% of people currently not in employment who are engaged in 'home duties' (including caring) would consider taking up a job if it could be done remotely. Indeed, the number of women whose principal economic status is 'Home Duties' decreased by 96,200 over the period Q4 2019 to Q4 2021 in Ireland (CSO, 2022), accompanied by record levels of female employment.

As mentioned earlier, 69% of people who have health problems, indicated that they would consider taking a job if it could be done remotely in the CSO pulse survey. For retired people and students, it is 29% and 79% respectively. This data indicates that the flexible working arrangements which

remote working inherently allows can attract new pools of workers to the labour market, potentially reducing hiring costs for firms, and filling skills shortages.

Academic literature also indicates that there are positive labour market effects of remote working for people with caring responsibilities. Chung and Van der Horst (2018) found that mothers who had the ability to telework in the UK were less likely to reduce their working hours after childbirth by 20 percentage points. They also find some evidence to suggest this effect is larger for first-time mothers.

In a US study, Lyttelton et al. (2020) find mixed effects of remote work on gender equality. While mothers of young children particularly value teleworking (Mas and Pallais, 2017), social pressures could mean that remote working increases the amount of housework women do. Lyttelton et al. find that teleworking mothers increased their housework by 49 minutes per day when at home, whereas fathers did no more housework on days when they worked from home than on days when they were in the office. The same paper does find that remote working increases the number of minutes fathers spend with their children, which could ease the childcare burden of women. Gibbs et al. (2021) though found that employees with children at home increased work hours more and had lower productivity than those without children when working from home during the pandemic. The authors note that a partial explanation for this could be the closing of schools during the pandemic. It is important to recognise that the experience of remote working during the pandemic will not be representative of the post-pandemic blended working model in this regard.

One final gender equality consideration to note is that if the return to the office is gendered (i.e. women choose to work remotely more often than men), women could suffer from reduced visibility and as a result have fewer opportunities for promotion or salary increases – widening the gender pay gap. It is important that firms monitor the gender balance of remote working and put in place policies where necessary to mitigate negative effects. NUIG-WDC and NTA survey data indicates that male and female preferences to work remotely post-pandemic are similar, however, with women having a slightly greater preference to work from the office.

As well as potentially increasing labour force participation for people caring for children, remote working can also benefit people who care for elderly or disabled family members or have other care responsibilities. A survey by Indecon (2021), found that in over 30% of households where there is a person with a disability, there is someone in the household working fewer hours than they'd like due to caring responsibilities. The Indecon report calculated that lost household income as a result of working fewer hours amounted to €482 per week, on average. These figures were highest in households where a household member suffers from an "intellectual disability". Paid working hours for carers may have even decreased during the COVID-19 pandemic due to the need to 'shield' vulnerable household members

Remote working can however result in several benefits for carers, potentially increasing participation in the labour force. For example, reduced commuting times because of remote working can allow carers to spend more time with the person they care for, while (if several household members work remotely) caring responsibilities may be more easily shared among household members, alleviating pressure on the primary family carer (Phillips et al. 2020). Evidence suggests that enabling carers to remain in employment can increase carers' levels of happiness, financial security, and social inclusion (Phillips et al. 2020).

Future Data Availability

- Census data: The 2022 Census can provide useful data in identifying changes in labour force participation. Directly attributing changes in labour market participation to remote work from Census data is problematic, partially due to the lack of focused 'remote working' questions in the Census.
- General Household Survey (GHS) Work-related Leave and Flexibility module: As mentioned previously, this survey will be a useful tool for capturing and analysing a wide range of data on remote work and remote workers according to demographic, locational, and occupational factors. It is unclear whether the module will be a one-off or will be repeated.
- Labour Force Survey: The LFS can provide useful data in identifying changes in labour force participation of different groups, although attributing changes to remote working would be challenging.
- DSP Welfare Claimants data: DSP data can be used to track the number of people claiming Jobseeker's allowance, Disability allowance, and Carer's allowance, over time. The causal impact of remote working would be challenging to assess from the data directly, but if combined with Census data could potentially give useful insights into its effect.

3.2 Impact on Productivity

Productivity is the engine of economic growth in the longer term, and as such is key to improvements in living standards, associated with growing and sustainable wage levels, good public services and improved wellbeing (NCPC). It is therefore a key outcome of interest to be tracked in relation to the National Remote Work Strategy.

Research to date on the impact of remote work on productivity has reached mixed conclusions, with some empirical studies such as Bloom et al. (2015) finding that remote working can lead to significant productivity gains for firms (as high as 22%), while others, such as that of Bonet and Salvador (2017) predict long-term innovation and productivity growth may suffer with increased levels of remote working. It is no surprise that existing research points to ambiguous results given the multiplicity, complexity and interactions between factors affecting productivity (OECD, 2020).

According to the OECD (2020), there are two main channels through which remote working can affect productivity: an efficiency channel which depends on the motivation and knowledge flows of/between the workforce, and a cost-reduction channel whereby remote working can free up resources for productivity enhancing innovation.

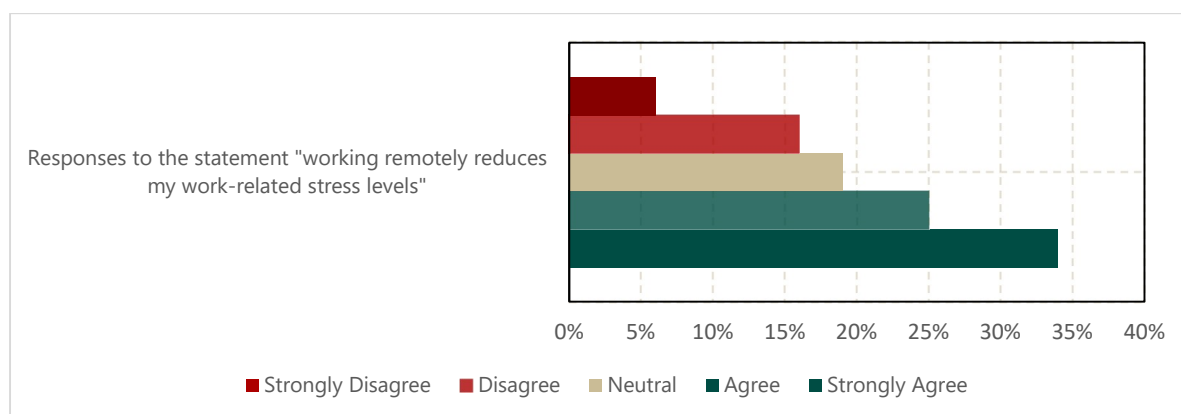
Worker Efficiency

Firstly, looking at the worker efficiency mechanism, the benefits of remote working are not entirely clear cut. Worker efficiency can be affected in a variety of ways: employee wellbeing and engagement, collaboration, and managerial oversight. A widely cited two-year Stanford study, found that home working for a sample of call centre employees led to a 13% performance increase compared to those in the office (Bloom et al., 2015). The majority of the increase could be explained by remote employees increasing the number of minutes they worked during their shifts, as well as taking less time off and sick days. This therefore could account for the increase in self-reported productivity in Ireland too more so than working remotely itself per se (WDC Whitaker Institute Expert Group on Remote Working, 2020). Following the success of the experiment, the option to work from home was rolled-out to the entire firm and the employees involved in the original trial were allowed to re-select between the home or office. The majority of employees switched which led to the gains from working from home almost doubling to 22%. This highlights the benefits of learning and selection effects, so that individual preferences can be accommodated,

and business practices can be adapted to maximise the gains of alternative working arrangements (NCPC, 2021).

A study by US multinational Cisco provides further evidence that remote work boosts productivity. Cisco estimate that remote working generates annual benefits of €277m for the firm in productivity improvements (Cisco, 2009). Employees at Cisco work remotely for an average of two days per week. An internal study found that 60% of the time saved by not commuting is spent working – resulting in longer working days for employees and boosting output to the firm. It is important to distinguish between output and productivity. Productivity is generally defined as the ratio between output volume and volume of inputs (OECD). In a labour market context, this means productivity is output per hour worked. An increase in output due to longer working hours does not therefore indicate that productivity has improved, but nevertheless is a benefit for the firm. Despite these working longer hours, 91% of respondents said remote working was somewhat or very important to their overall satisfaction. This is consistent with NUIG-WDC survey data in Ireland (Figure 5) which suggests remote workers are less stressed and that remote working improves quality of life - 59% of respondents in the NUIG-WDC survey agreed that remote working reduced their stress levels.

**Figure 5: Self-reported assessment of remote working's impact on stress levels
NUIG/WDC, Apr 2021)**



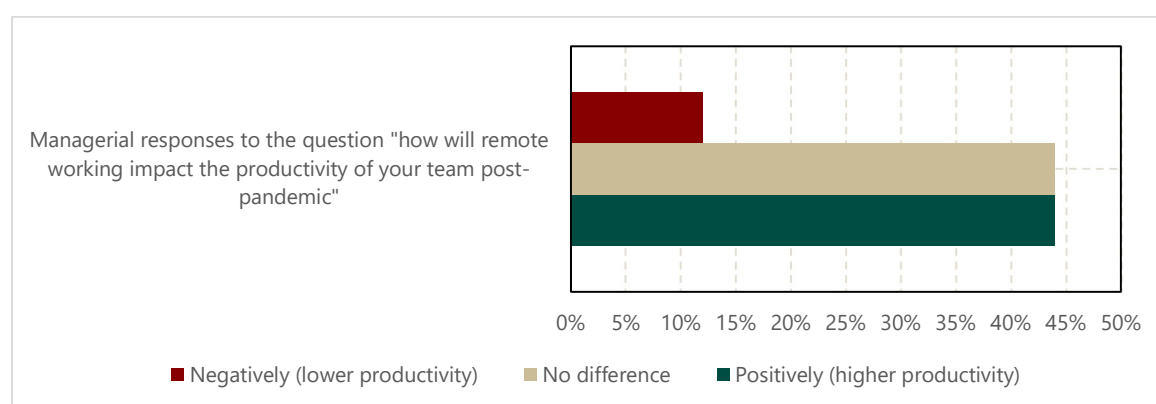
The findings by NUIG-WDC are especially surprising considering other 'stressful' stimuli, such as young children, may have been at home with lockdown restrictions. The results contradict some previous empirical evidence which indicated that remote working could lead to higher stress levels due to blurred boundaries between home and work life (Tavares, 2015). For example, a 2017 Eurofound-ILO study found that 41% of workers carrying out high levels of remote work reported high stress levels, compared to just 25% of office workers. Russell et al. (2009) also found that home working results in increased work-life conflict due to longer working hours reported when working from home which encroach on family time. To combat these issues in Ireland, the Workplace Relations Commission has established a new Code of Practice outlining workers' Right to Disconnect. The Right to Disconnect has three main elements: the right of an employee to not routinely perform work outside normal working hours, the right to not be penalised for refusing to attend to work matters outside normal working hours, and the duty to respect another person's right to disconnect.

Although workers may be more engaged and satisfied by remote work, it can hinder managerial oversight and reduce the manager's effectiveness in coaching, helping, and setting goals for workers (Bonet and Salvador, 2017). Learning by doing, a key process in achieving productivity gains, may also suffer if more junior staff are not coming into contact with management. Furthermore, an assessment by PwC Netherlands (2020) predicts that reduced levels of collaboration, and its subsequent impact on innovation, could reduce long term productivity and firm output. This assessment is supported by Claudel et al. (2017) who demonstrated a positive link between physical proximity and collaborative research output. According to the OECD (2020),

this suggests that ‘chance encounters’ which occur when people share office space are essential for knowledge sharing. Remote working in extreme intensity could therefore hamper productivity, and it may be optimal for firms to adopt a hybrid approach to remote working to maintain some in-person interactions.

Survey data, such as the NUIG-WDC Remote Work in Ireland Survey, and Microsoft’s Remote Work Survey provide contrary evidence that managerial oversight problems are affecting workers’ productivity. While 44% of managers in the NUIG-WDC survey agreed that it was more difficult to manage their team remotely than onsite, 44% also felt that remote working will lead to productivity improvements in their team post pandemic (Figure 6). A Microsoft survey of employees and business leaders also found that managers thought that their companies were equally or more productive than they were before the introduction of remote working (82% agreed).

**Figure 6: Managerial assessment of remote working’s impact on productivity
NUIG/WDC Manager’s survey, Apr 2021)**



The NUIG and WDC Survey also published these results split by industry. The results show there to be differences in the perceived productivity impact across sectors, although in all sectors, more managers believe remote working will increase productivity than decrease it. In the utilities, retail and wholesale, and administrative and support service industries, managers most believe that remote working will have positive impact on productivity (positive minus negative responses). In the construction, and manufacturing industries however, managers are less likely to believe that remote working will improve productivity. This is unsurprising given the nature of the industries, as many construction or manufacturing roles would require full-time onsite learning and working.

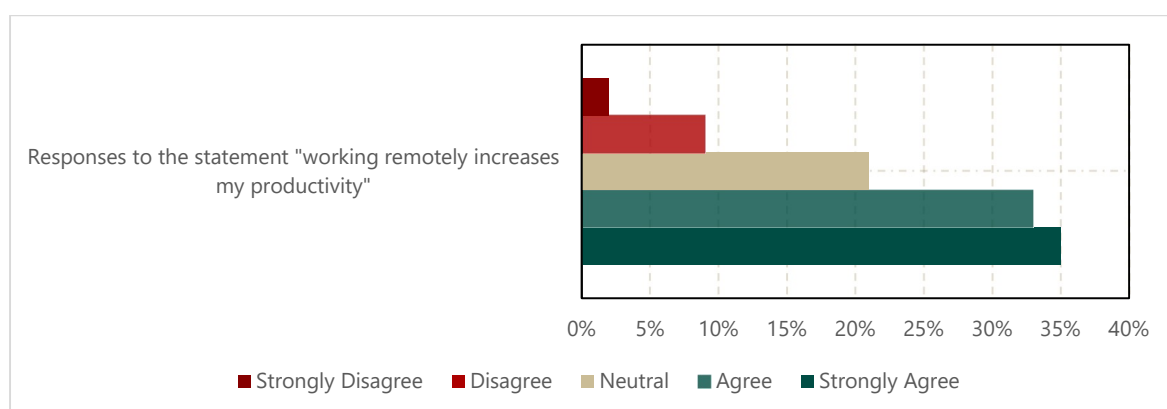
It is additionally worth noting that the current experiences of remote working during the pandemic may not be representative of the future blended working environment with a potential mix of office, hub and home working (NCPC, 2021). In many cases during the pandemic, remote working was required in an extreme intensity (often at 100%) – rather than chosen voluntarily (Criscuolo et al., 2021). Managerial oversight problems may be able to be overcome more easily with a blended approach to working, as could collaboration/innovation issues. This could result in managers and employees agreeing even more strongly that remote working results in productivity increases. It is also unknown at this time how more widespread remote working will interact with other accelerating trends in the global economy such as increased digitalisation and the emergence of new technologies, including artificial intelligence (NCPC, 2021). These technologies have the potential to unlock further productivity gains from remote working in future, as well as making some roles (including remote roles) obsolete.

The evidence outlined above suggests that there is a widespread perception that productivity benefits realised through the ‘worker efficiency’ channel outweigh efficiency costs. There may be additional ‘output’ benefits to firms if employees choose to work longer hours too. This would come at an equivalent cost for employees, however, and employees should not be obliged to increase

their working hours if working remotely. Guidelines such as the Code of Practice on the 'Right to Disconnect' should reduce any negative impact on employees.

The perception of increased productivity is also evidenced by workers' opinions themselves. In 2019, Microsoft research found that employees felt that 52% of their working day was wasted, due to factors such as unnecessary interruptions; meetings and calls with no clear agenda; and searching for information. In the move to remote working, this figure has fallen to 41%. In addition, in the NUIG-WDC Remote Work survey, 68% of respondents agreed that remote working increased their productivity, with just 11% disagreeing (Figure 7). As mentioned previously, one major limitation of the survey is that respondents were self-selected, meaning it is likely respondents who did not have any strong opinions on remote work would not take part – a truly random sample could reduce the overall 'agree' figures. The results here are nevertheless encouraging. It is likely that remote working will not be compulsory for any employee once pandemic restrictions ease, meaning the 11% who feel remote working harms productivity will be free to return to the office full-time. This self-selection can boost firm productivity further, as workers who are more productive at home can continue to work remotely, while those who are not can return to the office.

**Figure 7: Self-reported assessment of remote working's impact on productivity
(NUIG/WDC, Apr 2021)**



Cost Reduction

Secondly, looking at the 'cost reduction' mechanism in more detail, remote work could lead to large cost savings for businesses if it allows them to move away from large-scale headquarters and reduce their spend on related costs such as electricity, heating, cleaning and catering. Furthermore, recruitment costs can be reduced as remote working increases the pool of workers firms can choose from. This is because remote working opens up job opportunities to workers tied to a specific location due to personal reasons (Clancy, 2020).

It is important to note however that cost savings will only materialise if they are not eroded away by the costs associated with providing a remote working option to employees (NCPC, 2021). These risks may be greatest for SMEs rather than larger employers. Legislation such as the 'Right to Request' will require firms to change HR processes to manage appeals and disputes, which could result in increased costs for firms. HR departments may also incur costs in developing other remote work policy, such as amending clocking in/out policies that may be better suited to onsite working. There is evidence from the UK that, pre-pandemic, employees of SMEs had worse access to portable devices (e.g. laptops) than larger firms (Institute for the Future of Work). It is likely that the pandemic has changed this, although SMEs may have fewer resources (and do not benefit from economies of scale) to invest in technologies to support remote working than larger firms. For smaller firms, hub working can provide the opportunity for staff to meet physically, without permanently renting office space.

PwC Netherlands (2020) estimated that cumulative cost savings due to reduced need for office space, gas, electricity, and catering could be in excess of €1.6bn for firms availing of remote working in the Netherlands. It should be remembered that these potential cost savings only apply to firms engaged in remote working, and at an economy-wide level would be partially offset by loss of income to other businesses such as commercial landlords or catering firms, for example. PwC Netherlands assumed that a 10% rise in remote working across the economy would lead to a 10% fall in all office-related costs. Their analysis did not consider how these savings could translate into productivity gains however, such as whether firms are likely to invest savings into more productive purposes such as investing in new equipment, hiring and training employees, or developing and launching new products or services to expand their businesses.

In Ireland, a 2020 IGEES study (Hayes, 2020) analysed how working from home can save businesses money in terms of rental costs. Their baseline estimate (of the Dublin region) suggests that under a 20% WFH policy (and therefore reducing office space by 20%), along with a 5% reduction in market rents, the potential average cost per staff member per year for new leases could be reduced by 24%, or €1,492. The analysis finds that savings could reach as high as €2,860 per worker per year for firms under a 40% WFH scenario and a 10% reduction in market rents. As mentioned earlier however, it is unclear whether these savings would lead to productivity gains, and it is also unclear to what extent firms will scale back on physical office space post-pandemic. There are challenges in terms of the practicalities of scaling-back office spaces, as it is contingent on the availability of suitably sized alternative office space and limiting the number of staff who can work in the office at any given time.

The IGEES study also considered the effect remote working may have on the Exchequer, in terms of accommodation provision for Public Servants. The report concludes that “significant cost savings” could be achieved for the Exchequer if building leases are renegotiated or not renewed. A significant proportion of public-sector Dublin leases are due for renewal over the next 5 years, making now an ideal juncture for the Public Service to produce an overall Estate Management Strategy to consider future accommodation mix (Hayes, 2020).

Bloom et al.’s study (2015) found that remote working resulted in an overall cost saving of \$2,000 per worker per year for the call-centre firm, with two-thirds of the saving coming from a reduction in office space. The remainder of the saving came through other mechanisms, such as reduced sick leave and worker attrition. For example, worker attrition fell by 50% among the remote workers, significantly reducing hiring costs. These benefits are currently difficult to assess in today’s economy due to pandemic restrictions limiting transmission of all disease (cannot assess ‘reduced sickness’ benefit) and many firms may have been reluctant to take on new staff with economic uncertainty (making worker attrition difficult to assess). One would expect to see a fall in sickness-related absences post-pandemic versus pre-pandemic due to an increased incidence of remote working (less stress, reduced transmission). Some evidence, however, points to remote workers being more likely to work when actually sick, termed “virtual presenteeism” which can jeopardise employee’s health and reduce performance (Eurofound, 2019). This would be an unintended negative consequence of increased remote working. Again, the ‘Right to Disconnect’ Code of Practice, and other guidelines for the remote working age may reduce this.

Overall Productivity Impact

In conclusion, the survey data and existing theoretical and empirical evidence presented above suggests that remote working has an overall positive impact on productivity, although the exact extent to which this is the case is unknown. It is likely that remote working boosts productivity in certain occupations but reduces it in others. Productivity may also depend on the location of the remote worker, as poor quality broadband could harm productivity. Remote working in extreme intensity may decrease productivity due to reduced collaboration and innovation, often sparked during in-person conversations (Claudel et al., 2017). Therefore, it may be optimal for firms to adopt a hybrid approach to remote working.

It has not been considered appropriate to undertake a cost-benefit analysis assessment of the potential economy-wide productivity impact for Ireland, due to the lack of empirical evidence available. While studies such as Bloom et al. (2015) provide an indication as to potential effects at a firm-level, it would be problematic to extrapolate these findings across a whole population. The study was undertaken in a specific setting (call centre workers in China), likely to be particularly amenable to remote working. Where a worker needs to be physically present on-site to do a task, interact with others, or use location-specific specialised machinery or equipment, for example, remote working would not be appropriate. Long-term potential impacts such as reduced innovation would also be challenging to capture in any cost-benefit analysis model.

Individual firms and workers must make decisions as to whether they believe they are more productive working remotely. Guidance such as the 'Right to Request Remote Work' will set out a clear framework to facilitate remote and blended work options. It will ensure that when an employer declines a request, there are stated reasons for doing so and conversations with workers take place in a structured way (DETE, 2021).

Future Data Availability

- **CSO Productivity Estimates:** The CSO have plans to begin publishing a quarterly productivity release in the near future, which would include a breakdown of labour productivity across different sectors. There are many factors which affect productivity at any given time however, so drawing direct conclusions regarding the impact of remote work would be challenging.
- **Civil Service Absence Data:** Each year the Department of Public Expenditure and Reform publish Civil Service-wide absence data. As the National Remote Work Strategy outlines that remote work will be the norm for 20% of public sector employment, one would expect this to have an impact on Civil Service absence levels if empirical literature is to go by.
- **Academic Literature:** Remote work is a relatively new policy field, and it has taken the COVID-19 pandemic for it to become a major part of the employment landscape. It is expected that further research will be conducted regarding its potential impacts, including on productivity, in future.
- **Remote Work Incidence Rates:** The degree to which firms adopt remote working will provide some evidence, as it is unlikely that firms would grant permission to workers to remote work if they believed productivity would suffer. The data sources used to track this can be found in section 3.1.

3.3 Impact Regional Development and the Environment

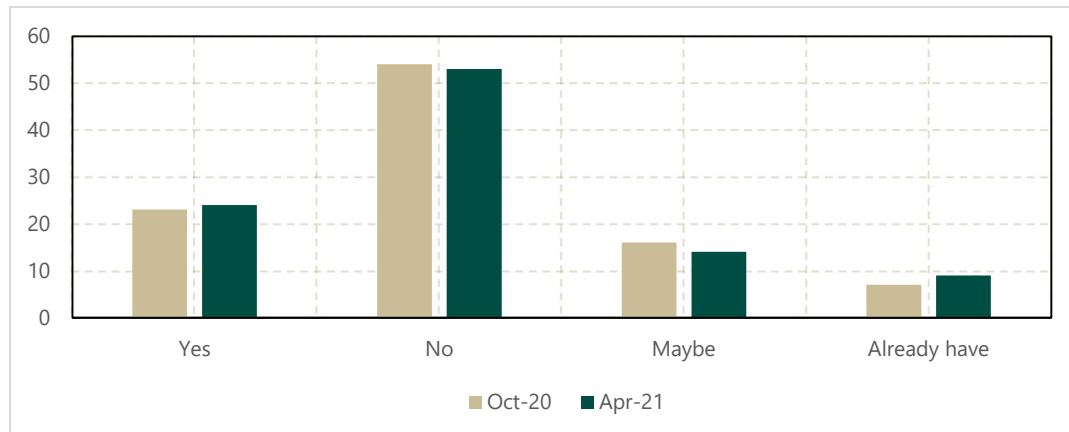
3.3.2 Regional and Rural Development

Remote working may provide more job opportunities to people who want to live in rural or suburban areas. This will have knock-on effects on a range of indicators such as house prices in rural and urban regions, and spending on service/retail sectors in cities and rural areas too.

The NUIG-WDC Remote Working surveys asked respondents whether they would consider relocating given their experiences remote working since COVID-19. The results are summarised in Figure 8 below. The figure indicates that a significant number of people in Ireland would consider moving home as a result of remote working. For example, in April 2021, 38% of respondents indicated that they might or would consider moving house because of remote working. This result is identical to that of the CSO 'Our Lives Online' Pulse survey of November 2021 which found that 38% of respondents would consider moving house if they could work remotely.

In both the October and April NUIG-WDC surveys, the top two regions that people had already moved to were West Ireland (Galway, Mayo, Roscommon) and Southwest Ireland (Cork, Kerry). This provides some evidence that people are relocating to more rural/regional areas rather than moving into Dublin.

Figure 8: Responses (%) to NUIG survey question “Based on your experience of remote working since COVID-19, would you consider relocating?”



Regional Labour Market Impact

Remote working will result in high-paying, high-skilled remote roles being more geographically dispersed around the country, if firms allow employees to relocate across Ireland (Sandbu, 2022). Post-pandemic it is likely that firms will increasingly advertise for entirely ‘remote’ roles, allowing someone from Donegal to apply to jobs at firms based in Dublin, for example, without moving home. Not only does this benefit prospective employees themselves, but firms can reduce recruitment costs as they open themselves up to a larger pool of talent.

While this will drive jobs growth outside cities, there is a danger that lower-paid urban workers employed in personal services roles (e.g., food services, cleaning, security) that heavily depend on workers going to the office, could suffer. This could result in increased inequality between high-paid professionals and low-paid service workers who cannot benefit from remote work (Criscuolo, 2021). As such, a long-term shift to high levels of remote working may change the nature of low-paid work in the retail and hospitality sectors as these industries adjust to a market where people spend less time in city centres (Carter and Johnson, 2021). While spending in city centres may be affected, equivalent gains can be made in the regions where remote workers are based. Retail and hospitality industries may expand into suburban or rural areas as a result (Nathan and Overman, 2020), re-locating staff, and thus increasing housing demand in these suburban areas. The Project Ireland 2040 National Planning Framework highlights the need to manage more balanced growth between regions, as Dublin has witnessed an overconcentration of population, homes and jobs. The diversification of jobs in regional areas, such as an increase of high-wage Knowledge Intensive Services (KIS) roles, is an important opportunity that remote working can offer.

A potential drawback of remote working is a danger that remote workers may move abroad. For those answering “yes” and “maybe” to relocating in the April 2021 version of the NUIG-WDC survey, the top region where people would move to was “outside Ireland”. This could have significant implications on the economy – particularly on service and retail sectors. In recent decades, the Irish government has worked hard to make Ireland an attractive place to do business and as such has attracted hundreds of multinationals to the country, bringing with them jobs, and higher levels of domestic spending. The increased global mobility of the workforce that remote work allows may have implications for Ireland and other jurisdictions regarding tax policy, tax revenues and tax administration. The impact of this should be monitored closely.

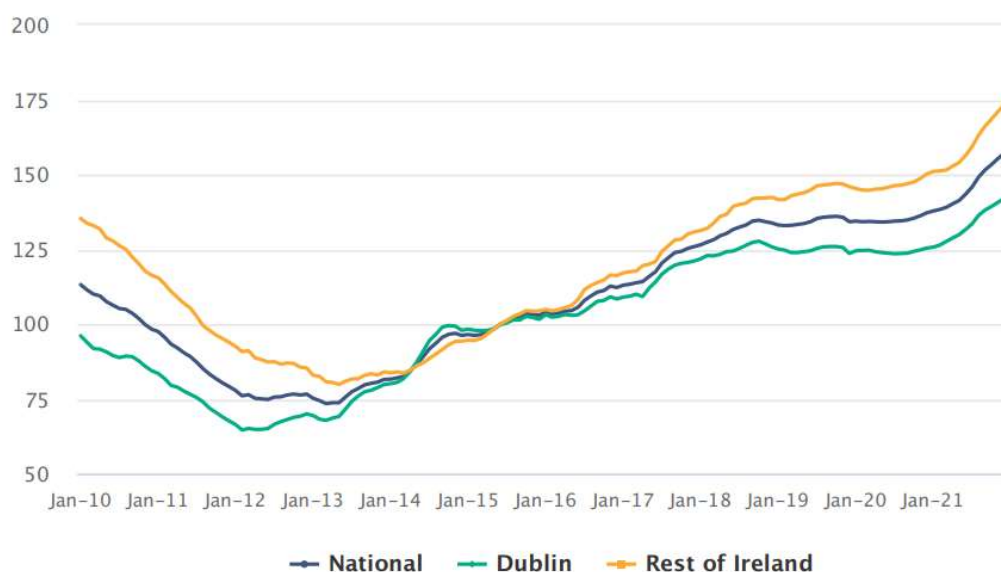
Housing Market Impact

Remote working is likely to lead to the cooling of commercial and residential real estate market prices in urban centres, accompanied by a relative rise in property values in suburbs and rural areas (OECD, 2020). Evidence from the US already shows that, following the COVID-19 pandemic, there has already been a significant reallocation of residents from the most densely to the least densely populated US counties (OECD, 2020).

Evidence from the UK also points to similar results. For example, private rents in London have started to fall as a result of residents moving to live and work in less urban and/or more rural areas (Hunt, 2020), while house prices in Wales rose by 8.2% in 2020, the highest rate of increase in 15 years (BBC, 2021).

In Ireland too, the onset of remote working has resulted in an increase in interest for rural properties. The median price of property listings nationally rose to €290,000 in Q4 2021, up 7.7% year-on-year (Daft.ie). All of the commuter belt counties saw gains in the median prices, with Kildare (11.4%), Meath (10.3%) and Wicklow (11.5%) rising to €307,000, €302,000 and €383,000 respectively. The largest house price gains came further west, however, in Leitrim (19.2% YoY), Mayo (18.5% YoY), and Galway (excluding Galway City) (15.8% YoY). Since the beginning of the pandemic, national average house prices have grown at a faster rate than that in Dublin (Figure 9). This could be for a variety of factors, however. Levels of both housing demand and supply will impact house prices, with remote working being one of many factors to influence demand.

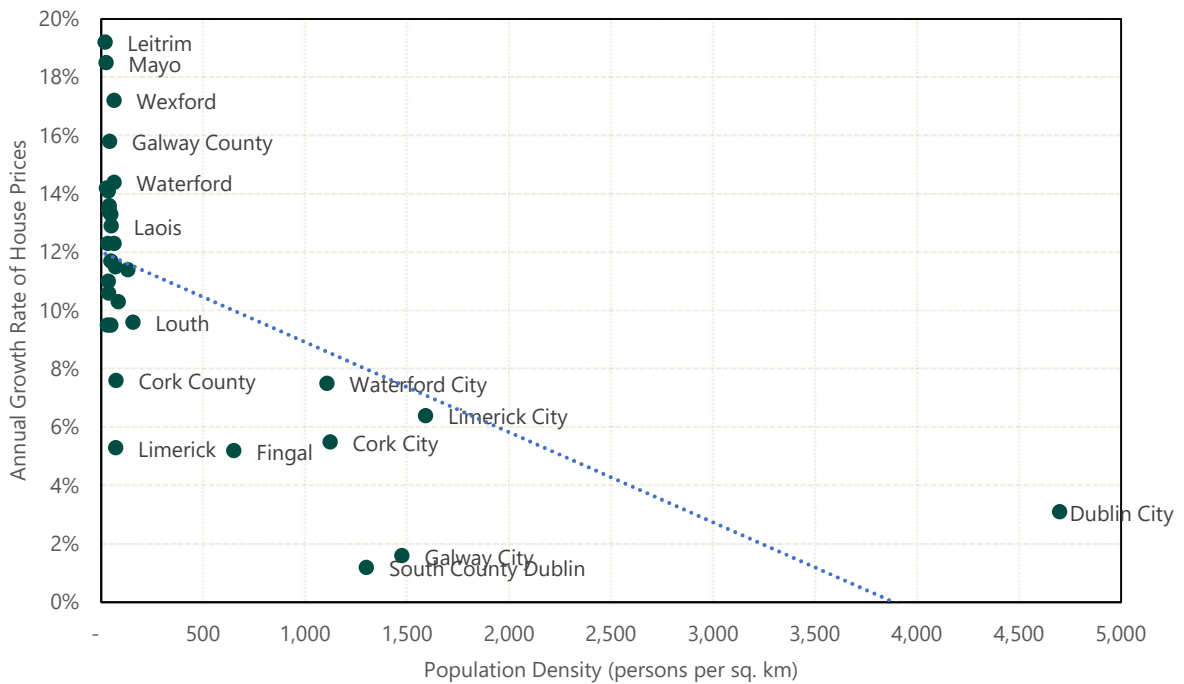
Figure 9: Dublin vs National and Rest of Ireland Residential Property Price Index (Base 2015 =100) (CSO, 2021)



Using Daft.ie data, and 2016 Census data, the below scatter graph has been created (Figure 10) showing the relationship between the Q4 2021 percentage annual growth rate in median house prices (Y axis) and population density of counties and cities in Ireland (X-axis).

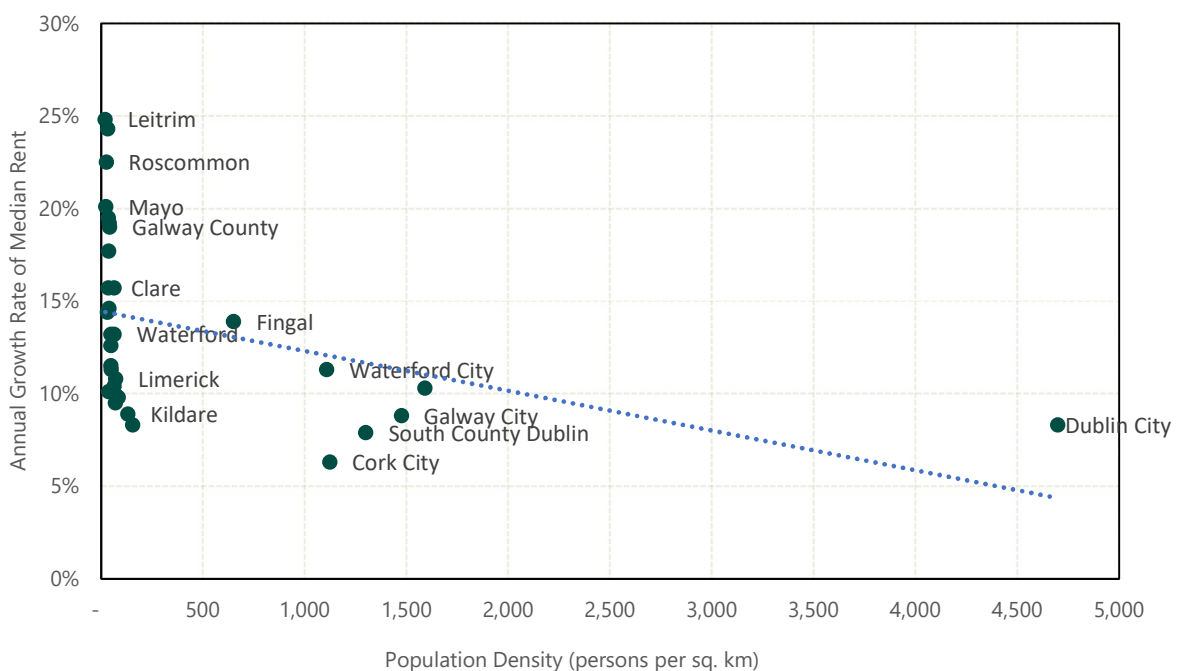
The data shows there to be a clear relationship between median annual house price growth in Q4 2021, and population density of a county/city. A simple linear regression model of population density on house price growth finds population density to be a highly significant predictor ($t=-4.35$).

Figure 10: Relationship between percentage annual growth in median house prices (Q4, 2021) and population density



This exercise was repeated for median rents too. Population density was also a significant predictor of median rent price growth ($t = -2.34$). Annual rent growth was highest in Leitrim (25%), Donegal (23%) and Roscommon (23%), and lowest in Cork City (6%) and South County Dublin. This data is visualised in Figure 11 below.

Figure 11: Relationship between percentage annual growth in median rents (Q4, 2021) and population density



While it is challenging to establish the causal effect of remote working on house price and rent growth, survey evidence suggests that remote workers are looking to move outside cities and into less densely populated counties. Remote working could therefore be a factor in fuelling house price growth in more rural areas. This conclusion is supported by Ronan Lyons, Associate Professor in Economics at Trinity College Dublin, who states “speculation that buyers would move further from work, to where homes were cheaper, is starting to be seen in the data” (Daft.ie housing report, Q4 2021).

One other potential housing market impact of remote working is the change in demand of house type. RE/MAX Ireland (2021) report that sheds/garages which can be converted into home offices, gyms or workshops are in high demand, as is demand for houses generally at the expense of apartments. This could have implications for the environment in terms of urban sprawl and home greenhouse gas emissions if people choose to move into homes with a larger footprint.

Commercial Property Impact

As well as an impact on residential property prices and rents, there is likely to be a cooling of commercial real estate market prices, particularly in urban centres. A reduction in commercial property interest could have knock-on effects for government revenue with falling property rates.

Geodirectory regularly publish reports analysing the stock of commercial properties in Ireland and vacancy rates. Data shows that vacancy rates increased in 18 of the 26 counties in Q2 2021 compared to Q2 2020. One difficulty interpreting this data is that many premises may have temporarily closed because of the COVID-19 pandemic but may be re-opened once restrictions are eased. Due to this ‘pandemic shock’ to vacancy rates, one cannot accurately estimate the effect remote working has had on vacancy rates or the stock of commercial properties. In industries where remote working is likely to be prevalent, such as financial and insurance industries, or public administration, the number of address points remained static year-on-year. This suggests that firms (in Q2 2021) had not yet made decisions whether to get rid of their physical offices. It is also important to note that the rise in working remotely will only affect commercial property vacancy rates when leases come up for renewal. Downsizing offices would also unfortunately not be captured in this measure. Instead, one would have to look at total office space rather than number of locations.

In June 2021 the Central Bank of Ireland (CBI) published a Financial Stability Note, analysing the impact of the pandemic on the Irish commercial property market and the potential systemic implications of this. The note evaluates a number of post-pandemic scenarios which factor in varying levels of remote work. Their “highest impact” scenario is based on the NUIG-WDC Remote Working Surveys which find a relatively high number of employees planning to work from home post-pandemic. The “low impact” scenario is based on research by CoreNet Global (2021) whose survey results suggest that firms may adopt a “hybrid” approach to remote working rather than working remotely on a daily basis. Varying assumptions for lease expiration and new office space delivery are also included in the models.

The Bank’s central estimates suggest that office market vacancy rates in Dublin are likely to rise to approximately 12% in 2021, before falling slightly in 2022 and 2023. In a “high impact” scenario, where remote working is most prevalent, lease expiration rates are high, and new property stock remains less occupied – vacancy rates could reach as high as 22% by 2023. This would have implications for the paths of rents and capital values too. In a “low impact” scenario however, by 2022 vacancy rates could even drop below their 2020 levels to below 5%.

Future Data Availability

- Census data: Census data can be useful in terms of tracking regional changes in employment, population, commuting patterns, and incomes. Directly attributing changes in labour market participation to remote work from Census data is problematic, partially due to the lack of focused 'remote working' questions in the Census.
- Labour Force Survey (LFS): In a way similar to that of the Census discussed above, the LFS collects data potentially useful for analysing the differential regional impacts of remote work across a number of employment factors.
- DETE Annual Employment Survey: Future editions of DETE's Annual Employment Survey will include specific questions directly relating to number of staff working remotely, and from what location.
- Myhome.ie and Daft.ie quarterly reports: Both firms produce quarterly reports on the Irish housing and rental markets with regional comparisons and changes over time.
- Geodirectory commercial and residential datasets: These datasets can be used to track trends in commercial activity in areas where remote working hubs are located, or changes in the incidence of remote working are identified. The GeoDirectory commercial dataset, which includes annual commercial vacancy rates provides regional, county, city and town data.
- Property Services Regulatory Authority (PSRA) commercial leases register: The PSRA produces a database of all commercial leases signed, including type of premises, and rent payable. Directly attributing any changes in rents, or the number of leases in a given area to remote working would be problematic, however. Useful insights could be gained if the register is used in conjunction with other data.

3.3.2 Impact on the Environment

One potential benefit of remote working is its impact on carbon emissions, which could help to achieve the emissions targets as set out in the Climate Action Plan (2021). The most impactful change on the environment is likely to come from reduced travel emissions. This benefit may be slightly offset by increased gas and electricity usage in the home.

Transport Emissions Cost-Benefit Analysis

Firstly, looking at transport-related savings, the National Transport Authority have shared regional modelling data with DETE. Their analysis focused on modelling a counterfactual scenario of 2019 travel behaviours in both the Eastern (i.e. Dublin and surrounding counties) and Mid-Western Region (i.e. Limerick and surrounding counties) where working from home was modelled as being prevalent and well established. The results of the model should be used as an indicative estimate of remote work's impact on travel behaviour, as the models did not attempt to take into account secondary behavioural effects, such as changes in the frequency of non-work trips. Potential demographic or land-use effects were also not included in models, due to insufficient real-world data quantifying these impacts. The results suggest that in a scenario where 25% of 'white-collar' workers work from home on a given day, total car commuter trips could fall by 17% in both regions. The impact on public transport is greater, with public transport commuting trips estimated to fall by 24% in the Eastern region and 48% in the Mid-Western region. The impact on 'active' modes, such as cycling and walking, is less significant, and in the Mid-Western region, total walking and cycling trips could potentially increase under a 25% work from home scenario.

Below, these estimates have been translated into equivalent CO₂ emissions savings. The 'reduced commuting' CBA calculations assume that 140g of CO₂ is emitted per car kilometre travelled, which are based on estimates by the European Environmental Agency (EEA). The Department of Public Expenditure and Reform (DPER) publish guidelines on the price of carbon to be used in estimates. It is currently €46 per tonne for non ETS sectors (2022).

For car-usage, multiplying total kilometres travelled by car (CSO Transport Omnibus, 2019) by the percentage of journeys undertaken for commuting purposes (CSO National Travel Survey, 2019) and by 17% (NTA potential 'trip' reduction) gives the total number of kilometres saved due to remote working. Multiplying by 140g gives the total car CO₂ emission reduction from reduced commuting of 199,132 tonnes. This figure is broadly in line with previous academic research on the topic. For example, Crowley et al. (2021) estimates that car emissions savings could reach as high as 175,000 tonnes per year if 100% of workers who have 'high potential' to work from home do so, for 2 days per week.

The impact on public transport carbon emissions is more challenging to estimate for two reasons. Firstly, the NTA models suggest that there could be significantly different reductions in public transport usage depending on the region, and secondly, busses and trains may be contractually obliged to run even if there are no/fewer passengers on them. The DoT and NTA may have to engage with operators to see whether changes to schedules should be made. For this reason, it has been considered most appropriate to use emission reduction estimates calculated by Crowley et al. (2021). The paper estimates country-wide annual CO₂ savings to be 1,820 tonnes and 6,310 tonnes for bus and rail respectively due to remote working, assuming that changes to schedules can be made. These figures can be found in Table 4, below.

Table 4: Country-wide transport impact from remote work (2022)

Metric	Change in CO₂ Emissions (tonnes)	Equivalent annual monetary benefit (€46 per tonne)	Percentage reduction in total emissions from transport sector (2018)
Reduced commuting (car)	-199,132	9,160,091	-1.3%
Reduced commuting (train) – Crowley et al. 2021 estimate	-6,310	290,260	-0.04%
Reduced commuting (bus) – Crowley et al. 2021 estimate	-1,820	83,720	-0.01%
Total	-207,262	9,534,071	-1.35%

As mentioned earlier, an important point to note is that the impact that remote work will have on travel behaviours may not be so clear cut as first seems. There are secondary and induced effects to consider, such as increased journey length (if people move out to the suburbs, or even to different counties), and the fact that if roads are freed up then people may switch to driving rather than taking public transport. An individual's weekly commuting kilometres may actually increase, even with working fewer days in the office, were they to move to a more regional or rural area because of remote working. Cerqueira et al.'s (2020) analysis of National Travel Survey data in the UK over the period 2002-2017 supports this theory, finding that on average, teleworkers are responsible for higher CO₂ emission levels than those working from a fixed non-home based place. Furthermore Hook et al. (2020) assert that teleworking may lead to unpredictable increases in non-work travel and home energy use that may outweigh the gains from reduced work travel.

These demographic and behavioural changes outlined above are challenging to capture in modelling as it is not yet clear how many people will move home due to remote working, or what the exact increases in non-work-related trips will be. Further research is required to capture demographic and behavioural impacts in modelling, which would give more precise environmental impact estimates. The figures used in this evaluation have not captured potential secondary effects, so should only be used as a rough indication of potential carbon savings from commuting. They are likely to be an overestimate of true carbon savings as a result. Emissions savings from remote working may also reduce over time as fleets become electrified. It is also unclear exactly

how many people will work remotely post-pandemic. Actual increases in remote worker numbers could be significantly more or less than the '25% of white collar workers' used in these calculations.

It is possible that these secondary impacts could be negated by an increase in the use of remote working hubs. For example, Caulfield and Charly (2022) find that users of remote work hubs in the Dublin region drive an average of 60km less per day to work since using a hub, rather than commuting to the office. The paper estimates that those driving alone could save 1.1 tonnes of CO₂ per year each by working from a remote work hub for 3 days per week.

Survey evidence also suggests that the potential positive effects on 'active travel' modes can be large. Some 74% of respondents to the CSO 'Our Lives Online' pulse survey, reported that they take fewer trips by car on days when they work remotely than on days where they work from the office. Encouragingly, 47% of respondents also answered that they take more trips by foot when working remotely, and 30% take more trips by bicycle, highlighting the health benefits of remote working, on top of environmental gains.

Household Emissions Cost-Benefit Analysis

While remote working is likely to result in fewer transport related emissions, emissions within the home will increase as employees use heating fuel and electricity to light and heat their homes during the working day. To calculate household emission increases due to remote working, the below assumptions have been made:

- An assumption that there will be 210,000 'new' remote workers compared to pre-pandemic levels has been made. This assumption is based on Solas figures which found that pre-pandemic, approximately 190,000 workers in Ireland 'usually' worked from home, and 670,000 did in Q4 2020. Due to the October 2020 and December 2020 'lockdowns' the Q4 670,000 figure is likely to be much higher than post-pandemic figures. For this reason, an assumption that there will be 400,000 remote workers post-pandemic has been made – an increase of 210,000 compared to pre-pandemic levels.
- These workers are assumed to work remotely for an average of 8 hours per day for 100 days a year. They are assumed to heat their home for half the working day (4 hours) during the cooler months of October-March. This is a similar methodology to that used by EcoAct (2020), in their whitepaper "Homeworking Emissions".
- It is assumed that 45% of new remote workers use oil to heat their home, 45% use gas, and 10% use electricity. Census (2016) data shows that oil central heating is used by 40.4% of households in Ireland, followed by gas (33.5%) and electricity (8.6%). For the purposes of this report, it is assumed that there is a 45-45-10 split between oil, gas and electricity based central heating in households where there is a remote worker. This is because gas and electricity are more popular in urban households than their national average, where a high concentration of hybrid roles are likely to be based.
- Based on consumption statistics from the SEAI and Commission of Regulation of Utilities, an assumption is made that the energy consumption for one hour heating is 5kWh for gas, 8kWh for oil, and 4kWh for electricity. The emissions factor of gas is 205g of CO₂ per kWh, while it is 274g per kWh for oil, and 296g per kWh for electricity (SEAI).
- It is assumed that there will be no incremental heating for one third of 'new' remote workers, as this proportion of households would already have had someone working/remaining at home prior to the COVID-19 pandemic. Research in the UK by NatWest (EcoAct, 2020) found that one third of remote workers reported that their living arrangements included at least one household member who would normally remain home during the day, prior to the impact of COVID-19. In Ireland, CSO LFS data indicates that approximately 230,000

people have an economic status as 'engaged in home duties', while a proportion of people who are retired or unemployed (who may be more likely to be at home for parts of the working day) may live in a household where there is a remote worker.

- In terms of incremental electricity usage for lighting and appliances, it is likely that lighting will not be in use for all office hours as homes typically benefit from good levels of natural light (EcoAct 2020). The calculations used in this evaluation have used the same 10W allowance per hour of lighting as used by EcoAct.
- The average "in use" power load per desk has been calculated in the Chartered Institution of Building Services Engineers Guide F (2012) as 140W. This allows for a laptop or PC, monitor, phone and printer. It is assumed in this evaluation that remote workers do not use electricity for purposes other than working throughout the day, such as watching television at lunchtime or using the oven, for example.

Using all the above assumptions, this paper calculates that incremental household CO₂ emissions from heating are 12,021 tonnes, 27,022 tonnes and 3,315 tonnes respectively for gas, oil and electricity sources. Total emissions from increased electricity (lighting and desk) usage in the home comes to 7,459 tonnes. These figures are found in Table 5 below:

Table 5: Household emissions impact from remote work (2022)

Metric	Change in CO ₂ Emissions (tonnes)	Equivalent annual monetary benefit (€46 per tonne)	Percentage increase in total emissions of residential sector (2018)
Increased household gas usage (heating)	12,021	-552,961	0.13%
Increased household oil usage (heating)	27,022	-1,242,997	0.30%
Increased household electricity usage (heating)	3,315	-152,499	0.04%
Increased household electricity usage (lighting and laptop)	7,459	-343,123	0.08%
Total	49,817	-2,291,580	0.55%

The vast majority of the increase in lighting and desk electricity usage (6,961 tonnes) is likely to be offset by reduced electricity usage in the office through workers not charging laptops or printing there (workers cannot be in two places at once). This paper has not estimated any reductions in gas or electricity usage in the office other than "desk power" usage, as it is unclear how firms will react to remote working in terms of keeping/selling office space. It could be the case that offices will be open every day of the week, so lighting and heating will be used regardless of how many staff are in the office. Alternatively, it could be the case that firms close offices on certain days of the week, or downsize, which would result in environmental benefits.

Table 6 below shows the full remote work environmental cost-benefit analysis for the years 2022-2026. The savings made from reduced transport emissions exceed any extra household emissions, leading to net environmental gains from remote working. Over the full period, total economy-wide environmental benefits could reach €44.65m, all else equal. These figures are calculated using Public Spending Code Shadow Carbon Prices, and a discount rate of 4%. These figures do not consider any potential savings made through avoiding paying fines for legally binding

climate targets. To put the emissions savings into context, the transport related CO₂ savings estimated in this chapter – 207,262 – are the equivalent to 1.35% of the total annual emissions in the transport sector. Given that the transport sector is responsible for 19.6% of Ireland's total greenhouse gas emissions, reduced commuting as a result of remote working can reduce Ireland's total greenhouse gas emissions by 0.33% per year. This reduces to 0.25% when taking into account the increased household emissions caused by remote working.

Table 6: Environmental impact (tonnes CO₂) from remote work (2022-2026)

Year	2022	2023	2024	2025	2026	Full period
Reduced transport emissions	-207,262	-207,262	-207,262	-207,262	-207,262	-1,036,310
Increased household emissions	49,817	49,817	49,817	49,817	49,817	249,085
Reduced office emissions	-6,961	-6,961	-6,961	-6,961	-6,961	-34,805
Total environmental impact (tonnes)	-164,407	-164,407	-164,407	-164,407	-164,407	-822,036
Equivalent monetary benefit (€)	7,562,722	8,220,350	8,968,207	9,646,376	10,259,112	44,656,769

Future Data Availability

- **Census data:** Census data can be useful in terms of tracking changes in employment, commuting patterns, and demographic patterns. Directly attributing changes in regional populations or commuting habits due to remote work from Census data is problematic, partially due to the lack of focused 'remote working' questions in the Census.
- **NTA Household Travel Survey:** The NTA conducts the National Household Travel Survey at similar intervals to the Census. The survey provides detailed insights into travel and commuting behaviour such as number of trips being made; mode of travel, time of travel; distance, purpose of journeys and the relationships of these with demographic, socio-economic and locational factors, car ownership and type of community. Subject to confirmation, the next iteration of the survey will take place in 2022 and will include questions in relation to remote working.
- **NTA Modelling:** The NTA regularly models future transport scenarios utilising a range of data and factoring in potential and secondary and tertiary effects of changes in policy and practice. It is likely that the NTA will continue to develop a number of remote working sensitivity tests in the coming months.
- **EPA data:** In January 2021 the EPA/SEAI reported on the impact of COVID-19 restrictions on greenhouse gas emissions. The report noted that remote working was a significant contributory factor in the decline in carbon emission from transport measured in 2020, while also contributing to an increase in emissions from homes and the built environment. Assessing the exact causal impact of remote working remains challenging, however.

3.4 Impact on Public and Private Finances

3.4.1 Private Finances

Firstly, to assess cost savings due to reduced commuting, one needs to calculate the average fuel cost per kilometre. This price depends on both fuel price per litre, and average fuel consumption of a car. Official fuel consumption figures published by manufactures state that an average car has a fuel consumption of 21km/l (60mpg), although these figures are calculated under carefully controlled laboratory conditions. Research (van Gijlswijk & Ligterink, 2018) indicates that a more accurate, 'real', fuel consumption is 12km/l (35mpg). For the fuel cost, a price per litre of €1.70 has been used as again, online research finds this to be the current (as of January 2022) average price of fuel.

Multiplying these figures by the average commute distance in Ireland by car – 15km (CSO, 2016), by two (each way), and 100 (estimated number of days spent remote working per year), gives an estimated annual fuel cost saving of €413.46 per remote worker per year. This figure is just an estimation, and an individual's true cost saving could vary significantly depending on their commute distance, or whether indeed they even use a car. True cost savings are likely to be greater than this, as in cities, despite shorter (in km) commutes, cars burn fuel sitting in traffic, while average commuting lengths are significantly higher in rural areas, with the average commuting distance being more than 25km each way in Laois, for example.

In cities, a significant proportion of people use public transport to commute. In Dublin City, for example, public transport is used by 21.5% of commuters. A Luas, Dublin Bus, or DART ticket costs €2.30 each way with a Leap card (standard fare), which would result in annual transport cost savings of €460 for remote workers usually taking those modes. Again, for persons using public transport for longer journeys, potential cost savings because of remote working would be greater.

Secondly, home electricity and gas bill increases can be calculated using energy price statistics from the SEAI. For gas usage, average costs per kWh are €0.07, compared to €0.24 for electricity usage and €0.10 for oil. Using these statistics, and assumptions made in section 3.3.2, this paper estimates that that remote working is likely to lead to a €43 increase in gas heating bills per year, a €104 increase for households that use oil, and a €128 increase for households that use electric central heating. Taking an average of these figures, using the 45-45-10 household split discussed in the previous section, an average heating cost bill is likely to rise by €79 due to remote working.

It is also projected that all households will face a €30 a year increase in electricity bills due to increased lighting and "desk usage" costs. As mentioned earlier, Budget 2022 has already increased the amount of heat and electricity tax breaks employees can claim while remote working. Employees can now claim a tax deduction of 30% of the cost of vouched expenses for heat, electricity and broadband, an increase from 10%. The estimated costs to the Exchequer of such reliefs are discussed in the next section.

Table 7: Estimated changes in household costs from remote work

Direct household cost	Estimated cost saving per year (€)
Reduced commuting (car)	€413
Increased heating costs (national average)	-€79
Increased electricity costs (lighting and “desk” usage)	-€30
Total Direct Cost Impact	€304
Indirect Impact	
Time saving from commuting	€1,103
Total Impact	€1,407

An additional potential cost for households is increased broadband costs. It is difficult to assess the exact cost to households of increased broadband usage, as the vast majority would have had access to broadband already so there would be no incremental cost. A Commission for Communications Regulation (2020) survey found that 8% of households have experienced difficulty paying for their broadband in the last year, although the research did not indicate whether this was due to increased usage due to remote working or other factors such as reduced income. Households without pre-pandemic access to broadband would have been less likely to need it for work purposes too (e.g., retired people). For these reasons, a cost-benefit analysis of broadband costs has not been calculated.

Summed together, incremental commuting and heating and electricity costs come to a net average saving of €304 per household per year. While individual circumstances may differ, this provides some evidence that there is little need for government to provide further enhanced tax supports to incentivise individuals to remote work.

One other important point to note is that these savings for consumers are for the most part transfers from one party to another, and so cannot be defined as ‘economy-wide benefits’. For example, a reduction in fuel costs for households has a direct negative financial impact on car service stations’ revenues, and for government tax revenues. Similarly, for firms, cost savings with regard to office space, discussed in the next section, will come at a cost to commercial property landlords, and will also have an impact on government tax revenues.

A further benefit to individuals of remote working is time savings from commuting. Data from the CSO shows that average commuting times were 28 minutes per journey in 2016 – giving a total commute of 56 minutes per day on average. This is then multiplied by the value of travel time (€11.86) as given by the National Parameters Values Sheet (Transport Infrastructure Ireland, 2016) to ensure consistency with other studies. Assuming that remote workers work remotely for 100 days a year, this gives an average ‘saving’ per remote worker of 93 hours per year – the equivalent to €1,103. This is a potentially crude estimation of the travel time savings because of remote working, and ‘real’ benefits to workers could be much greater. For example, were workers to value their leisure time at the average wage rate (€26), this benefit could be as high as the equivalent of €2,400 a year. Furthermore, it may be the case that average commuting times have increased since the 2016 Census. Reduced commuting time is often cited by remote workers of one of the main benefits of remote working, so it is important not to underestimate the value it is given by workers. A survey by Auxillion of 500 remote workers in Ireland found that of the main

benefits of remote working, no commuting topped the list (53%). A CSO (2021) survey found that the most common activities undertaken by remote workers who felt they had more time on their hands were exercising, spending more time with family and friends, and doing household duties, highlighting the health benefits of remote working. Some 23% of respondents answered that they spend time on further education activities, while 10% answered that they volunteer. Although working longer hours is not a desirable output of remote working, in reality some of the travel time savings benefit may be attained by employers if employees choose to spend a proportion of that time working.

As discussed earlier, one potentially large benefit of remote working for businesses is that they can make cost savings if they move away from large-scale headquarters and reduce their spend on related costs such as electricity, heating, cleaning and catering. These cost savings will only materialise however if the savings are not eroded away by the costs associated with providing a remote working option to employees (NCPC, 2021). Previous IGEES estimates provide a useful indication as to the potential cost savings for firms. An IGEES (Hayes, 2020) study calculated that firms could save an average of €1492 per worker per year in rental costs in a 20% remote work scenario. Summing this benefit across the 210,000 estimated new remote workers across the economy, a total saving of almost €313m per year can be made for firms. Whether this saving would be invested in staff or technologies to improve productivity remains to be seen, however. Smaller firms in particular may struggle with the cost burden of providing a remote work option to employees (IT devices, HR costs etc).

Table 8: Estimated annual business accommodation cost impact of remote work

Direct Impact on Business Finances	Economy Wide Reduction in Office Costs (€)	Benefit per remote worker per year (€)
Office Space Savings	313,320,000	1492

3.4.2 Public Finances

Remote work will have an impact on public finances through many mechanisms. For example, reduced travel would lead to a reduction in fuel duty received and public transport revenues. On the flip side, the Exchequer can benefit from remote working through less environmental pollution/damage, potential reduced office space for Public Servants, increased tax revenue through increased labour market participation (& reduced welfare benefits), and potentially reduced spend on road/infrastructure maintenance.

Firstly, Revenue publish annual data on excise receipts by commodity. In 2019, total receipts from Hydrocarbon Light Oils (i.e. Petrol) were €568m with a further €47m coming from the additional carbon tax on Petrol. For diesel, these figures were €1.5bn and €192m respectively. These types of taxes are known as corrective taxes and are primarily designed to change consumer behaviour rather than raise revenue. It is therefore expected that these tax revenues will fall over time, especially with increased popularity of electric vehicles, and remote working may accelerate the pace of the fall.

Fuel duty reductions are possible to estimate using the assumptions made in the 'reduced commute' section. Fuel duties per litre are approximately 62 cents for petrol, and 52 cents per litre for diesel. Using a fuel economy estimate of 12.33 km per litre, one can estimate the total number of litres of fuel saved per year, and lost fuel duty revenue. This is estimated to be 115m litres and €65m respectively. On top of this, the Exchequer will lose VAT revenue (23%) on fuel too. This would lead to a further loss of €46m per year to the Exchequer. These figures can be seen in Table 9 below.

Table 9: Impact on Exchequer of reduced commuting from remote work

Direct Impact on Exchequer	Annual Impact (2022) (€)
Reduced Fuel Duty	-64,809,059
Reduced VAT	-46,067,911
Total Impact	-110,866,971

Another impact on the Exchequer is the impact of reduced use of public transport. As previously mentioned, the DoT and NTA could consider liaising with bus providers to see whether changes in schedules can be made if there is a fall in bus demand. If no changes can be made, the Exchequer may end up subsidising bus operators more for unprofitable routes, with few commuters on them. Due to this uncertainty, estimates as to the monetary impact on the Exchequer have not been calculated.

One potential benefit to the Exchequer of reduced commuting is that less money may have to be spent on resurfacing roads, and on dealing with the consequences of road traffic accidents if fewer vehicles are on the roads. PwC Netherlands have estimated that fewer traffic accidents as a result of home working will lead to a €594m a year saving to society per year in the Netherlands. This estimate was based on SWOV Institute for Road Safety Research data which suggests that each road death costs society €2.8m and each serious injury costs €300,000.

In Ireland, it is still unclear exactly how commuting patterns will change post-pandemic. Although it is likely that commuting will reduce across the country on average, in rural regions road traffic volumes could increase if remote workers move out of major cities, and it is still unclear the effect remote working will have on traffic volumes of other vehicles such as bicycles or e-scooters. Occurrences of both people moving to rural regions and people in cities using active travel commuting methods could increase if commuters have a weekly time-based 'budget' for commuting. On days in which they do go to the office, they may be more willing to use slower 'active travel' means to commute or travel longer distances due to the more infrequent nature of the journey. 'Active' modes of transport could cause more road traffic accidents if suitable cycling or pedestrian infrastructure is not in place. For this reason, potential savings from road reduced accidents and spend on resurfacing roads have not been estimated quantitatively.

Looking at non-transport-related savings, Figure 12 below shows the total SQM of office space currently leased by the Office of Public Works (OPW) for which leases will expire over the years 2020-2025, split by region (IGEES, 2020). Leased office space located in Dublin accounts for 98,421 SQM, or 58% of all leased space expiring over the 6-year period. One objective of the OPW is to increase the proportion of owned accommodation relative to leased accommodation. An increase in remote working within the Civil Service would lead lower overall demand for staff accommodation, which could translate into large cost savings for the Exchequer if leases are renegotiated or allowed to expire.

Figure 12: Civil Service lease expiries 2020-2025 by region

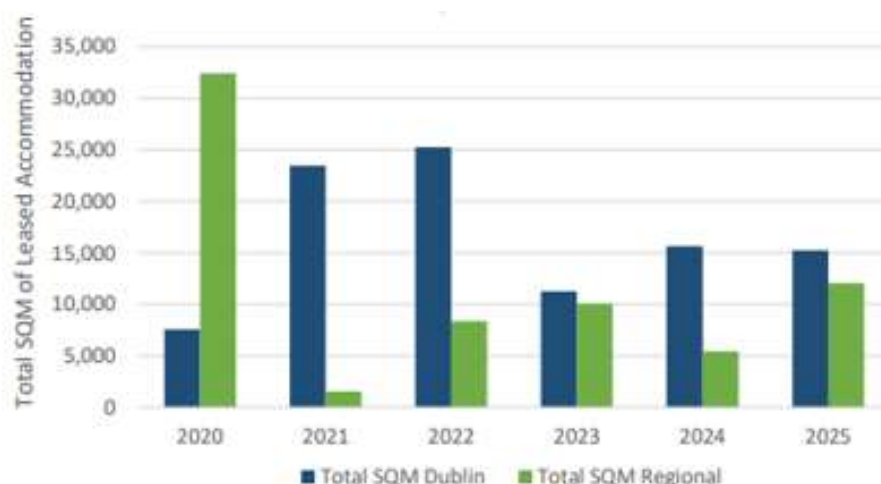


Table 10 below models potential cost savings per year for the Exchequer if 20% of rented accommodation up for renewal is not renewed per year. A price per square foot of €60 in Dublin, and €30 outside Dublin has been used in the calculations, based on previous IGEES studies and online research. A 4% discount rate has been applied as per Public Spending Code guidelines.

Over the next four-year period, the Exchequer could save over €32m if 20% of leases up for renewal are not renewed. It is important to note that leases up for renewal would have to be assessed on a case-by-case basis, and a policy of reducing 20% of rented space per lease may not be appropriate or possible. The policy would also depend on whether staff are willing to give up permanent desk space in favour of 'hot desking' or shared working spaces, where a proportion of staff work from home each day.

Table 10: Impact on Exchequer (Civil Service rent costs) from remote work (2022-2025)

Year	2022	2023	2024	2025	Full period
Total annual benefits - discounted	4,262,504.4	6,830,936.5	9,195,491.5	11,942,196.7	32,231,129.2

As discussed in section 3.1.3, remote working will potentially lead to increases in labour market participation as it allows people with caring responsibilities or disabilities, in particular, to work more flexibly. This in turn would result in an increase in income tax revenue received, and consumption taxes such as VAT. However, this impact is difficult to assess quantitatively due to the multitude of factors that affect employment rates of different groups at any given time. One would expect a modest increase in income tax revenues received due to increased incidence of remote work. Government spend may also be necessary to remove employment barriers for people with disabilities to begin with. It is also estimated that remote work tax reliefs will cost the Exchequer €17.4m per year in forgone income tax.

Another potential impact on the Exchequer of remote working is a reduction in commercial property rates received for local councils. Commercial rates accounted for approximately 30% of annual local authority income pre-pandemic, so were firms to close offices permanently, or downsize, this would have a sizeable impact on council budgets. Urban councils were particularly dependent on commercial property rates to fund spending. In 2020, across Ireland's 31 local councils, €1.6bn had been budgeted (pre-pandemic) for revenue from commercial property rates (Turley, 2020). Of course, not all firms will downsize or close offices post-pandemic, so the exact impact of remote working on commercial property rates is difficult to assess. An estimate of a 5% reduction in commercial property occupancy due to remote working would cost local councils a total of €80m per year. This figure is based on CBI estimates which predict that commercial vacancy rates could

increase to 12% by 2023 (central estimate). These costs are included in Table 9 below. This is a further consideration to factor in for policymakers when developing remote work policies. It may be the case that urban areas require more central government support to fund these losses than rural areas.

It is challenging to assess the overall impact of remote working on the Exchequer due to a lack of data needed to assess some impacts. Table 9 below summarises these costs and benefits to the Exchequer. On the one hand, increased levels of remote working will potentially lead to a large reduction in fuel excise duty and VAT revenue received, although these costs are uncertain as it is still unclear exactly how remote working will impact travel volumes. On the 'benefit' side of the equation, the Exchequer can potentially benefit from reduced spend on accommodation for public servants and receive more income tax revenue as labour market participation increases. Another potential benefit to the Exchequer, not quantified here, is productivity improvements of public servants. As remote working will become the norm for 20% of public sector employment (National Remote Work Strategy), the benefits of potentially improved worker efficiency (discussed in section 3.2) will apply to the public sector too.

The €754m total 'cost' to the Exchequer over 4 years should not be taken at face value due to the large number of unknown factors that can affect Exchequer revenues during this time (see Table 11). Furthermore, as mentioned previously, a large proportion of potential Exchequer 'costs' come from reduced tax revenue from corrective taxes. These taxes are primarily designed to change consumer behaviour rather than raise revenue, and receipts from which are expected to fall over time as behaviour changes.

Table 11: Total impact on Exchequer from remote work (2022-2025)

Year	2022	2023	2024	2025	Full period
Reduced spend on Civil Service accommodation	4,262,504	7,103,174	9,945,844	13,433,347	34,745,869
Reduced fuel duty income	-64,809,059	-64,809,059	-64,809,059	-64,809,059	-259,236,236
Reduced VAT income	-46,067,912	-46,067,912	-46,067,912	-46,067,912	-184,271,646
Reduced commercial property rates	-80,000,000	-80,000,000	-80,000,000	-80,000,000	-320,000,000
Remote work tax relief spend	-17,369,137	-17,369,137	-17,369,137	-17,369,137	-69,476,548
Reduced spend on resurfacing roads and road traffic accidents	?	?	?	?	?
Increased income tax revenue	?	?	?	?	?
Reduced spend on welfare benefits	?	?	?	?	?
Potential productivity improvements of Civil Servants	?	?	?	?	?
Total benefits- undiscounted	-203,983,604	-201,142,934	-198,300,264	-194,812,761	-798,238,561
Total benefits - discounted	-203,983,604	-193,406,667	-183,339,741	-173,187,835	-753,917,846

While many impacts on the Exchequer are hard to quantify, the impacts on businesses and individuals engaged in remote working are likely to be positive, overall. Households can make large cost savings through not commuting into the office, and businesses can similarly save money by reducing spend on office space. These effects will not be completely clear-cut however, and the true nature of cost reductions will depend on individual household and business circumstances. For example, city centre businesses that rely on high levels of office workers could suffer. The policy implications of this are discussed in the next section.

Chapter 4: Conclusions and Policy Implications

This section brings together the conclusions and policy implications reached in the above analysis. The conclusions and policy implications are split into the impacts: Labour Markets, Productivity, Regional Development and the Environment, and Public and Private Finances.

4.1 Labour Markets

This research has evaluated the impact of remote work on several labour market outcomes such as labour market participation (particularly for people with disabilities or caring responsibilities), and more generally, an increased incidence of remote working post-pandemic.

Firstly, the evaluation found both businesses and employees have post-pandemic plans to increase the levels of remote working compared to pre-pandemic levels. Survey results from the Dublin Chamber indicate that 81% of companies have plans to do so, while NUIG-WDC survey data suggests that 95% of employees would like to work from home at least some of the time post-pandemic. This strong preference of employees to work remotely post-pandemic should not be underestimated as a benefit. As well as giving workers direct financial benefits, discussed in section 3.4.1, remote working can greatly improve work life-balance, reduce stress, and allow workers to re-locate to regions where they otherwise would not have been able to. These 'quality of life' improvements associated with remote working are difficult to estimate quantitatively.

It is acknowledged that in some situations employees and employers may have opposing views as to the extent employees can work remotely. Legislation such as the 'Right to Request Remote Work' will set out a clear framework to facilitate remote and blended work options. It will ensure that when an employer declines a request, there are stated reasons for doing so and conversations with workers take place in a structured way (DETE,2021).

The evaluation also then examined the impact of remote work on labour market participation for people with disabilities and caring responsibilities. Theoretical evidence suggests that remote working should improve labour market outcomes for people in both groups. Latest LFS data shows that female labour force participation rates are at a record high, with some of this increase likely to have come from remote working. This is because remote work enables improved access to the workplace through greater flexibility in terms of time management, childcare and commuting options. Policies to improve care affordability and reduce barriers to work for people with disabilities should continue to be developed in parallel to ensure these gains can be made. A targeted approach in giving additional support to people with disabilities or low incomes could be considered, as 'start-up' costs such as broadband may present a barrier to these people entering the workforce. It should be noted that many low income earners are outside the income tax net, so existing interventions in the form of tax reliefs may not remove the barriers or assist those entering the workforce with low incomes.

Furthermore, it is important that firms do not mistakenly see remote working as a way to avoid offering the required workplace provisions for jobseekers and existing employees with disabilities. It should be stressed that the onus is on employers to suitably adapt workplaces, and the State should not in any way fund employers attempting to avoid responsibility for these provisions.

4.2 Productivity

Secondly, the evaluation examined the impact remote work is likely to have on employees' productivity. While theoretical evidence is mixed, survey data indicates that management and employees alike expect remote work to improve productivity. If past empirical studies are to provide an indication (Bloom et al. 2015), remote working could boost firm productivity by as much as 22%, although Bloom's study was undertaken in a specific setting (call centre workers in China) that may be particularly amenable to remote working. Productivity benefits can be achieved through two main mechanisms: worker efficiency and cost reduction. There is also evidence suggesting that remote workers are spending up to 60% of the time saved from commuting, working. Although

this is not a desirable output of remote working, realistically this would result in further output-related benefits to firms, although not due to increased productivity. There is a danger however that increased levels of remote working results in increased work-life conflict due to longer working hours which encroach on family time. Guidance such as the Right to Disconnect can mitigate this virtual presenteeism by giving employees the right not to routinely perform work outside normal working hours.

Overall, it is likely to be the case that remote working boosts productivity in certain occupations but reduces it in others. Because of this, individual firms and workers must make decisions as to whether they believe they are more productive working remotely. For potential benefits to be realised, it is important that employees and businesses are equipped with the necessary skills and expertise of remote work technologies. Efforts should continue to be made to ensure that all people with poor digital skills have access to remote work training and that workers in all regions have access to fast and reliable broadband connections to maximise these productivity benefits.

4.3 Regional Development and Environment

Section 3.3 of this report assessed the impact that remote working will have on regional development and on the environment. The impact on regional development is challenging to assess due to the variety of factors affecting development at any given time. One potential proxy for regional development is to assess house price growth. The evaluation found evidence to suggest that housing demand in more rural regions is outstripping that of cities. In the April 2021 NUIG-WDC survey, for example, 38% of respondents indicated that they might or would consider moving house because of remote working. The evaluation found there to be a clear relationship between recent house price and rent growth, and population density. If this urban to rural switch continues to materialise, ensuring workers in all regions have access to fast and reliable broadband connections will be particularly important for policymakers. Pillar Two of the National Remote Work Strategy already recommends exploring how the National Broadband Plan can be accelerated. Broadband Connection Points (BCPs) are a key element of the National Broadband Plan and will provide high speed broadband in every county in advance of the roll out of fibre to the home network. These BCP locations are in places of community importance, including remote work hubs.

This potential urban to rural switch could also have implications for labour markets – with high-skilled, high-paying remote roles being dispersed across the country, bringing with them their spending on consumer service industries such as retail, hospitality, cleaning, or transportation. This could potentially exacerbate inequalities in the labour market for lower-paid urban workers who rely on workers going into the office. However, equivalent gains could be made in more rural or suburban areas. Retail and hospitality industries may expand into suburban/rural areas because of the relocation of remote workers, helping to achieve the goals of Project Ireland 2040 of balanced regional development. This could create further housing demand in suburban and rural areas as consumer services workers move out of city centres to new places of work. Future research examining housing supply needs caused by remote working may be required if this impact materialises.

Next, this document evaluated the impact remote working will have on the environment – in particular, CO₂ emissions. It found that per year, predicted post-pandemic levels of remote working ‘save’ 164,407 tonnes of CO₂ a year, with an equivalent monetary saving of €7.6m. These potential benefits depend on a variety of factors, however, and the analysis assumed that there would be no secondary environmental effects such as remote workers taking more frequent, shorter trips during the day. The environmental benefits will also depend upon demographic factors, such as whether people move out of cities into rural areas where there is a lack of public transport. To mitigate any unwanted transport pollution effects, the NTA and DoT should continue to assess changing transport trends due to remote working. It may be necessary to alter public transport timetables to cater to changing demand. It will also be key to continue developing ‘green’ transport infrastructure to mitigate environmental impacts of any unintended secondary impacts such as increased frequency of short journeys near the home.

On the 'home pollution' side of the equation, this evaluation found that remote working will likely lead to a relatively modest increase of emissions generated in households due to increased heating and electricity usage by employees when working from home. This impact could be reduced by an increase in the use of remote working hubs, particularly as the Connected Hubs Fund 2021 provided funding to hubs to make them more energy efficient. It may also be useful for the SEAI to continue to increase awareness of Insulation Grants which can make households more energy efficient.

4.4 Public and Private Finances

The final impacts of remote work that were evaluated were its effect on public and private finances. The evaluation found that potential cost savings for employees could be large, with any increases in heating and electricity costs likely to be outweighed by a reduction in commuting costs. Estimated annual increases in heating and electricity costs are €79 and €30 respectively, while potential savings from reduced commuting (by car) are estimated to be €413 per household. Remote workers will also benefit from significant time savings from not commuting, improving work-life balance. This time saving benefit is found to be worth over €1,100 per year per remote worker, on average. Some of this benefit may be transferred to firms however if remote workers spend some of the time saved commuting, working. Firms too can make significant cost savings if they downscale expensive city centre offices. Previous IGEES estimates indicate potential benefits for firms to be approximately €1,492 per employee per year. This is on top of any benefits accrued through improved employee productivity.

In summary, this evaluation found that there are already significant private incentives for firms and individuals to engage in remote working. The economic case for introducing further enhanced supports for remote working through the tax system is therefore not a strong one (DFIN, 2021). For the majority of remote workers and for firms, private benefits are likely to outweigh the costs, indicating there is likely to be little market failure for the government to correct. There are also distributional effects to consider. Tax-breaks for remote workers are likely to mainly benefit high-earners, as remote workers are more likely to work in high-paying IT, Financial or Professional Service industries, while workers who cannot work remotely are likely to work in industries such as Retail, Caring or Hospitality, which tend to pay lower wage rates.

Existing policies to assist households, such as tax deductions on electricity, gas, and broadband, are low-cost, however. Revenue data from July 2021, suggests that for the period 1/1/2021 – 30/6/2021, 73,000 tax-deduction claims have been submitted, amounting to approximately €11m. In Budget 2022, the Minister of Finance announced that people who work remotely will see an income tax deduction of 30% of the cost of vouched expenses for heat, electricity and broadband. DETE have estimated that this will cost an additional €8.6 million per year, compared to the previous reliefs. An alternative option would have been to introduce a per-diem home tax relief. The Department of Finance estimated that a €1.50 per day tax relief for remote workers could cost the state approximately €21m per year. Due to their low cost, and in-line with government objectives to facilitate and support remote working, maintaining Budget 2022 tax reliefs into the future could be considered appropriate. The tax reliefs provide a signal to firms and workers that government encourages the use of remote working, and distributional effects of the tax policy are likely to be small. Targeted spend to further encourage remote working, such as supports to people with disabilities or digital training for those with poor digital skills, could be considered to reduce barriers to work for these groups.

Despite there being benefits to some firms and workers of remote working, these benefits will not be felt by everyone. Businesses profiting from high-office usage such as commercial landlords, petrol stations, and catering firms will suffer hardest. This paper also finds that the annual impact of remote working on the Exchequer is approximately €200m (undiscounted) per year. This figure does not take into account potential gains from increased income tax revenue, reduced welfare benefit costs, or reduced road traffic accidents so should not be taken at face value. The majority of the estimated loss in revenue will come from a reduction in corrective tax receipts, which by their nature are designed to reduce over time as consumption falls.

4.5 Evaluation and Impact Assessment

On balance, the evaluation found that remote working is likely to have a positive impact on the Irish economy and society. The societal benefits of remote working can potentially be large if it improves quality of life and reduces stress, as evidenced by some surveys. Out of the seven policy impacts discussed, remote working is likely to affect six of them positively: remote working incidence, labour market participation, productivity, environmental emissions, regional development, and private finances. The overall impact on Exchequer finances is currently indeterminable. The exact nature of costs and benefits will vary for different groups of people, and benefits for some groups come at a direct cost to others. These costs and benefits are summarised in the appendix (Table 12).

One must be cautious when interpreting cost-benefit analysis calculations as at times assumptions were made when estimating potential effects. This was due to a lack of data, the absence of a clear pre-pandemic baseline from which to measure outputs/impacts, and the absence of strong existing empirical literature to assess some impacts. Regression analysis and other econometric approaches were avoided, as a lack of reliable data would result in findings lacking robustness and consistency. In order to conduct this more robust analysis, a deep mine of quantitative data is needed regarding the impacts of remote working.

It is advised that the impacts of remote working are monitored on an ongoing basis as more data and empirical evidence comes to light. It may be useful to repeat this evaluation exercise in future as more data becomes available. This is particularly true for environmental impacts, which can be dampened by secondary impacts such as demographic changes caused by remote working. 'Future Data Sources' have been specified at the end of each section that can assist with monitoring impacts in future. This evaluation can therefore be used as a framework for assessing impacts in future. The National Remote Work Strategy itself aims to develop national data on the incidence and frequency, as part of a wider effort to improve data on flexible working arrangements, to provide an evidence base for future policy. This data will also be useful for future monitoring and tracking of remote work trends.

Appendix

Table 12: Summary of costs and benefits of remote working

Metric	Costs and Benefits
1. Change in Incidence of Remote Work	Benefits - Individuals have a strong desire to work remotely post-pandemic. - Firms too are willing to facilitate remote working post-pandemic (survey results from Dublin Chamber suggest 81% of companies have plans to enable increased remote working post COVID-19). Costs - Some firms (particularly SMEs) may struggle with the costs of offering a remote working option (in terms of equipment, technology, and/or HR policy).
2. Change in Labour Market Participation	Benefits - Increased labour market participation for people with disabilities and caring responsibilities. - Remote working can facilitate employment for people with disabilities by removing architectural and transportation barriers to work and can allow for greater flexibility around working hours. - Remote working can help address obstacles to female participation in employment due to the disproportionate burden of unpaid care work carried out by women. - Remote work enables improved access to the workplace through greater flexibility in terms of time management, childcare and commuting options. - Increased wellbeing, financial security and social inclusion. - Increased pool of talent for firms to choose from. Costs - People who are deaf and speak silently through a sign language interpreter don't show up in interfaces that use active speaker detection to choose which video streams to display, for example. This could have the effect of reducing visibility of people with disabilities, reducing morale and may hamper promotional prospects. - Firms must not attempt to use remote working as a way to avoid offering required workplace provisions for people with disabilities. The responsibility to provide a suitable working environment for all people, including those with disabilities is firmly on employers. - Evidence suggests remote working does little to improve the disability pay gap. - If the return to the office is gendered (i.e., women choose to work remotely more often than men), women could suffer from reduced visibility and as a result have fewer opportunities for promotion or salary increases
3. Change in Employee Productivity	Benefits - Increased employee wellbeing and reduced stress. - Reduced employee sickness. - Fewer distractions such as unnecessary interruptions or meetings with no clear agenda. - Potentially large cost savings for businesses if it allows them to move away from large-scale headquarters and reduce their spend on related costs such as electricity, heating, cleaning and catering -> freeing up resources for productivity enhancing innovation. - Reduced recruitment costs with reduced worker attrition and an increased pool of talent for firms to choose from.

	- Survey evidence suggests that, on average, managers and employees alike believe that remote working improves productivity. However, it could be the case that output is being conflated with productivity. Costs - Reduced managerial oversight, and ability to coach and set goals for workers. - Blurred boundaries between work and home life – potentially longer working hours, potentially mitigated by ‘Right to Disconnect’. - Reduced collaboration and innovation – potentially overcome by a hybrid approach to remote working. - Not suitable for some firms or individuals who are required to work in close proximity to onsite capital or provide face-to-face services. - Poor broadband access and/or quality in some regions could harm productivity.
4. Regional and Rural Development	Benefits - Remote working will result in high-paying, high-skilled remote roles being more geographically dispersed around the country, if firms allow employees to relocate across Ireland. This can help achieve Project Ireland 2040 goals of balanced growth between regions. - Increased pool of talent for firms to choose from, reducing recruitment costs. - Retail and hospitality industries may expand into suburban or rural areas as a result of remote working, boosting spending in these areas. This may come at a cost to footfall in city centres. - People gain the ability to live where they want to live rather than being restricted by office location. - For homeowners in suburban or rural areas, remote working could result in increased rents or house prices in these areas. Costs - There is a danger that lower-paid urban workers employed in personal services roles (e.g., food services, cleaning, security) that heavily depend on workers going to the office, could suffer. - For renters or non-homeowners in suburban or rural areas, remote working could result in increased rents or house prices in these areas. - Cooling of commercial property interest in urban areas, impacting commercial landlords and government tax revenues.
5. Change in Levels of Environmental Pollution	Benefits - Overall, taking into account reduced commuting emissions and increased household emissions, it is estimated that remote working could reduce Ireland’s total CO₂ emissions by 0.25%. - Reduced need to commute. It is estimated that total emissions savings from reduced commuting could reach 207,000 tonnes, the equivalent to 1.35% of total emissions in the transport sector. This has an equivalent monetary benefit of €9.5m per year. - Firms could make large greenhouse gas emission savings if they downscale from large headquarters. - Encouragingly, 47% of respondents to the CSO ‘Our Lives Online’ Pulse Survey answered that they take more trips by foot when working remotely, and 30% take more trips by bicycle, highlighting the health benefits of remote working, on top of environmental gains. - Air quality may also improve as emissions reduce because of remote working. - Congestion in urban areas may reduce. Costs - An individual’s weekly commuting kilometres may actually increase, even with working fewer days in the office, were they to move to a more regional or rural area because of remote working.

	• Remote working may lead to unpredictable increases in non-work travel during the day. • Households will increase heating and electricity usage when working from home. This paper estimates that CO2 emissions could increase by 50,000 tonnes because of this – 0.55% of total emissions in the residential sector.
6. Impact on Private Finances	Benefits • Overall, household cost savings could be large, as savings from reduced commuting are likely to outweigh costs from increased heating and electricity usage in the home. • This paper estimates that the potential savings from reduced commuting (for car commuters) could be €413 per year. • A further benefit to individuals is time savings from not commuting. Commuters can save an average of 56 minutes per day not commuting through remote working, giving an equivalent annual monetary benefit of €1,103. • Reduced commuting allows remote workers to undertake activities they otherwise would not get the opportunity to do (e.g., exercising, or spending more time with family and friends). • One potentially large benefit of remote working for businesses is that they can make cost savings if they move away from large-scale headquarters and reduce their spend on related costs such as electricity, heating, cleaning and catering. • An IGEES (2020) study calculated that firms could save an average of €1,492 per worker per year in rental costs in a 20% remote work scenario. Costs • Household cost savings will depend on individual circumstances. For people who previously walked or cycled to the office, overall costs could increase due to the increased need for heating and lighting in the home. • This paper estimates that potential costs from increased heating and electricity usage in the home could be €79 and €30 respectively. • A potential increased cost for households is increased broadband costs. These costs are likely to be greatest for disadvantaged groups who did not have access to broadband previously. • Smaller firms in particular may struggle with the cost burden of providing a remote work option to employees (IT devices, HR costs etc).
7. Impact on Exchequer	Benefits • Remote working results in reduced environmental pollution and damage, helping Ireland meet its climate targets. • A potential benefit to the Exchequer of reduced commuting is that less money may have to be spent on resurfacing roads, and on dealing with the consequences of road traffic accidents if fewer vehicles are on the roads. • An increase in remote working within the Public Service would lead lower overall demand for staff accommodation, which could translate into large cost savings for the Exchequer if leases are renegotiated or allowed to expire. • Over the next four-year period, the Exchequer could save over €32m if 20% of leases up for renewal are not renewed. It is important to note that leases up for renewal would have to be assessed on a case-by-case basis, and a policy of reducing 20% of rented space per lease may not be appropriate or possible. • Remote working will potentially lead to increases in labour market participation. This in turn would result in an increase in income tax revenue received, and consumption taxes such as VAT. It would also reduce spend on welfare benefits. • Productivity of public servants could increase due to remote working. The National Remote Work Strategy aims to make remote working the norm for 20% of public-sector employment. The Blended Working Policy Framework, published in March 2022, provides an overarching framework for how Civil Service organisations can facilitate remote working.

Costs

- Reduced travel would lead to a reduction in fuel duty received and public transport revenues. This paper estimates that reductions in fuel duty and VAT receipts caused by reduced commuting could be €110m per year. It is important to note that fuel duty is a corrective tax, however, and are primarily designed to change consumer behaviour rather than raise revenue.
- Commercial rates accounted for approximately 30% of annual local authority income pre-pandemic, so were firms to close offices permanently, or downsize, this would have a sizeable impact on council budgets. An estimate of a 5% reduction in commercial property occupancy due to remote working would cost local councils a total of €80m per year.
- It is estimated that remote work tax reliefs will cost the Exchequer €17.4m per year in forgone income tax.

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List of Acronyms

List of Acronyms	Meaning
CSO	Central Statistics Office
DECC	Department of Environment, Climate and Communications
DETE	Department of Enterprise, Trade and Employment
DFIN	Department of Finance
DoT	Department of Transport
DSP	Department of Social Protection
NUIG	National University of Ireland Galway
OECD	Organisation for Economic Co-operation and Development
WDC	Western Development Commission
NTA	National Transport Authority
SEAI	Sustainable Energy Authority Ireland
IGEES	Irish Government Economic Evaluation Service
NCPC	National Competitiveness and Productivity Council
DCEDIY	Department of Children, Equality, Disability, Integration, and Youth
DRCD	Department of Rural and Community Development
GHS	General Household Survey
LFS	Labour Force Survey
CBA	Cost-benefit Analysis
EU-SILC	European Union Statistics on Income and Living Conditions
SMEs	Small and Medium-sized Enterprises
CBI	Central Bank of Ireland

Quality Assurance Process

To ensure accuracy and methodological rigour, the author engaged in the following quality assurance process:

- ☑ Internal/Departmental review
- ☑ Line management review
- ☑ External review (Academia and Public Bodies)
- ☑ Working Group (Interdepartmental Group on Remote Working)